

new products

Focus on test and measurement

The descriptions of the new products listed in this section are based on information supplied to us by the manufacturers. PHYSICS TODAY can assume no responsibility for their accuracy. For more information about a particular product, visit the website at the end of the product description.

Andreas Mandelis

Handheld x-ray fluorescence analyzer

Bruker has introduced the second generation of its S1 Titan handheld x-ray fluorescence analyzer platform, with the company's protective detector shield now on all models. Among the enhancements is a weatherproof IP54-rated housing.

An integrated camera and a small spot collimator of 3, 5, or 8 mm are optional. The patented SharpBeam collimator technology remains standard. Its optimized geometry improves measurement precision, reduces power requirements, and increases battery life. The S1 Titan is available in four configurations. The 600 and 800 models use a thin-film window and Amptek's FAST silicon drift detector for analysis of up to 37 elements, including magnesium, aluminum, and silicon, with no need for a vacuum or helium gas flush. The 200 and 300 models are value analyzers with Si PIN detectors. *Bruker AXS Inc, 5465 East Cheryl Parkway, Madison, WI 53711-5373, <http://www.bruker.com>*

Multigas flow meters and controllers

Omega Engineering now offers FMA 7400/7500 elastomer-seal and FMA 7400/7500-SS metal-seal thermal mass flow meters and controllers for gas-flow measurement and control. The new series is designed to overcome a long-standing limitation that many thermal mass flow units have when changing gas types: A simple correction factor, such as the ratio of heat capacities between the calibration gas and new gas, cannot account for viscosity and density differences. To establish correction functions that account for both thermal and physical differences among gases, the FMA7400/7500 data-

base is built on thousands of native gas runs. According to Omega, that makes the series among the most accurate and flexible mass flow designs available. It is suitable for those who use thermal mass flow meters or controllers on a variety of gases, who need to change gas type frequently, or who must re-range while preserving gas measurement and control accuracy. *Omega Engineering Inc, One Omega Drive, P. O. Box 4047, Stamford, CT 06907-0047, <http://www.omega.com>*

USB spectrometer

The waveScan USB from A·P·E is a novel spectrometer with high spectral resolution over a total wavelength range from 200 nm to 2600 nm. It is potentially useful for spectral analysis of laser systems and in applications in which a wide spectral range and good resolution are essential. The standard spectral resolution is 0.2 nm; in certain wavelength ranges, the resolution is 0.1 nm or 0.5 nm. The fast data-refresh rate makes the waveScan USB suitable for optical systems in the visible and IR wavelength ranges. The control software displays and stores the measured spectra on a standard PC and gives access to all measuring and calibration features. Users can easily exchange the new optional fiber input for the free space input. *A·P·E Applied Physics & Electronics Inc, 45401 Research Avenue, Suite 141, Fremont, CA 94539, <http://www.ape-america.com>*

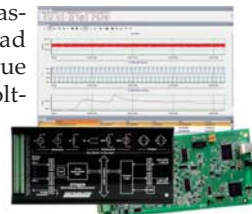
Software-enhanced spectrometers

The Exemplar series of spectrometers from B&W Tek now feature improved functionality and stability. The Exemplar and Exemplar LS have onboard data processing, USB 3.0 communication, and temperature compensation. The Exemplar Plus offers the same features and a thermoelectrically cooled CCD detector. Additions to the series include a trigger delay for synchronization and a stable burst mode for time-

of-flight measurements. Also added are pulse chain outputs for low-intensity signals, such as the multitriggering of a light source for a weak fluorescence measurement. The company's improved BWSpec spectral data acquisition software can be integrated with the Exemplar spectrometers. *B&W Tek Inc, 19 Shea Way, Newark, DE 19713, <http://bwtek.com>*

Multisensor module

Data Translation's new data acquisition module DT9829 supports a broad array of sensor types that includes thermocouples, resistance temperature detectors, and thermistors for measuring temperature; bridge-based and strain gauge sensors for measuring strain and load cell data, such as torque and pressure; and voltage, current, and resistance sensors for measuring electrical parameters. A sensor simply has to be connected at



an input, and all selections—for example, those necessary for excitation, cold junction compensation, and bridge completion—are supported by QuickDAQ software. No other circuitry or external components are needed. The module samples at 960 Hz, uses a 24-bit sigma-delta analog-to-digital converter to eliminate aliasing, and provides four isolated digital inputs and four open-collector digital outputs for notifications or control. Other software support includes drivers and interface tools for LabVIEW and MATLAB programming. *Data Translation Inc, 100 Locke Drive, Marlboro, MA 01752-1192, <http://www.datatranslation.com>*

Magnetometers

Bartington Instruments' new Mag-13 three-axis fluxgate sensors for high-precision magnetic field measurements have a bandwidth of 3 kHz and noise levels down to less than $4 \text{ pT}_{\text{rms}}/\sqrt{\text{Hz}}$ at 1 Hz. Available with cylindrical and square section enclosures, the sensors are environmentally sealed and shielded from electrical interference. They incorporate a test coil and temperature sensor. The product range includes two-part sensors for cryogenic, high-vacuum, and high-temperature applications and 2-mT and single-axis versions; the company is also developing other variations. *Bartington Instruments Limited, 5, 10 & 11 Thorney Leys Business Park, Witney, Oxon, OX28 4GE, UK, <http://www.bartington.com>*

Vacuum process gas analyzer

The compact Hidden HPR-30 differentially pumped mass spectrometer enables real-time measurement and control of gas composition in vacuum processes in the pressure regime 1 mbar to 10^{-7} bar. It addresses vacuum coating, plasma etching, sputter deposition, chemical vapor deposition and metal-organic CVD, and reactive-ion etching.



The system mounts directly to the process chamber. The close-coupled reentrant sample extractor tube is inserted directly into the process environment for fast response to status changes in the gas composition. The integral differential turbo-molecular pump ensures that the spectrometer continues to operate within a UHV environment through process pressures up to 1 mbar. The system is fully PC controlled and programmable for automatic operation and data reporting. Multiple input channels enable processing data such as pressure, temperature, and feed-gas admission or shutoff statuses to be integrated with the acquired mass spectra. *Hidden Analytical Inc, 37699 Schoolcraft Road, Livonia, MI 48150, <http://www.hiddenanalytical.com>*

Cryogenic probe station for DC measurements

Lake Shore Cryotronics now offers a fully configured, tabletop cryogenic probe station for scientists who need a basic unit. Model PS-100, a fully specified, pre-packaged platform, uses components from the company's TTPX probe station line. The new device has four-point tri-axial probing for applications that require sensitive, high-impedance DC measurements. It features the same performance specifications as

Lake Shore's TTPX probe station, with high-stability operation over the full TTPX temperature range. The PS-100 can be upgraded in the field with standard TTPX options, including those for low- and high-temperatures, support for larger sample sizes, vibration isolation, and backside optical access. *Lake Shore Cryotronics Inc, 575 McCorkle Boulevard, Westerville, OH 43082, <http://www.lakeshore.com>*

Digital controllers for measurement systems

New controllers from MMR Technologies come with a unified software suite compatible with Windows platforms from XP on. More compact than their predecessors, the controllers also have greater resolution and speed in data acquisition and processing. With the new software in the controllers, users can customize many of the interface options and easily export files to a wide range of formats. The K2000 digital temperature controller can be used as a manual controller, or it can be handled through MMR's software and computer control using RS232 or USB interfaces. The controllers allow for new experimental capabilities, including measuring the heat capacity of samples and monitoring two temperature sensors at once. *MMR Technologies Inc, 1400 North Shoreline Boulevard, Unit A5, Mountain View, CA 94043-1346, <http://www.mmr-tech.com>*



Software for real-time testing

The latest version of National Instruments' configuration-based software environment, NI VeriStand 2013, has an open, intuitive interface for developing real-time testing applications. It provides a common test framework for the embedded software development process. To maintain consistency across each phase, test components can be reused. The 2013 release can be integrated directly with NI DIAdem data management software. Users can configure automation scripts and report templates in DIAdem, and operators can log data, perform postprocessing, and generate reports with one click. New features and performance improvements include reduced deployment



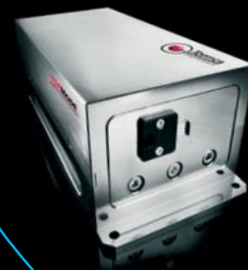
No more Mode-Hops

Challenging measurement tasks in interferometry, holography, scatterometry and Raman spectroscopy require top performance lasers. The spectral properties must remain extremely stable – a single mode-hop can spoil a measurement.

TOPTICA's new TOPMode lasers operate as easily as a HeNe, but also offer higher power and blue wavelengths. They set records in terms of power, coherence and wavelength stability. The unique Coherence-Advanced Regulation Method (CHARM) ensures continuous single-frequency operation and keeps the promise: **No more mode-hops.**

TOPMode @ TOPTICA

- ▶ 405 / 445 / 488 / 515 / 633 / 685 nm
- ▶ Up to 100 mW single-frequency power
- ▶ Coherence length > 25 m
- ▶ CHARM: mode-hop-free operation



www.toptica.com

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CoolFET®



Noise @ 0 pF: 670 eV FWHM (Si)
~76 electrons RMS

Noise Slope: 13 eV/pF with Low C_{iss} FET
11.5 eV/pF with high C_{iss} FET

Fast Rise Time: 2.5 ns

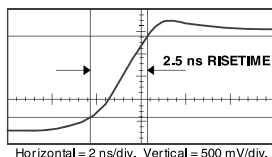
FEATURES

- Thermoelectrically Cooled FET
- 3 FETs to match detector
- Lowest Noise and Noise Slope
- AC or DC coupling to the detector
- Both Energy and Timing outputs
- Optional input protection
- Easy to use

STATE-OF-THE-ART A250



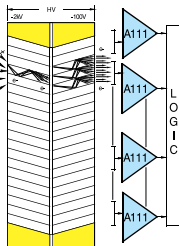
External FET
FET can be cooled
Noise: <100 e⁻ RMS (Room Temp.)
<20 e⁻ RMS (Cooled FET)
Gain-Bandwidth $f_p > 1.5$ GHz
Power: 19 mW typical
Slew rate: >475 V/ μ s



THE INDUSTRY STANDARD A111



A Microchannel Plate
(MCP) Array Connected
to Multiple A111s



AMPTEK - Your complete
source for high performance
preamplifiers and amplifiers



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times and faster real-time execution rates. Updated support, streamlined calibration, and the LabVIEW interface toolkit integrate models with NI LabVIEW software. National Instruments Corporation, 11500 North Mopac Expressway, Austin, TX 78759-3504, <http://www.ni.com>

Atomic force microscope

Park Systems has developed the Park XE15, a versatile atomic force microscope with a novel MultiSample scan. The large-sample microscope allows researchers and operators to automatically image and measure up to nine individual samples; it can easily scan samples of up to 200 × 200 mm. The scan process can be initiated after loading the stage with the multiple samples. The Park XE15 is suitable for laboratories that handle a diverse range of samples, researchers who conduct multivariate experiments, and failure analysis engineers who work on wafers. A multisam-



ple chuck that holds the individual samples allows operators to scan them under identical environmental conditions for improved data accuracy and reliability. Park Systems Inc, 3040 Olcott Street, Santa Clara, CA 95054, <http://www.parkafm.com>

Helium recovery units

Pfeiffer Vacuum has introduced helium recovery units (HRUs) for reclaiming helium used when testing parts for leak tightness. Helium is an essential part of customized leak detection systems. The HRUs recover the helium so it can be recycled, thus making the leak detection process as efficient and resource conserving as possible. Used helium recovery is particularly useful for meeting the environmental certification requirements under DIN EN ISO 14001. The HRUs are designed as standalone systems and can recover helium test gas regardless of the leak detection system manufacturer. Depending on the process

parameters, up to 98% of the inert gas can be recovered with helium concentrations between 10% and 95%. Pfeiffer Vacuum Inc, 24 Trafalgar Square, Nashua, NH 03063-1988, <http://www.pfeiffer-vacuum.com>

Sensor for E-band power measurements

Designed with a WR-12 flange connector, the E8486A waveguide power sensor from Agilent Technologies makes precise and accurate power measurements in the E-band spectrum of 60–90 GHz. According to



the company, the sensor is a suitable solution to meet the rapid demand in E-band telecommunications applications. With an 80-dB dynamic range option, the sensor can measure from -60 dBm to 20 dBm instead of the standard range of -30 dBm to 20 dBm. The E8486A is accurate even when measuring low-level signals, so it can measure power at the receiver side of point-to-point transceiver modules in addition to the module's output power. The sensor offers a high-standing wave ratio of 1.06 to minimize any measurement uncertainty caused by sensor and source mismatch. Agilent Technologies Inc, 5301 Stevens Creek Boulevard, Santa Clara, CA 95051, <http://www.agilent.com>

Parametric test system

Keithley Instruments has upgraded its S530 parametric test systems for semiconductor manufacturers to ensure they meet user needs for serviceability and measurement confidence. The new graphical user interface-driven tool expands diagnostic coverage for all system instrumentation and matrix pathways. Users can run the system verification tool to ensure the S530 is within its published specifications. The diagnostic and system verification tool generates comprehensive results files to make it easier to share information with Keithley field service personnel and to monitor trends in system health. Keithley Instruments Inc, 28775 Aurora Road, Cleveland, OH 44139, <http://www.keithley.com>