Each year, Test & Measurement World's editors present the Best in Test awards to products we think are particularly innovative or useful. Here, we present the 2006 Best in Test winners as well as 18 products worthy of honorable mention (p. 36). T&MW's editors narrowed this year's field from scores of deserving products, nominated by vendors, that were introduced between November 1, 2004, and October 31, 2005.

You can help determine which of the 12 Best in Test products will become the Test Product of the Year. To make your voice heard, visit www.tmworld.com/awards and cast your electronic ballot by January 18, 2006. We will announce the winning product in February and publish a description of it in our March 2006 issue.

In addition to the products described in this Best in Test section, keep in mind other worthy products identified by Test & Measurement World editors throughout the year in our Editors' Choice columns and Product Update features. You can read about these products at www.tmworld.com/product_showcase.

> VOTE ONLINE for the Test Product of the Year

WWW. TMWORLD.COM/AWARDS  ☆  DEADLINE: JANUARY 18, 2006

> Review more editors’ selections for 2005: www.tmworld.com/product_showcase
BOARD & SYSTEM TEST

ScanFlex boundary-scan platform
GOEPEL ELECTRONIC, WWW.GOEPEL.COM

Created to extend boundary-scan tests beyond the capabilities embodied in the traditional IEEE 1149.1 standard, the ScanFlex platform supports IEEE 1532 for in-circuit programming, IEEE 1149.4 for analog boundary-scan test, and IEEE 1149.6 for AC boundary-scan tests. The modular ScanFlex supports serial scan-pattern rates to 80 MHz on as many as eight independent test-access ports (TAPs).

A ScanFlex system includes a boundary-scan controller, TAP transceiver modules, and optional I/O modules to support additional test instruments. Prices start at $4000 for a configuration having two independent programmable TAPs plus support for 32 dynamic digital I/O signals, two analog I/O signals, three static digital I/O signals, and three trigger lines.

SPECTRUM ANALYZER

RSA3408A real-time spectrum analyzer
TEKTRONIX, WWW.TEKTRONIX.COM

The RSA3408A can display frequency-domain plots over time, a feature that lets you see how the frequency content of a signal changes. That’s important for viewing signals on devices such as cell phones, wireless LANs, radars, and RFID products that operate in several modes. The real-time feature lets you trigger an acquisition based on frequency anomalies that occur within any 36-MHz frequency range, and the analyzer can store any frequencies that occur within that range. Once it captures a series of signals, the RSA3408A lets you view them as time-correlated plots, so you can find which condition caused a particular frequency to occur. Prices start at $49,800.

X-RAY INSPECTION

XStation MX and ClearVue inspection system
TERADYNE, WWW.TERADYNE.COM

ClearVue 3-D x-ray imaging technology employs a patented off-center tomosynthesis imaging technique to enhance the detection of PCB solder and quality defects. ClearVue uses a stationary x-ray source and detector, avoiding rotating mechanical parts that can induce image errors with laminography and other 3-D x-ray techniques that employ a steerable x-ray beam in synchronization with a moving image detector and board under test. Teradyne reports an improvement in image clarity that enables users to achieve false failure rates of less than 500 joints per million inspected, with false calls reduced up to 40 times despite faster cycle times. A Teradyne XStation MX inspection system equipped with ClearVue technology costs from $500,000 to $600,000.

DATA ACQUISITION

PXI-5922 digitizer
NATIONAL INSTRUMENTS, WWW.NI.COM

Digitizing applications from audio to RF can take advantage of the PXI-5922 single-slot PXI card. Using NI’s FlexII ADC, the card can change its resolution with sampling rate. For example, the card can change from 16 bits at 15 Msamples/s to 18 bits at 10 Msamples/s to 24 bits at 500 ksamples/s. Starting at $6495, the PXI-5922’s FlexII ADC uses a 6-bit sigma-delta ADC that oversamples incoming signals at 120 Msamples/s. The multibit converter reduces noise and increases sampling rates over single-bit delta-sigma ADCs. A proprietary linearization technique results in the ADC’s wide dynamic range at the high end of its frequency range.
**Sapphire D-10 test system**

CREDENCE SYSTEMS, WWW.CREDENCE.COM

Built around a high-speed switched data network instead of a conventional bus-based implementation, the Sapphire D-10 leverages high-density CMOS integration combined with FPGA-based flexibility to provide a cost-effective test platform that performs wafer sort and final test for microcontroller, wireless-baseband, display-driver, and other low-cost consumer mixed-signal devices.

Priced from $169,000 for a digital system and ranging to $550,000 for a fully loaded configuration, the air-cooled system moves data between instruments and processors at sustained rates to 500 Mbyte/s. The Sapphire D-10 supports up to 768 digital pins and a full complement of analog and mixed-signal instruments—including industry-standard CompactPCI instruments as well as Credence in-house-developed implementations.

**DL9000 series oscilloscopes**

YOKOGAWA, WWW.YOKOGAWA.COM/TM

Yokogawa’s DL9000 1.5-GHz and 1-GHz digital oscilloscopes let you adjust the sampling rate and waveform memory to match the needs of your application. With a starting price of $10,995, the scopes are available with 2.5 Msamples of waveform memory on each of four channels, with an “L” version containing 6.25 Msamples on each channel. You can also select the number of acquisitions the instrument sends to the screen each second. In accumulate mode, the scope overlays up to 2000 acquisitions on the screen (at 2.5 ksamples per acquisition) that you can scroll through to look for signal peculiarities. The scopes have an array of analysis functions that include mask tests and eye-pattern measurements such as jitter.

**ZVT 8 vector network analyzer**

ROHDE & SCHWARZ, WWW.ROHDE-SCHWARZ.COM

The world’s first eight-port vector network analyzer operating to 8 GHz, the R&S ZVT 8, supports multiport and balanced-device measurements. Equipped with up to four independent sources, it can quickly perform swept multitone and intermodulation measurements on amplifiers and mixers. All ports can be driven in parallel, enabling simultaneous measurement of several DUTs or several paths of one DUT.

The ZVT 8’s designers managed to integrate the multiple sources and receivers while maintaining high isolation to achieve a dynamic range greater than 120 dB. Other features of the instrument, priced from 36,380 euros, include an output power of at least 13 dBm at all test ports and an electronic level sweep range of 50 dB.

**Lab Manager 4.1 software**

EDENTREE TECHNOLOGIES, WWW.EDENTREETECH.COM

Lab Manager lets you automate test beds used for testing optical and RF networks and their components. It works with a variety of optical and RF switches from Apcon, Calient Networks, Gillerglass, Racal, Universal Switching, and others so you can reconfigure test networks without having to remove and reinstall optical or copper cables. Price varies with number of switches supported, with typical prices from $60,000 to $100,000. You save time and money switching from one UUT or series of tests to another. Lab Manager communicates with switches through an Ethernet link, sending commands to each switch for connecting the appropriate ports. The software hides the specific commands from you, letting you configure switches from its user interface.
Electronics Design Automation

Encounter Test Architect software
CADENCE DESIGN SYSTEMS, WWW.CADENCE.COM

Employing a unified compiler-based approach to full-chip test, Cadence Encounter Test Architect allows design and test engineers to specify, compile, and verify all of the test structures for an entire chip using a single environment. Encounter Test Architect supports scan, compression, memory BIST, on-product clock generation, boundary scan, and I/O test to address designs containing multiple cores, hundreds of memories, and a complex hierarchy of RTL blocks.

Customers will benefit from Encounter Test Architect, priced at $250,000 per seat per year, with increased productivity, accelerated time to tape-out, reduced cost of test, and improved end-product quality. It makes unnecessary the use of disparate tools and homemade scripts to insert test structures into designs, thereby avoiding the costs and potential DFT errors that can affect traditional approaches.

Power

eLOAD series electronic loads
AMREL/AMERICAN RELIANCE, WWW.AMREL.COM

Designed especially for testing fuel cells, batteries, power supplies, solar arrays, and super capacitors, AMREL’s eLOAD line of electronic loads offers closed-case calibration, so you can calibrate the units from the front panel instead of returning them to the factory. The eLOADs are available with operating voltages up to 1200 V, current dissipation to 5000 A, and wattage to 150 kW. An oscillation protection circuit slows the load to eliminate oscillations, and it compensates for long lead lengths and connections that contribute to the inductance. The AMREL eLOAD uses a bus plate instead of a bus bar to cancel out the unit’s internal inductance. Prices start at $1675.

Wireline

OBR reflectometer
LUNA TECHNOLOGIES, WWW.LUNATECHNOLOGIES.COM

Luna Technologies’ OBR optical backscatter reflectometer is the first component-level and module-level reflectometer with backscatter sensitivity. It lets you diagnose fiber-optic components and assemblies. You can measure minute reflections with 125-dB sensitivity and 40-micron spatial resolution. This year, Luna enhanced the $90,000 instrument, enabling it to test components connected with up to 300 m of optical fiber with submillimeter resolution. The long length lets you interrogate long, complicated optical networks such as runs between amplifier modules. You can adjust the instrument’s dynamic measurement range from 0 dB to –130 dB. Software provides for data storage and manipulation.

Failure Analysis

NC-1 noncontact probe system
SUSS MICROTEC TEST SYSTEMS, WWW.SUSS.COM

With the NC-1, Suss MicroTec has developed a patented system to acquire voltage and timing information from a DUT without physical or electrical contact. This system enables no-load, in-circuit probing of functional devices without the use of optical emissions for detection and acquisition, thus promising continued functionality well beyond the 65-nm range.

The NC-1 also makes unnecessary the addition of probe points via focused ion-beam (FIB) structures, which, even with the use of active probes, can alter circuit performance. The system, with a base price of $750,000, can function from the top side or backside of a device through a barrier oxide layer. The resulting data is presented graphically as a voltage-over-time trace.