

# Test & MEASUREMENT WORLD®

THE MAGAZINE FOR QUALITY IN ELECTRONICS

## 2008 BUYER'S GUIDE

Vendor Contact  
Information Page 106

Professional Societies  
& Trade Associations

Page 113

CLICK HERE TO  
**RENEW**

your FREE magazine  
subscription

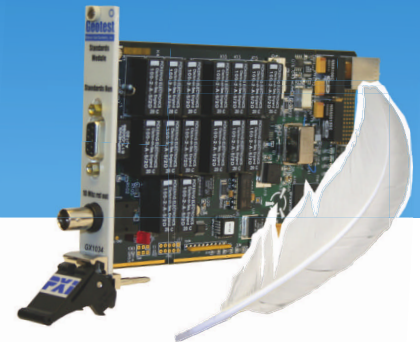
CLICK HERE TO  
**START**

a FREE e-newsletter  
subscription

# Carrying the burden of PXI System Certification?

**Geotest**  
Marvin Test Systems, Inc.

[www.geotestinc.com](http://www.geotestinc.com)



## Let us help lighten your load

The GX1034 3U PXI Standards Module features NIST traceable DC & AC voltage standards, resistance standards and a 10 MHz frequency standard. Decrease your system certification, logistics, and maintenance burden by incorporating the GX1034 into your PXI test system. With the GX1034 as part of your test system, a self-contained, in-system accuracy verification strategy can be deployed for recertifying your system's source and measurement instrumentation.

- EEPROM based, NIST traceable standards
- Built-in current source and DC measurement resources for system self-test support
- Built-in self test
- 3U, single slot configuration

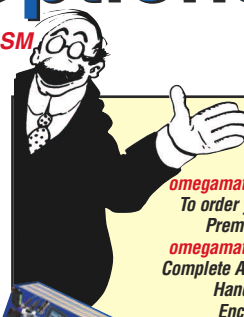




# Need More Automation Options?

Shop online at **omegamation.com<sup>SM</sup>**

100,000 process control and measurement products (and counting)



Visit—  
**omegamation.com<sup>TM</sup>**  
To order your FREE  
Premier Edition  
**omegamation.com<sup>TM</sup>**  
Complete Automation  
Handbook and  
Encyclopedia.  
It's loaded with thousands  
of Automation products  
and over 200 pages of  
technical reference!

Visit us at  
Semicon West  
2008 Booth  
No. 6163  
North Hall

Before there was OMEGAMATION<sup>TM</sup> there was Rube Goldberg

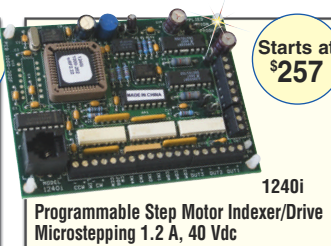


NEED MORE  
RUBE GOLDBERG  
CARTOONS?

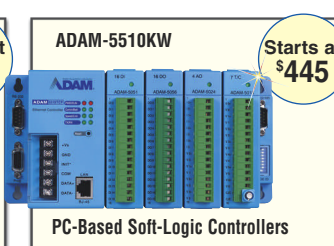
Go to: [www.omegamation.com](http://www.omegamation.com) for your daily dose of RUBE GOLDBERG!



Starts at  
\$24<sup>90</sup>



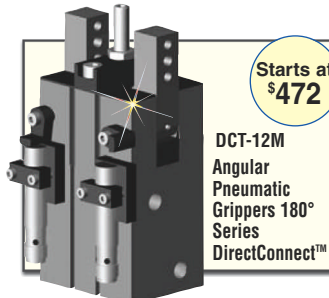
Starts at  
\$257



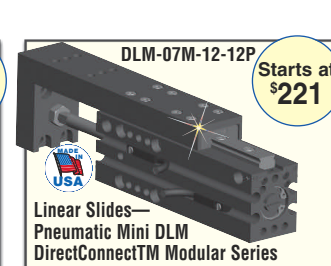
Starts at  
\$445



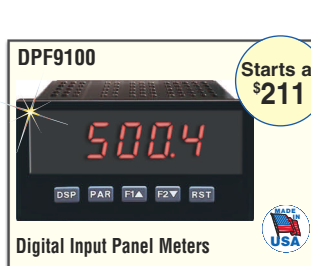
Starts at  
\$41<sup>75</sup>



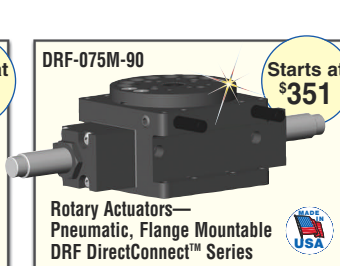
Starts at  
\$472



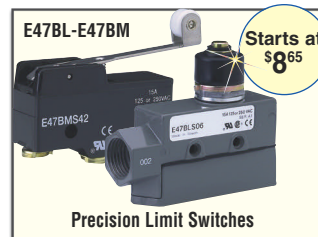
Starts at  
\$221



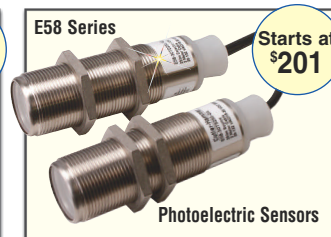
Starts at  
\$211



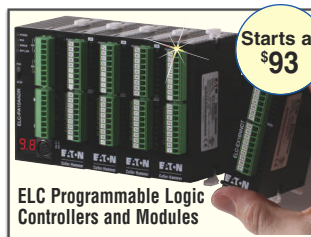
Starts at  
\$351



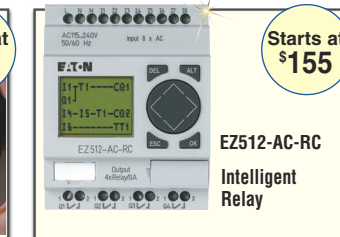
Starts at  
\$8<sup>65</sup>



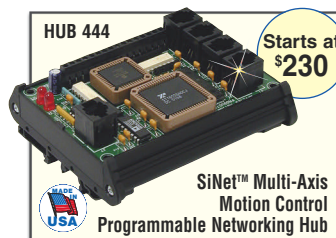
Starts at  
\$201



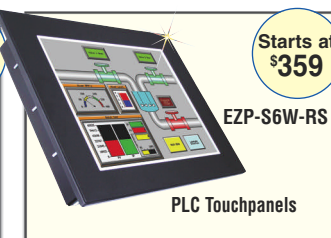
Starts at  
\$93



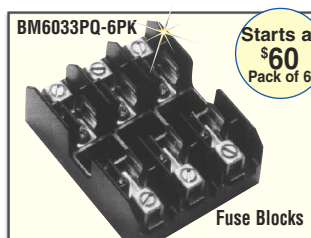
Starts at  
\$155



Starts at  
\$230



Starts at  
\$359



Starts at  
\$60  
Pack of 6



Starts at  
\$595

For Sales and Service, Call TOLL FREE  
**1-888-55-66342<sup>TM</sup>**  
**1-888-55-OMEGA**

Handbook Cover Art: Based on an original Norman Rockwell illustration © The Curtis Publishing Co.  
Rube Goldberg © Rube Goldberg, Inc.

Shop Online:  
[omegamation.com/608TM3](http://omegamation.com/608TM3)

Shop Online at  
**omegamation.com<sup>SM</sup>**  
**Ω OMEGA<sup>®</sup>**

© COPYRIGHT 2008 OMEGA ENGINEERING, INC. ALL RIGHTS RESERVED





# Pick a waveform

Any waveform

© Agilent Technologies, Inc. 2008



*Agilent 33220A/33250A  
Function and Arbitrary Waveform Generator*

**FREE**

Arbitrary Waveform Library  
[www.agilent.com/find/any\\_wave](http://www.agilent.com/find/any_wave)

If you see a function generator in use today, the odds are it's an Agilent. Why is Agilent the best-seller?

Versatility. Our generators produce the most powerful array of waveforms in the industry. They include all the functions you'd expect, with pulse and arbitrary waves of up to 64k points—accurate, stable, low noise. And the 33220A is the first arb function generator designated LXI compliant.

Right now, you can get our Arbitrary Waveform Library absolutely free. The library includes 20+ waveforms that can be used immediately or modified to suit your own applications.

It's your deal. Call today to learn more, or visit us at  
[www.agilent.com/find/any\\_wave](http://www.agilent.com/find/any_wave)

Agilent Authorized Distributors

**RS ELECTRONICS**  
888-852-7234

**Allied Electronics**  
800-433-5700

**Hensley Technologies**  
877-595-7447

**Instrument Engineers**  
800-444-6106



**Agilent Technologies**



# Test & MEASUREMENT WORLD®

JULY 2008  
VOL. 28 NO. 6

## CONTENTS

### 2008 BUYER'S GUIDE

#### 35 Instrumentation

- 35 Stand-Alone Test Instruments
- 45 Modular Instruments
- 52 Sensors
- 54 Software
- 55 Accessories
- 55 Third-Party Suppliers
- 56 Services/Labs/Test Houses

#### 59 ATE/DFT/BIST

- 59 ATE/Production Test/QA
- 62 ATE/DFT/BIST Software
- 64 Accessories
- 68 Third-Party Suppliers
- 68 Services/Labs/Test Houses

#### 73 Machine Vision & Inspection

- 73 Machine-Vision & Inspection Equipment
- 76 Machine-Vision Software
- 77 Third-Party Suppliers
- 77 Services/Labs/Test Houses

#### 79 Communications Test

- 79 RF/Microwave and Wireless Communications Test Equipment
- 82 Telecom/Datacom Test Equipment
- 99 Fiber-Optic/Electro-Optic Test Equipment
- 100 Third-Party Suppliers
- 101 Services/Labs/Test Houses

#### 103 Electrical & Physical Environmental Test

- 103 Environmental Test Equipment
- 103 ESD Control/Protection
- 103 EMC Test Equipment
- 104 Third-Party Suppliers
- 104 Services/Labs/Test Houses

#### 106 Vendor Contact Information

#### 113 Professional Societies & Trade Associations



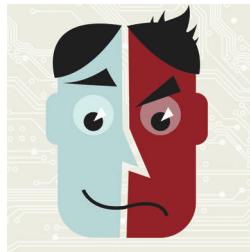
COVER BY: GORDON STUDER

#### DEPARTMENTS

- 7 Editor's note
- 13 Test voices
- 15 News briefs
- 19 Show highlights:
  - Sensors Expo & Conference
  - Design Automation Conference
  - The Vision Show
- 122 Viewpoint
- 8 Editorial staff
- 120 Advertiser index
- 121 Business staff

#### TECH TRENDS

- 23 STC to help test keep pace with design
- 25 Do you want data or results?



#### 27

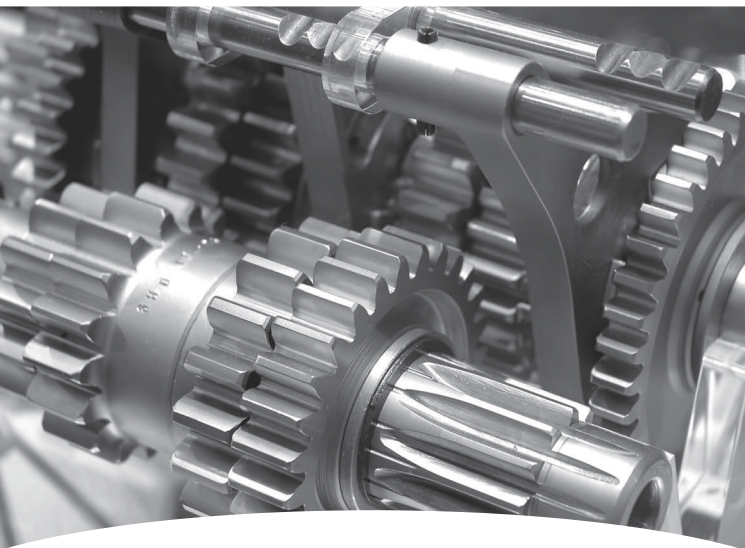
TOPS IN TEST

#### Test's split personality

For the leading companies that provide the instruments for electronics test, the past year produced sharply contrasting results.

By Lawrence D. Maloney,  
Contributing Editor

RENEW YOUR T&MW SUBSCRIPTION ONLINE: [WWW.GETFREEMAG.COM/TMW](http://WWW.GETFREEMAG.COM/TMW)



## Get your NEW 2008 Honeywell Sensing and Control Test and Measurement Sensors Catalog — free.

With load cells, pressure transducers, torque sensors, instrumentation, accelerometers and displacement sensors, we're offering innovation that's well apart. So from off-the-shelf products to uniquely customized solutions, trust Honeywell.

With highly accurate, stable sensors engineered for harsh environments, worldwide delivery and customer support, and industry-leading engineers, Honeywell Sensing and Control is your full-service, globally competitive answer. **Order your free catalog today: visit <http://sensing.honeywell.com/newcatalogTM> or call 1-800-848-6564.**

# Honeywell

Part Innovation.  
Part Engineering.  
Total Solutions.

Check out these exclusive features on the *Test & Measurement World* Web site:

## News from the International Microwave Symposium

Introductions at the MTT-S International Microwave Symposium (June 15–20, Atlanta, GA) included an RF power meter family, Mobile WiMAX test capabilities, a PXI digital RF signal generator, a WLAN test set for silicon developers, and an online ultra-high-density cable configurator.

[www.tmworld.com/ims2008](http://www.tmworld.com/ims2008)

## Blog commentaries and links

### Taking the Measure

Rick Nelson, Editor in Chief

- S-parameters are so yesterday
- Cell phones helping cell phones
- RF takes center stage at DAC as well as IMS

### Rowe's and Columns

Martin Rowe, Senior Technical Editor

- Keep your documentation close
- More on Bill and Dave
- Foolproof? Never

### Engineering Students at Work

Jessica MacNeil, Contributing Editor

- Dean Kamen leads by example
- Students call attention to plasma conversion technology
- FIRST program pays career dividends

[www.tmworld.com/blogs](http://www.tmworld.com/blogs)

## Take a T&M Challenge

Answer our latest oscilloscope challenge question, and you could win a TomTom ONE navigation system courtesy of Yokogawa, the challenge sponsor. *New in July: Data-Acquisition Challenge* sponsored by Data Translation.

[www.tmworld.com/challenge](http://www.tmworld.com/challenge)

## WHAT IS YOUR SURPLUS EQUIPMENT WORTH?

SHOULD YOU RECYCLE, REUSE, OR RESELL YOUR SURPLUS EQUIPMENT?

Visit the site that helps you determine what is best for you.

[www.tmworld.com/dispodog](http://www.tmworld.com/dispodog)



# WHAT YOU WANT, WHEN YOU NEED IT.



**Digi-Key**  
CORPORATION



**Hundreds-of-thousands\*  
of parts in stock. Visit  
[www.digikey.com](http://www.digikey.com) today  
to see how many!**

*Quality Electronic Components, Superior Service*

**Digi-Key Corporation purchases all product  
directly from its original manufacturer.**

**[www.digikey.com](http://www.digikey.com)  
1.800.344.4539**

\*New product added daily.  
© 2008 Digi-Key Corporation

701 Brooks Ave. South • Thief River Falls, MN 56701 • USA





## Caught in a balancing act between accuracy and price?

Only Keithley DMMs offer you the perfect balance of high precision and affordable cost.



**NEW** Model 2100 USB DMM offers 6½-digit accuracy, features, and speed at a 5½-digit price.

- **High performance family of digital multimeters** offers a wide range of price and performance options for virtually any application.
- Maximum resolutions from 6½ to 8½ digits and a complete set of built-in measurement tools to **simplify and improve even the most critical measurements**.
- High speed, low noise 28-bit A/D converter technology for **superior measurement precision, sensitivity, and traceability**.
- **Integrated switch mainframe options** simplify configuring complete test systems economically.

Go to [www.keithley.com/balance](http://www.keithley.com/balance) and try a demo.



**RICK NELSON**  
EDITOR IN CHIEF



## Science vs. technology

I had always wanted to study theoretical physics in college, but my parents thought that a more practical field, such as accounting, would provide a better return on their tuition investment. We compromised, and I studied electrical engineering.

Of course, there needn't be a sharp divide between pure science and applications-oriented engineering. The relationship between the two was addressed by Joseph H. Taylor, the 1993 Nobel Laureate in Physics, in a keynote speech at the IEEE MTT-S International Microwave Symposium on June 17 in Atlanta.

During his talk, titled "Symbiotic Relationships in Technology and Basic Science," Taylor invited the attendees to think about the relationship

### Technologists need mathematical descriptions of nature's laws.

between technology and the fundamental laws of nature. Technologists, he said, need to understand how the materials they use interact, and they need mathematical descriptions

of nature's laws to form extrapolations to predict how materials will respond in real-world applications. "It's a two-way street," he said. "Science enables technology, and technology enables science to get done."

Taylor commented that it's only been for the last couple of hundred years, commencing with Michael Faraday's experiments and continuing with Joseph Henry's work on mutual- and self-inductance, that we've had any idea of the relationship of magnetism and electricity. He said that researchers like Faraday and Henry were not engineers, but rather scientists doing research just to acquire understanding.

Indicating the tension that can exist between scientists and engineers, Taylor said that Henry, the first head of the Smithsonian Institution, built

the first telegraph, but as a professor, he didn't get the credit—that went to Samuel F.B. Morse.

Taylor noted that James Clerk Maxwell put into a mathematical framework the experimental observations of others. Maxwell's equations, he said, predict a radiative form of electromagnetic energy, which Heinrich Rudolf Hertz was later able to generate and detect. It wasn't long, Taylor said, until practical radios came into use.

Taylor described his work with the large radio telescope at Arecibo, Puerto Rico, recounting the 1974 discovery of a binary pulsar and the observations on that pulsar that confirm Albert Einstein's prediction that objects accelerated in a strong gravitational field emit gravitational waves. The pulsar's relativistic velocities of one tenth the speed of light, Taylor said, afforded an opportunity to test predictions that the pulsar's orbit should shrink by 1 mm per orbit.

"It was the ultimate in scientific chutzpah," Taylor said, "to think that we could make that measurement from 25,000 light-years away." But he added that very-high-bandwidth, low-noise receiver front ends developed by engineers helped make the feat possible. Such discoveries, he concluded, would not have been possible without healthy and continual interaction between scientists and engineers.

I would agree with that. My only quibble might be in Taylor's drawing of such a sharp line between pure science and applied engineering. Samuel F.B. Morse was not an engineer; he was a painter who had a serendipitous encounter with the experimenter Charles Thomas Jackson that led to a practical telegraph. And Taylor did acknowledge that there is crossover in which scientists may turn to engineering, and vice versa. The important thing, he said, is to find a position for which you can't wait to get up in the morning and get to work. T&MW

> > > POST YOUR COMMENTS AT [WWW.TMWORLD.COM/BLOG](http://WWW.TMWORLD.COM/BLOG).

# Switching?

Controlled via  
**TCP/IP**



**Products span DC to 40GHz**



**Series G2**

Rack Mountable Switching Systems

## It's what we do!

- 1000's of standard plug-in modules available
- Built-in Ethernet, GPIB and Serial ports with LXI support
- Hot-swap redundant power supplies
- Field upgradable firmware
- Rugged aluminum construction
- Various sized units to meet most needs
- Built-in rack and chassis slide mounting
- Solid-state, relay, digital or fiber optic switching
- Built-in forced air cooling with monitoring
- Field proven performance and reliability
- BITE for superior performance
- International wide-range AC power capacity
- Intelligent front panel illuminated control keypad
- Long life high contrast VFD display
- Hinged front panel access to power supplies
- Free LabView VISA drivers
- Excellent product support and quality



**Audio & Video - Digital - RF/IF  
ATE - Telemetry - Microwave**

**US Universal  
Switching  
Corporation**

**State-of-the-Art Switching Solutions**

7671 North San Fernando Road  
Burbank, CA 91505 USA

8 JULY 2008



Call to get your  
**FREE catalog today!**

Phn +1 818-381-5111  
Fax +1 818-252-4868  
Email sales@uswi.com  
Web uswi.com

**Test &  
MEASUREMENT  
WORLD**

### EDITORIAL STAFF

**Editor in Chief:** Rick Nelson  
rnelson@tmworld.com  
ATE & EDA, Inspection, Failure Analysis, Wireless Test,  
Software, Environmental Test

**Managing Editor:** Deborah M. Sargent  
dsargent@tmworld.com

**Senior Technical Editor:** Martin Rowe  
mrowe@tmworld.com  
Instruments, Telecom Test, Fiber-Optics, EMC Test,  
Data-Analysis Software

**Assistant Managing Editor:** Naomi Eigner Price  
neprice@tmworld.com

### Contributing Technical Editors:

Jon Titus, jontitus@comcast.net  
Bradley J. Thompson, brad@tmworld.com  
Steve Scheiber, sscheiber@aol.com  
Greg Reed, tmw@reedbusiness.com  
Richard A. Quinnell, richquinnell@att.net

**Editorial Intern:** Jessica MacNeil

**Publisher:** Russell E. Pratt

**Senior Art Director:** Judy Hunchard

**Senior Art Director/Illustrator:** Dan Guidera

**Director of Creative Services:** Norman Graf

**Reed Business Information-US,  
A Division of Reed Elsevier Inc.**

**CEO:** Tad Smith

**President, Boston Division:** Mark Finkelstein

**CFO:** John Poulin

### HOW TO CONTACT T&MW

#### EDITORIAL:

225 Wyman St.  
Waltham, MA 02451  
Phone: 781-734-8423  
Fax: 781-734-8070  
E-mail: tmw@reedbusiness.com  
Web: www.tmwworld.com

#### SUBSCRIPTIONS:

For address changes, cancellations, or questions  
about your subscription, please contact:

Customer Service  
Reed Business Information  
8878 S. Barrons Blvd.  
Highlands Ranch, CO 80129

Phone: 800-446-6551  
Fax: 303-470-4280  
E-mail: subsmail@reedbusiness.com  
Web: www.getfreemag.com/tmw

#### CIRCULATION:

Jeff Rovner  
303-265-6266  
jrovner@reedbusiness.com

#### LIST RENTAL:

Hector Gonzalez  
630-288-8368  
hector.gonzalez@reedbusiness.com

**GENERAL AD SALES AND MARKETING:**  
800-438-6597

#### REPRINTS:

The YGS Group  
800-290-5460, ext. 149;  
tandmw@theygsgroup.com

**Subscribe to T&MW online:**  
[www.getfreemag.com/tmw](http://www.getfreemag.com/tmw)

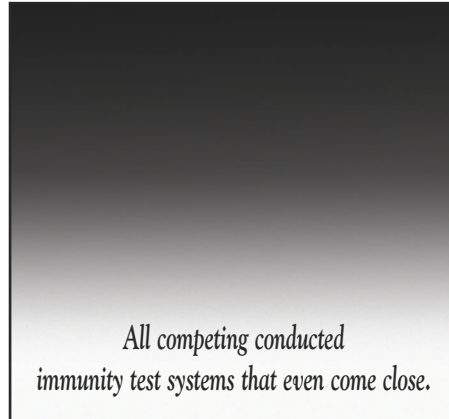
 Reed Business Information



# Introducing The Conducted Immunity Test System ... And Its Closest Competition.



One of two CI Systems from AR.



All competing conducted  
immunity test systems that even come close.

The new CI self-contained Conducted Immunity Test Systems from AR stand alone. No competing products even come close. Not when it comes to ease of use, flexibility, reliability, or any other features that really matter. Among the features that set the CI Systems apart are a higher level of accuracy, a wider sensitivity range, excellent speed, and the ability to do accurate margin testing. The CI Systems make it easy to conduct customized tests; and reports are generated directly into Microsoft® Word or Excel.

## AR Components Can Be Used Independently

Of course, it's the AR components that make these systems so accurate and reliable. The AR amplifier and signal generator are state-of-the-art equipment. And you can use them independently, apart from the system. So when you purchase a CI System you also get a stand-alone AR amplifier and signal generator! Talk about value!

Two CI Systems are currently available and more are on the way:

Model CI00250 (75 watts, 10 kHz – 250 MHz) – Provides complete testing solutions to the following standards: EN/IEC 61000-4-6, IEC 60601-1-2, EN 50130-4, EN 61000-6-1/2, and EN 55024.

The CI00400 (100 watts, 10 kHz – 400 MHz) – Designed to test to MIL-STD-461D & E CS114, DO160D & E, EN/IEC 61000-4-6, IEC 60601-1-2, EN 50130-4, EN 61000-6-1/2, and EN 55024 standards.

AR supplies a multitude of unique RF solutions to some of the best-known companies worldwide. Our products are backed by the strongest, most comprehensive warranty in the industry, and a global support network that's second to none.

To learn more, visit [www.ar-worldwide.com](http://www.ar-worldwide.com) or call us at 215-723-8181.

Visit us at IEEE EMC 2008 – August 18-22, Cobo Center, Detroit, MI, Booth 306

ISO 9001:2000  
Certified



## rf/microwave instrumentation

Other **ar** divisions: modular rf • receiver systems • ar europe

USA 215-723-8181. For an applications engineer, call 800-933-8181.

In Europe, call ar emv United Kingdom 441-908-282766 • ar emv France 33-1-47-91-75-30 • emv Germany 89-614-1710 • emv Netherlands 31-172-423-000

Copyright © 2008 AR. The orange stripe on AR products is Reg. U.S. Pat. & TM. Off.

# T&M Milestones

## Rohde & Schwarz: 75 Years of Driving Innovation

**Higher, faster, more precise – the T&M industry is almost Olympic in nature, and not only since yesterday. Numerous new technologies and increasingly higher frequencies are challenging T&M. For 75 years now, Rohde&Schwarz has been in business and successfully combining seasoned know-how with strong innovation. And the company's T&M solutions for wireless communications, general electronics and microwave are often ahead of their time. A historical snapshot.**

The present – 2008: Rohde&Schwarz is a leading global supplier of T&M equipment for wireless communications and electromagnetic compatibility (EMC). Every second mobile phone is produced or developed using T&M equipment from the Munich-based electronics group. Manufacturers of electronics around the world rely on high-quality products from the T&M expert – regardless whether in spectrum and network analysis, signal generation or power measurement. More than 70 subsidiaries and offices stand ready with direct customer care, and the company's great manufacturing depth translates into maximum quality and precision. But how did all of this start?

We glance back to the year 1932. Even before founding the company, Dr. Lothar Rohde and Dr. Hermann Schwarz developed their first T&M solution: a dissipation factor meter. Starting in autumn 1933, the company launched operations under the name „Physikalisch-Technisches Entwicklungs-

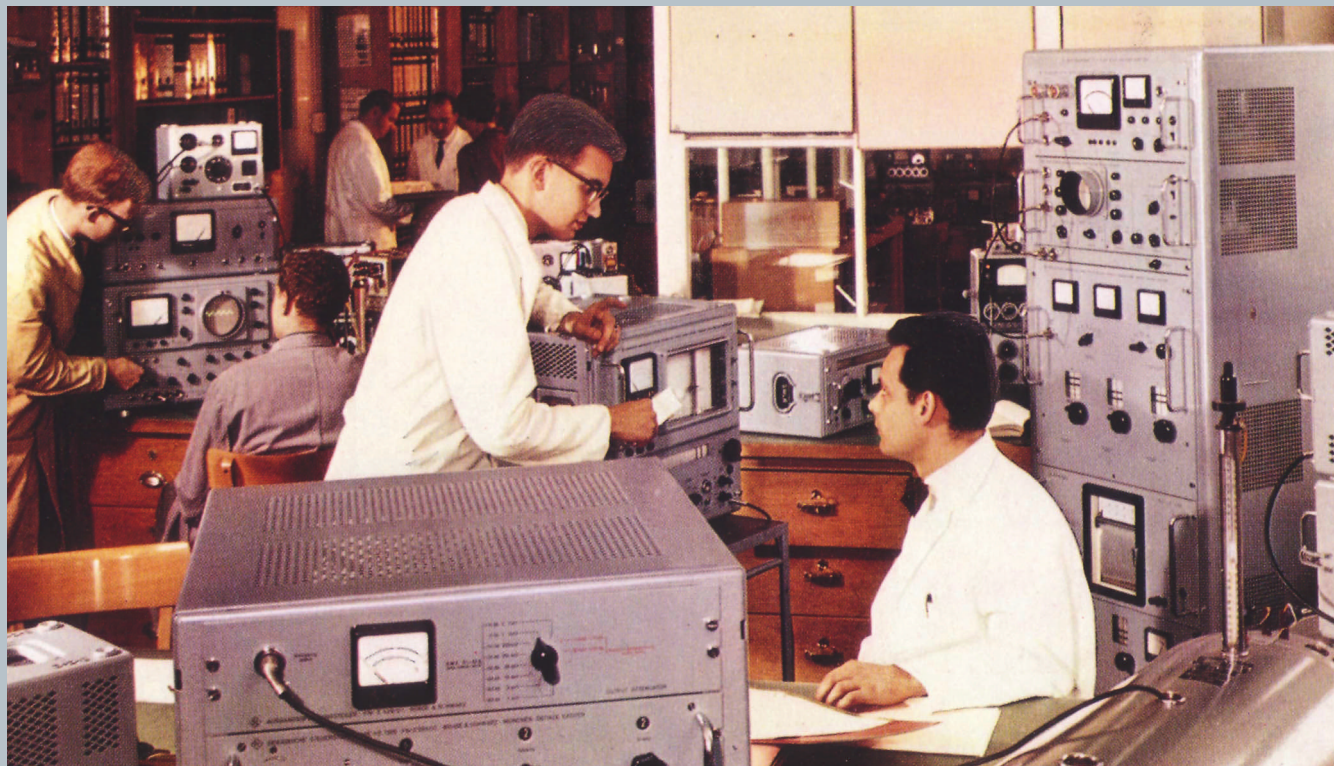
labor Dr. L. Rohde und Dr. H. Schwarz“ – now known as Rohde&Schwarz since the 1940s. The company's first best-seller was the WIP interference wavemeter from 1933, sold throughout the world for more than 20 years.

Since its early days, the company's objective has been to provide customers with cost-efficient solutions and to achieve high integration. To avoid the use of numerous separate test instruments, the company in 1952 developed the URI electronic multimeter – a small, ten kilogram tester. Likewise in the 1950s, the T&M expert became a pioneer in network analysis: The first vector network analyzer worldwide finally made it possible to measure the magnitude and phase of S-parameters and to display them in a Smith chart.

A further highlight from this era was the compact SWOB wideband sweep generator, whose successors were considered a standard in TV set alignment for years to come.

Germany's Wirtschaftswunder (economic miracle) and the continued general evolution of technology led to a strong increase in the number of electronic components and instruments over the following decades. EMC measurements gained in significance. Rohde&Schwarz responded logically by using its expertise in receiver development as a springboard to the field of EMC T&M. In 1987/88, for example, the company equipped Europe's most advanced and largest EMC anechoic chamber in Greding, Germany.

During this phase, Rohde&Schwarz step-by-step gained a solid foothold in further T&M fields. In 1985, the UPA audio



Rohde & Schwarz not only develops and sells T&M instruments— it also uses them in its own labs (picture from 1963).

analyzer rapidly became a standard in audio engineering. In 1982, the SWP became the first synthesized sweeper on the market. And the high-quality SMPC frequency synthesizer also won over customers worldwide with its low single side-band phase noise and high spurious suppression. The company's entry into spectrum analysis followed in 1986 – and, to the surprise of the competition, Rohde & Schwarz bounded into the major leagues in one leap with its FSA. Plus, the story of power and voltage measurement – one of the company's business fields since its founding – stands out owing to numerous innovations. In the mid-1980s, for example, a data memory for calibration data was directly integrated into a power sensor for the first time. In 2002, the world's first USB power sensors were brought to market.

Finally, Rohde & Schwarz has for decades been playing a major role in T&M equipment for the wireless market. By introducing the first GSM system simulator in 1991, the company helped GSM conquer the world. The system helped determine whether mobile phones performed to standard. Since then, test systems and testers from Munich have accompanied all major developments in the wireless industry. This brief journey through seven and a half decades is now nearing an end. Manufacturers of electronics and wireless companies know Rohde & Schwarz as a supplier of customized solutions. The company's signal generators offer dual-path capability and generate spectrally ultra-pure signals. In network analysis, the product portfolio offers the

economy-priced R&S ZVL vector network analyzer as well as the high-end model up to 50 GHz with four-port architecture. The R&S ESIB and R&S ESU have become fixtures in EMC labs as reference standards for compliance measurements. Users can also find everything they need in spectrum analysis – from a handheld instrument for mobile use all the way up to a 67 GHz analyzer. And in the field of T&M equipment for the wireless sector, Rohde & Schwarz stands shoulder-to-shoulder with other pioneers in next-generation wireless, which is already taking shape with WiMAX and 3GPP LTE. In 2008, the company's sixth-generation wireless testers appeared on the market: The R&S CMW500 embodies decades of combined know-how.

A success story that is far from over.

#### Contact information:

Customer Support America:

Telephone: 1-888-TESTRSA (1-888-837-8772) selection 2

E-mail: [customer.support@rsa.rohde-schwarz.com](mailto:customer.support@rsa.rohde-schwarz.com)

Customer Support Asia:

Telephone: +65 65130 488, Fax: +65 68461 090

E-mail: [customersupport.asia@rohde-schwarz.com](mailto:customersupport.asia@rohde-schwarz.com)

Customer Support Europe:

Telephone: +49 180 512 4242, Fax: +49 89 4129 63778

E-mail: [customersupport@rohde-schwarz.com](mailto:customersupport@rohde-schwarz.com)

**To learn more about the company's history, visit:**

[www.rohde-schwarz.com/ad/](http://www.rohde-schwarz.com/ad/) 75



# Cytec, Making Switching Easier.



For over 25 Years Cytec Corporation has been a leading manufacturer in modular switching systems. With over 300 types of innovative and progressive products we provide a comprehensive assortment of standard and custom switching systems. Through extensive research, testing, and customer feedback we are able to supply industry leading quality and value to all of our customers. All products come with our 5-year warranty, and our competitive pricing provides unparalleled value. Our knowledgeable and experienced sales team is eager to help you find a solution to even the most difficult engineering challenges.

**So for your next project, choose Cytec.**



**CALL OR VISIT OUR WEBSITE FOR A FREE CATALOG**

## **Programmable Switching Systems**

for Automatic Test, Data  
Acquisition, Communications  
and Controls



2555 Baird Road, Penfield NY 14526  
800.346.3117 • 585.381.4740  
[cytec-ate.com](http://cytec-ate.com)

[An exclusive interview with a test engineer]

## From design to production

**S**tewart Wilde is a test-development engineer at International Rectifier. Working in the company's Durham, NC, design center, Wilde is responsible for test programming and design verification for packaged ICs used for power-monitoring and pulse-width-modulation (PWM) applications. Senior technical editor Martin Rowe spoke with Wilde by phone.

### **Q: When do you get involved in a new product design?**

**A:** I start just after a part has a product objective data sheet, which is a list of specifications that a designer wants to achieve. I begin to formulate a test plan based on specifications for each IC pin. I also take part in design reviews, where I can suggest design-for-test improvements.

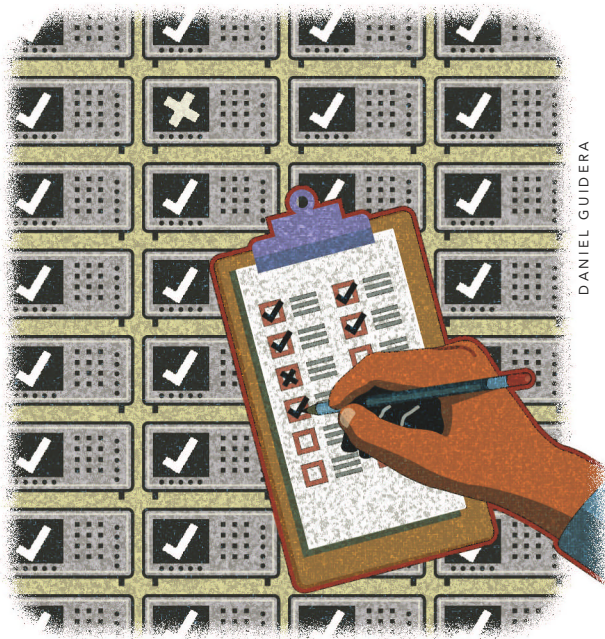
### **Q: What's involved in developing a test?**

**A:** The test plan spreadsheet contains the parameters for each test. We develop tests for Credence ASL series ATE systems, using the Credence test executive to write test sequences that call out test code. The test code makes calls to test functions provided by the ATE manufacturer. They include force, measure, arm, and trigger.

Our code also maps these functions to the appropriate device pins. We use Microsoft Visual C++ to write the code needed to test each IC pin and debug on one of two ASL systems in the lab. A test plan and code takes several months to develop.

### **Q: What tests do you perform in design verification?**

**A:** Tests include measuring current consumption, input bias current, reference voltages, and PWM duty cycle. We also measure  $R_{DS(on)}$  for field-effect transistor (FET) devices. We measure these parameters over a specified temperature range, looking for unacceptable drift. To perform voltage and current measurements, we use the ATE system's voltage and current sources.



DANIEL GUIDERA

Test parameters range from 20 V at 30 mA to 100 V at 100 A.

The tests are designed to help us find inconsistencies that a design engineer can't predict during design simulation. Sometimes, we run tests that the designer didn't request but we know are necessary based on prior experience.

### **Q: How many devices do you test in a design validation?**

**A:** We typically test three lots, each with at least 30 devices. The lots are produced at the same factory, but at different times. We look for variations that could be related to the manufacturing process. We also look for measurement variations from devices tested several times with the same test fixture. Then, we change the load board and analyze measurement variations because component tolerances and calibration between the test systems can affect measurements. If we find inconsistent test results, then we may have to write new code. We must make the test results repeatable in production. Furthermore, we've found timing variations between the ASL 1000 and ASL 3000 ATE systems, so we have to compensate for that.

### **Q: Do you reuse code written for design verification in production?**

**A:** Yes, we reuse most of the test code for production because the production line uses the same ATE systems that we use in the design center. **T&MW**

Every other month, we will publish an interview with an electronics engineer who has test, measurement, or inspection responsibilities. If you'd like to participate in a future column, contact Martin Rowe at [mrowe@tmworld.com](mailto:mrowe@tmworld.com).



# The New Oscilloscope Experience Is Here



Quick Insight. Deep Insight.  
Experience the New LeCroy Oscilloscopes.

[www.insightwithconfidence.com](http://www.insightwithconfidence.com)

**LeCroy**

[www.lecroy.com](http://www.lecroy.com)

1-800-5-LeCroy

## Wide screen, quick measurements

LeCroy has introduced a new line of WavePro general-purpose oscilloscopes, serial data analyzers, and disk-drive analyzers—the 700Zi series—that feature a 15.3-in. wide-screen display and give you the option of adding a second screen of the same size. In addition, the 700Zi instruments have a removable control panel so you can operate them without looking up from your circuit.

Available in bandwidths from 1.5 GHz to 6 GHz, the instruments provide up to 128 Msamples/channel of waveform memory on four channels and up to 256 Msamples/channel on two. All models contain both 50- $\Omega$  and 1-M $\Omega$  input capability.

Using LeCroy's X-Stream II technology and a quad-core processor, the WavePro 700Zi can process data at rates up to 750,000 measurements/s. The processor runs 64-bit Windows Vista and has 8 Gbytes of processor memory, large enough to handle real-time calculations on long data records. The 700Zi can run data-processing code written in Java, C, Matlab, or Visual Basic, and you can move data to a PC at 500 Mbytes/s through an optional Cabled PCI Express link.

A TriggerScan feature lets the 700zi look at a repetitive waveform shape and decide which waveform to store. User-defined parameters set the criteria for data storage. You can then process the data using built-in math functions or with your own code. A mixed-signal option adds digital channels. Prices range from \$23,500 to \$59,490. [www.lecroy.com](http://www.lecroy.com).



## Credence and LTX sign merger agreement

Credence Systems and LTX have announced that they have entered into an agreement to combine the two companies in a tax-free, all-stock "merger of equals." Credence and LTX say the combined company will offer a complementary portfolio of technologies and the largest installed base in the Asia-Pacific region. The new company's systems will address the test requirements of the wireless, computing, automotive, and entertainment markets.

Lavi Lev, president and CEO of Credence, will become executive chairman of the combined company for a transitional period. David Tacelli, CEO and president of LTX, will become CEO and president; and Mark Gallenberger, CFO and VP of LTX, will become CFO.

The merger is subject to approval by both companies' stockholders. Under the terms of the agreement, Credence shareholders will own 50.02% of the outstanding shares of the combined company and LTX shareholders will own 49.98%. The boards of directors of both companies have unanimously approved the agreement and recommend their stock-

holders vote in favor of it. Pending regulatory approval, the companies expect the transaction to be completed by the end of September 2008. [www.credence.com](http://www.credence.com); [www.ltx.com](http://www.ltx.com).

## Cognex sues MVTec

Cognex recently announced that it has filed a complaint against MVTec Software GmbH of Germany as well as its US subsidiary, MVTec LLC. The com-

## Test converged networks

VeriWave has added hardware and software to its WaveTest wired and wireless network-test system. The new hardware—the WaveBlade Ethernet 1104—adds four Ethernet ports. Each port can generate or analyze traffic on 10/100/1000-Gbps Ethernet layer 2 through layer 7, and each port supports up to 500 clients. You can use the WaveBlade to connect the test system to wired Ethernet devices, and then use wireless-interface cards to connect the test system to IEEE 802.11a.b/g/n networks.



The new WaveQoE software lets the WaveTest system measure end-user Quality of Experience (QoE). You can use it to test wired and wireless edge-network elements such as routers, gateways, security-enabled switches, and network accelerators. The software

enables you to create profiles and test conditions that generate mixtures of traffic that simulate actual network conditions. WaveQoE controls traffic-carrying applications such as HTTP, FTP, and TCP protocols for data; VoIP for voice; and MPEG-2 for video. The software also controls traffic flow rate, traffic direction, and traffic load.

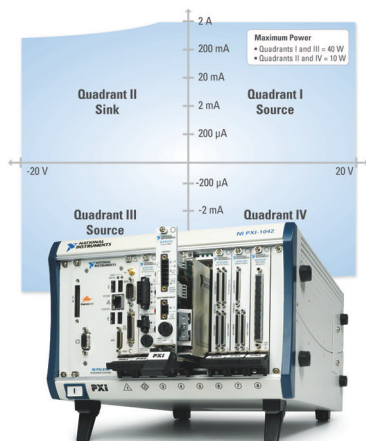
Test reporting includes real-time and final results. You can export final results into comma-separated variable or HTML formats. WaveQoS can also generate reports in PDF format.

Prices: WaveBlade Ethernet 1104—\$24,000; WaveQoE—\$6000 per port that the software will control. VeriWave, [www.veriwave.com](http://www.veriwave.com).

Editors' CHOICE



# PXI Source Measure Unit



## Introducing Affordable Power and Precision in PXI

### NI PXI-4130 SMU Features

- 4-quadrant operation up to  $\pm 20$  V and 2 A
- 1 nA measurement resolution
- Additional +6 V utility channel
- Compact size – up to 17 SMU channels in a 19 in., 4U space

>> View product demos and  
download specifications at  
[ni.com/smu](http://ni.com/smu)

800 891 8841



©2008 National Instruments Corporation. All rights reserved. National Instruments, NI, and ni.com are trademarks of National Instruments. Other product and company names listed are trademarks or trade names of their respective companies. 2007-9245-501-101-D

plaint was filed in the US District Court for the District of Massachusetts in Boston.

The complaint by Cognex alleges that MVTec's Halcon machine-vision software infringes the claims of at least seven Cognex patents. Cognex is asking the court to enjoin MVTec from making and selling the infringing software and is seeking unspecified damages in compensation for past infringement. Fuji America, a company selling semiconductor capital equipment that incorporates MVTec's Halcon software, was also named in the complaint.

Dr. Robert J. Shillman, chairman and CEO of Cognex, said, "Cognex has made a very significant investment in R&D over the years, and we have a responsibility to both our investors and to our customers who have paid for Cognex proprietary technology to protect that investment."

Dr. Olaf Munkelt, managing director of MVTec Software GmbH, issued this statement in response to the lawsuit: "MVTec is ready and committed to defend itself as well as its customers

## CALENDAR

**IEEE EMC Symposium**, August 18–22, Detroit, MI. Sponsored by the EMC Society of the IEEE. [www.emc2008.org](http://www.emc2008.org).

**Autotestcon**, September 8–11, Salt Lake City, UT. Sponsored by the IEEE. [www.autotestcon.com](http://www.autotestcon.com).

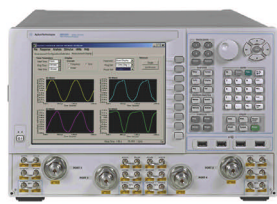
**International Test Conference**, October 26–31, Santa Clara, CA. Sponsored by the IEEE. [www.itctestweek.org](http://www.itctestweek.org).

To learn about other conferences, courses, and calls for papers, visit [www.tmworld.com/events](http://www.tmworld.com/events).

against these claims because we believe these claims to be unfounded. MVTec has spent a great amount of resources over the years to invent, develop, and to patent machine-vision technology." [www.cognex.com](http://www.cognex.com); [www.mvtec.com](http://www.mvtec.com).

## VNA analyzes active-device nonlinear behavior

Agilent Technologies has announced nonlinear vector network analyzer (NVNA) capability for its PNA-X microwave network analyzer, which operates from 10 MHz to 26.5 GHz. Requiring minimal external hardware, the Agilent NVNA software effectively converts a four-port PNA-X into a high-performance nonlinear analyzer. The new capability features nonlinear component characterization, nonlinear pulse envelope domain capabilities, and



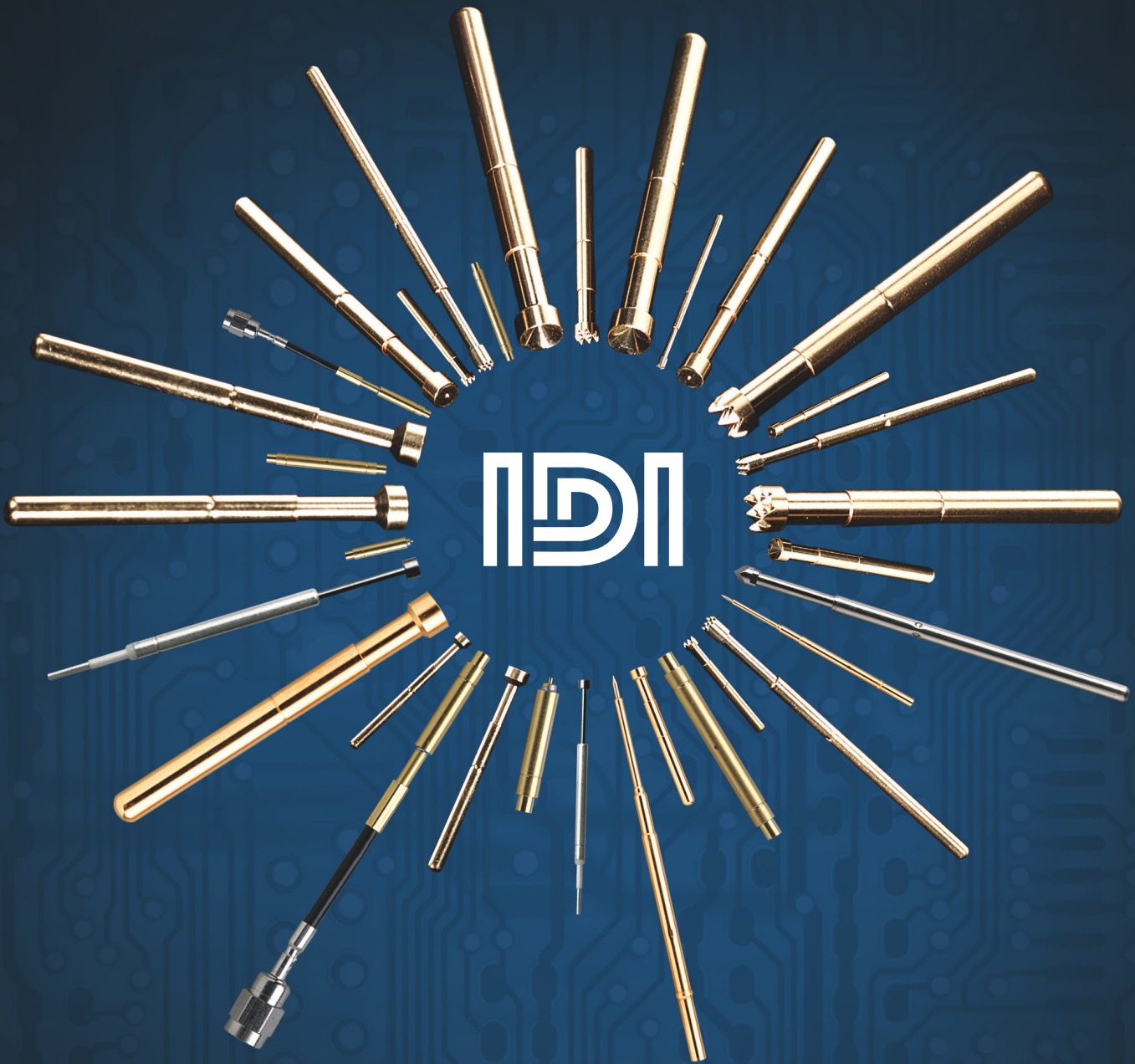
support for nonlinear scattering parameters that Agilent calls X-parameters; it targets engineers designing active RF components.

The instrument's new X-parameter support extends linear scattering parameters (S-parameters) into the nonlinear operating region and

enables an accurate portrayal of both nonlinear device and cascaded nonlinear device behavior using measurement-based data. The NVNA can measure the calibrated amplitude and cross-frequency relative phase of measured spectra from 10 MHz to 26.5 GHz to help engineers better understand and control the nonlinear behavior of their DUTs. Data can be displayed in time, frequency, power, or user-defined custom domain. The NVNA also provides a nonlinear pulse-envelope domain measurement.

Base price: nonlinear support option—\$56,000. Agilent Technologies, [www.agilent.com](http://www.agilent.com).

Editors' CHOICE



# IDI

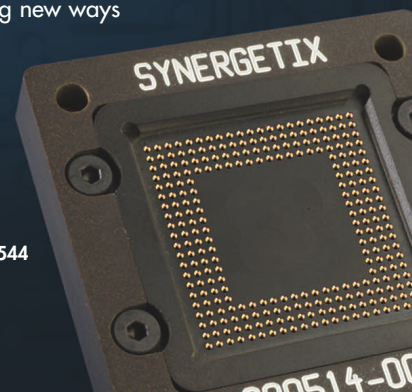
## THE ULTIMATE SOURCE FOR YOUR TESTING NEEDS

For nearly three decades, IDI has been designing and manufacturing test probes for printed circuit boards, various semiconductor devices and wire harness testing. Plus, our probe designers and builders are constantly discovering new ways to advance spring probe technology, resulting in the world's most complete offering of interconnect products. So regardless of what you're looking to test, you can tap into IDI and get the solution you need to meet your interconnect demands.



**INTERCONNECT DEVICES, INC.**

SPRING CONTACT PROBES • CONNECTORS • INTERFACES • SYNERGETIX® TEST SOCKETS  
5101 Richland Avenue • Kansas City, KS 66106 • FAX: 913.342.7043 • PHONE: 913.342.5544  
E-MAIL: [info@idinet.com](mailto:info@idinet.com) • WEB: [www.idinet.com](http://www.idinet.com)





# THE HEART OF YOUR SWITCHING NETWORK

IN A COMPLETE RF SOLUTION



CONTACT DOW-KEY TODAY  
**(805) 650-0260**

email: [askdk@dowkey.com](mailto:askdk@dowkey.com)

**[www.dowkey.com](http://www.dowkey.com)**

From Start To Finish, Dow-Key Adds  
Experience to Your Signal Routing Needs  
With Our Relays, Matrices, and Custom  
Full Switch Networks with Integrated  
Components.

**Who's at the heart of your system?**



microwave products  
group



AS9100/ISO9001:2000  
Hold Cert. No. FM 86698



**Dow-Key® Microwave**  
CORPORATION

A **DOVER** COMPANY

*Visit Us*

*NIWeek in Austin, TX (August 5-7) at Booth #316*

## Sensor networks large and small

> > > [Sensors Expo and Conference, June 9–11, Rosemont, IL, \[www.sensorexpo.com\]\(http://www.sensorexpo.com\)](#).

What was once a conference and show for sensor and data-acquisition equipment manufacturers has turned into an event that includes wireless sensors, data converters, microcontrollers, RF interface ICs, and wired interface ICs. The change came about because sensors are no longer used in just industrial monitoring and control systems, and they no longer need to be wired to vehicles or aircraft. Wireless sensor networks now monitor agricultural fields, oil wells, power plants, and many other facilities.

On a smaller scale, IC sensors mount on circuit boards and connect to microcontrollers with integrated analog-to-digital converters or to data converters and digital signal processors. These systems measure temperature, weight, strain, position, and other parameters in vehicles, machines, and other equipment.

“Sensors Expo is no longer just about sensor manufacturers improving on specifications,” said marketing consultant Roger Grace, who chaired an all-day session on MEMS sensors. “It’s much more applications focused now.”

### ON THE EXHIBIT FLOOR

**PCB Piezotronics** announced several products, including the series 3991 and 3993 MEMS-based accelerometers that mount on printed-circuit boards. The company’s Model 410B01 force sensor signal-conditioning module, which works with strain sensors, mounts on rails and produces a 0 to 10-V output. PCB Piezotronics’ automotive division introduced a line of microphones designed for automotive testing that help engineers measure wind noise, road noise, brake squeal, and sound quality. The company also introduced an automotive accelerometer preamplifier for high-temperature areas such as power trains.

**Analog Devices** introduced a motion sensor with six degrees of freedom. The ADIS16365 module mounts on a PCB and contains three linear motion sensors and three rotational sensors. It includes digital signal processing and a digital output. **Texas Instruments** demonstrated several bus transceivers that run on 3.3 V. The company also demonstrated its CAN bus interface devices and low-power RF ICs for developing wireless sensor networks.

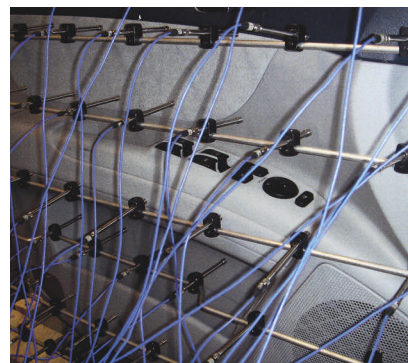
**Millennial Net** exhibited MeshScape, a wireless sensor protocol that creates a wireless mesh network that runs over a 2.4-GHz link.

**Crossbow Technology** also demonstrated a wireless mesh network protocol for its accelerometers and tilt sensors. While these two companies use proprietary protocols, **Solidica** uses IEEE 802.15.4 (ZigBee) low-speed wireless, and others use IEEE 802.11 wireless Ethernet.

“Wireless is just another instrumentation bus,” said **National Instruments’** product manager Jared Aho. Because several technologies are used for wireless sensor networks,

National Instruments has developed LabView drivers that let you use the programming language to collect data wirelessly. Support includes IEEE 802.11, IEEE 802.15.4, Bluetooth, and proprietary protocols. The company also demonstrated a module that lets you use its C series data-acquisition modules over wireless Ethernet.

**Pico Technology** exhibited its Model 5000 USB 1-GHz oscilloscope and the Model 9201, a 12-GHz USB sampling oscilloscope. **Yokogawa** displayed its new WT500 power analyzer, its SB5310 automotive serial-data-bus analyzer, a mixed-signal oscilloscope, the GS610 source-measure unit, and the DL750 ScopeCorder. **Lambda** exhibited its Genesys line of rack-mounted power supplies with GPIB and LXI interfaces. **OriginLab** demonstrated its Origin8 data-analysis and plotting software. **T&MW**



Microphones from PCB Piezotronics connect to a data-acquisition system to record noise in a vehicle door.

Courtesy of PCB Piezotronics.

## From system-level design to hardware prototypes

> > > [Design Automation Conference, June 8–13, Anaheim, CA, IEEE, EDA Consortium, and SIGDA, \[www.dac.com\]\(http://www.dac.com\)](#).

**STMicroelectronics** at the **Mentor Graphics** booth highlighted an electronic-system-level (ESL) reference design flow that is integrated with **Atrenta’s** SpyGlass for register-transfer-level (RTL) lint-checking and power-analysis tool as well as Mentor’s Catapult C synthesis tool and **Calypto Design Systems’** sequential logic equivalence checker (SLEC). Atrenta at its booth announced its 1Team-Genesis product, which spans design-specification capture through correct-by-construction chip assembly. ST representatives were on hand at the Atrenta booth to explain that 1Team-Genesis forms the basis of a collaborative effort in the area of power estimation and management.

(continued)



# Get on board!

## MultiWriter™ Speeds Part Programming

User-proven MultiWriter with simultaneous programming lets you program up to 24 parts each of up to 16 different types simultaneously—that's up to 384 chips at once.

Program parts in usually less than 30 seconds with clean signals at data book rates.

It's the on-board programming solution that simplifies your process and lets you program unique data like serial numbers and date codes.

Available on CheckSum's Analyst tester and now on MultiWriter pps, the world's first production system for on-board gang programming.

Find out more at  
[www.checksum.com/multiwriter.asp](http://www.checksum.com/multiwriter.asp)  
or call:

**1-877-243-2578**

**CHECKSUM**   
Fully tested

### Design Automation Conference *(continued)*

**Virage Logic** demonstrated an open RTL-to-test-floor embedded-memory test-and-repair subsystem based on the company's Self-Test and Repair (STAR) memory system and yield accelerator. Virage also announced support for TSMC's Power Trim Service technology, which helps control leakage. **Apache Design Solutions** announced that TSMC's Reference Flow 9.0 accommodates Apache's technology for jitter, power, noise, and leakage analysis.

**Berkeley Design Automation** announced a co-simulation capability for its Analog FastSpice circuit simulator with third-party Verilog hardware-description-language (HDL) simulators. **Extreme DA** and **UMC** announced their collaboration on variation-aware

IC design flows for 65-nm and finer process technologies. The flows predict design performance and yield by analyzing timing behavior in the presence of process variations.

**National Instruments** was one of the few companies to have hardware on display to complement software offerings. NI highlighted an automated chip characterization and validation system based on LabView and PXI instruments. NI also demonstrated a prototype field-programmable-gate-array (FPGA)-based engine-control system put together by **Driven**. **T&MW**

See the online version of this article at [www.tmworld.com/2008\\_07](http://www.tmworld.com/2008_07) for our coverage of the DAC keynote address.

## Vendors tout performance gains at vision show

>>> **The Vision Show, June 10–12, Boston, MA, Automated Imaging Association, [www.machinevisiononline.org](http://www.machinevisiononline.org).**

While Corning automation expert Babak Raj described in his keynote speech a spectacular future for vision technology, including “imaging pills” for diagnosing disease, vendors on the show floor unveiled technology advances for the here and now.

Among a flurry of new camera designs, **FLIR Systems** debuted its A325, which it claims is the world's first plug-and-play infrared camera, compatible with both GigE Vision and GenICam standards. Key application: process monitoring on production lines.

**Dalsa** added one color model (C1410) and one monochrome model (M1410) to its Genie line of area-scan cameras. Operating at 22 fps, the cameras feature a Sony CCD sensor. The company also showed a new Camera Link version of its Spyder 3 line of dual-scan cameras.

Aiming at customers needing high resolution at low cost, **CIS America**

showed color and monochrome versions (VCC-F60 and VCC-G60) of its 5-Mpixel, GigE camera. Specializing in FireWire-compatible cameras for economical machine vision, **Allied Vision Technologies** introduced its Stingray line, which features a heat-dissipating design, resolutions up to 2 Mpixels, and data transfer rates up to 84 fps.

Also offering cost-saving solutions, **EPIX** is offering its new PIXCI S14 system, which includes four “Silicon Video” cameras, cabling, and frame grabbers for \$5295. Finally, **PPT Vision** claimed its tiny A20 Impact camera, priced at \$2995 and including more than 100 programs, offers the power of a vision system in a sensor footprint. **T&MW**



**Camera introductions dominated The Vision Show, including Dalsa's new Camera Link version of its Spyder 3 line of dual-scan cameras.**

*Courtesy of Dalsa.*

See the online version of this article at [www.tmworld.com/2008\\_07](http://www.tmworld.com/2008_07) for additional coverage of technology at The Vision Show.

# NOISE COM RISING ABOVE THE NOISE.



Sure, other companies talk about diodes, generators and components, but why work with an imitator when you can work with Noise Com? With 25+ years' experience and knowledge, only Noise Com can deliver total noise solutions. From custom components to complex instrumentation, you'll find the reliability and control you need, and the results you expect.

## COUNT ON THE NOISE LEADER. COUNT ON NOISE COM FOR:

- Custom designs
- Complete line of noise solutions
- Analog and digital noise
- Passion for innovation
- Proven expertise

# NOISE/COM

A WIRELESS TELECOM GROUP COMPANY

25 Eastmans Road, Parsippany, NJ 07054 • P: 973.386.9696 F: 973.386.9191 • [www.noisecom.com](http://www.noisecom.com)





### Remove all doubt

Your instruments restored to like-new condition, returned on time

- Premier measurement expertise
- NIST-traceable metrology
- A2LA-accredited calibration available

For more information, send email to [service-info@agilent.com](mailto:service-info@agilent.com) or call 1-800-829-4444 and we'll connect you to your local cal center:

**Arlington Heights, IL**

**Bethlehem, PA**

**Chelmsford, MA**

**Durham, NC**

**Irvine, CA**

**Richardson, TX**

[www.agilent.com/find/CAL\\_LAB](http://www.agilent.com/find/CAL_LAB)

With six regional labs, it's easy to access Agilent's calibration services. And when we calibrate your instruments, you can be sure that they retain their "like new" performance and accuracy.

Thorough, high quality calibrations start with automated, factory-written procedures. All necessary adjustments are included, no matter how many test points are out of cal—and you'll receive comprehensive pre- and post-adjustment data. We'll even advise you of the latest hardware and firmware updates, clean parts that need it, and make minor repairs—all at no extra cost.

Turnaround time from your local cal center is normally five business days, and if you're within a two-hour radius, pick up and delivery are free. Or when downtime is critical, our Volume Onsite Calibration (VOSCAL) service brings Agilent's expertise to your site.

To learn more, contact us at [service-info@agilent.com](mailto:service-info@agilent.com). We'll send an overview of your nearest cal center's capabilities and a copy of our "Remove all doubt" brochure.

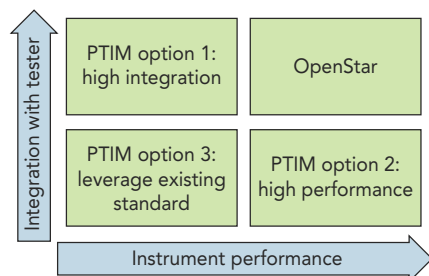


**Agilent Technologies**



## STC to help test keep pace with design

**D**esign productivity is outpacing test capabilities—that's one conclusion to be drawn from the global Semiconductor Test Consortium (STC) conference held June 4–6 in San Diego. That situation has implications for areas ranging from instrumentation to education, according to conference presenters.



Two PTIM options would offer either the integration or the performance levels of native semiconductor ATE instrumentation. A third option would leverage existing instrument platforms like PXI.

Don Edenfeld of Intel laid out the implications for instrumentation in his presentation as chair of the STC's as-yet unofficial Portable Test Instrument Module (PTIM) working group. To emphasize the need for a PTIM standard, Edenfeld cited a scenario in which last-minute design changes mandate test capabilities not available in existing native ATE system instruments—such as those complying with the STC's OpenStar standard. Development of a new ATE-class instrument that could provide the necessary capabilities might represent a \$2 million investment over 18 to 24 months, he said, making the time and cost prohibitive.

Edenfeld said that because of gaps in existing standard instrument platforms like PXI and GPIB, working group participants ruled them out, but based on a subsequent evaluation of the time and expense necessary to develop a new platform, existing platforms are back under consideration.

Luke Schreier of National Instruments made the case for PXI as the

basis for a PTIM standard. He presented a picture (**figure**) in which two PTIM options offer the system-integration capabilities or the performance of native-mode ATE instruments, but at high development costs and with long turnaround times. He proposed a third option that would complement the integration and performance of native ATE instruments while leveraging an existing instrument platform.

PXI would serve well as that platform, Schreier said, because of the breadth of instruments already available, including digital, RF, and precision DC instruments; arbitrary waveform generators; digitizers; and clock generators.

Edenfeld said a draft standard could be available in the third quarter with a final spec completed by year's end.

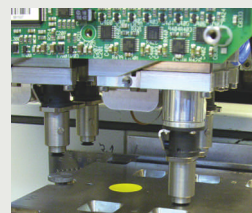
Paul Roddy of Advantest laid out the implications for education in a presentation titled "Aligning Academia with Leading Edge Semiconductor Test

Technology." Roddy, a co-chair of the STC University Working Group (UWG), said the group is working to align academic programs with industry needs, establish a global database for test research projects (to avoid duplication of effort), partner with other organizations to promote research, and set up a repository for test-engineering curricula.

Specific efforts of the UWG, Roddy said, include putting OpenStar testers in university labs and working with organizations such as Science-Engineering-Technology Congressional Visit Day ([www.setcvd.org](http://www.setcvd.org)) and Alliance for Science & Technology Research in America ([www.aboutastra.org](http://www.aboutastra.org)). Such efforts, he said, can reduce the six to 18 months it now takes new engineering graduates to become fully integrated into industry test projects—with a concomitant reduction in the time senior engineers need to train them. T&MW

### Handler technique passes customer test

Multitest has announced that its "voice coil" pick-and-place handler technology passed an evaluation at a German production site of an international integrated device manufacturer (IDM). The voice-coil principle—used to control the z-axis height while placing a device under test—increases overall test cell efficiency by speeding device handling, the company reports; Multitest also says that the technique is particularly suitable for applications with short test times and high parallelism. [www.multitest.com](http://www.multitest.com).



### UTAC Taiwan acquires V93000 HSM2200 systems

Verigy has announced that United Test and Assembly Center Taiwan (UTAC Taiwan), a semiconductor test and assembly service provider, has acquired multiple V93000 HSM2200 high-speed memory test systems for high-volume production of DDR3 devices. DDR3 features per-pin data rates of up to 1600 or 2133 Mbps, doubling the maximum data transfer rates of DDR2. [www.utacgroup.com](http://www.utacgroup.com); [www.verigy.com](http://www.verigy.com).

### Teradyne's Nextest unit ships 2000th tester

Teradyne has announced the shipment of the 2000th test system from its Nextest business unit. "This significant milestone underscores the success of Magnum and its ability to provide customers with compelling test solutions from engineering through the critically important high-volume production process," said Tim Moriarty, GM of the Nextest business unit. [www.teradyne.com](http://www.teradyne.com).



# Pump Up Image Processing Performance

Gone are the days of the single processor! Today's PCs offer more processing power than ever before. Multi-core CPUs and Graphics Processing Units (GPUs) are readily available to boost image processing performance.

## But did you know?

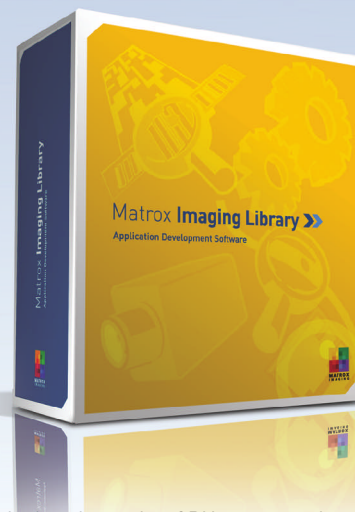
- All imaging operations won't run eight times faster on a eight-core machine.
- GPUs offer tremendous computing power for image processing applications.
- The Matrox Imaging Library (MIL) 9.0 is optimized for maximum performance on multi-core systems and GPUs.

## What else should I know?

The truth is, software tools provided by the silicon manufacturers are not specifically designed for image processing. The Matrox Imaging Library (MIL) is a field-proven toolkit containing hundreds of image processing operations for imaging and machine vision applications, as well as functions for video capture and display.

## Not all functions are created equal

Not all operations benefit equally from multiple-cores as shown in the graph. Matrox Imaging has analyzed the functions in MIL and determined which respond best under multi-core processing conditions: arithmetic, filtering, LUT mapping, morphological and geometric transformation operations. MIL 9.0 automatically and intelligently dispatches an application to the appropriate number of cores for maximum performance. Programmers can also tune the application's usage of host resources by controlling the maximum number of cores used by a thread that is executing MIL operations.



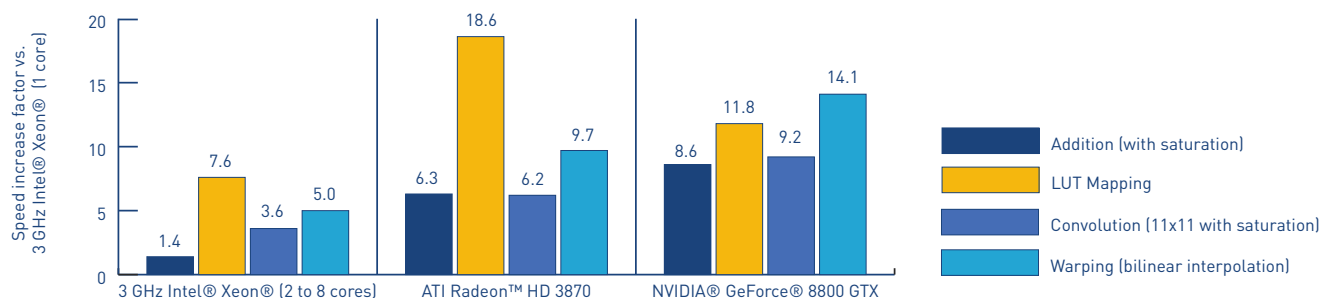
The graph also shows that GPUs can greatly accelerate image processing functions. Knowing that image data needs to be transferred to and sometimes back from the GPU, a GPU is best used for performing long sequences of operations in order to minimize the transfers between the system and local GPU memory.

## Do things the optimized way

The "do it yourself" approach is always an option: take a chance with a low-level tool from a silicon vendor. But it's easier, faster, and more cost-effective to use an image processing library like MIL 9.0. We've already done the work for you!

## Learn more about MIL today!

[www.matroximaging.com/mil](http://www.matroximaging.com/mil)

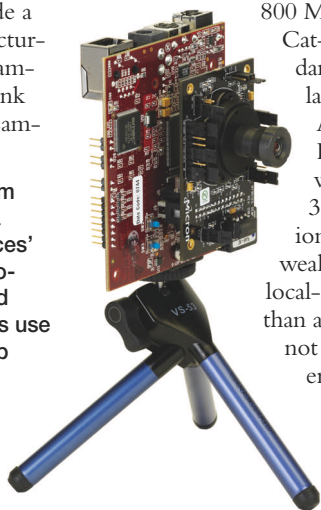




## Do you want data or results?

In the fall of 2000, vision and camera experts established the Camera Link standard to address the needs of high-speed digital cameras. This standard defines low-voltage differential signaling (LVDS) communications that transmit serial pixel data from a camera to a computer. Recent changes to the Camera Link spec include a method that lets manufacturers provide power to a camera through a Camera Link cable. Sprucing up the Cam-

**This development kit from Avnet includes a camera module, an Analog Devices' Blackfin digital signal processing (DSP) board, and software tools. Designers use this type of kit to develop and test smart-camera algorithms.** Courtesy of Avnet.



era Link spec may seem like a good idea, but the vision industry should also concentrate on developing a new approach to camera-to-PC communications.

Designers can now use high-bandwidth Gigabit Ethernet (GigE) connections when they must place a high-speed or high-resolution camera beyond the 10-m limit inherent to Camera Link cables. But as image-sensor resolutions increase and as inspection equipment must operate at higher frame rates, the demand for more bandwidth will run up against GigE's limits.

I see several paths that designers of cameras and vision equipment can consider.

First, look to a new serial-data standard. One possibility is USB 3.0, which Intel demonstrated about nine months ago. Reports say that Intel demonstrated USB 3.0 with a fiber-optic connection operating at 5 Gbps, but Intel has released no hard information about the final physical interface. Could USB 3.0 use a regular USB connector and an electrical bus? Who knows? At this

point, implementation of USB 3.0 in vision equipment seems far off.

Second, consider whether recent changes to FireWire make the bus appropriate for your application. The IEEE 1394c-2006 standard, which codifies the FireWire S800T link, should

lead to equipment that operates at 800 Mbps over inexpensive

Cat-5e cable and uses standard RJ45 connectors. In

late 2007, the 1394 Trade

Association announced FireWire S3200, which

will increase data rates to 3.2 Gbps. But in my opinion,

FireWire comes on as a weak contender. It uses a local-access protocol rather than a network protocol, so it's

not great for networked cameras. And who knows when

S3200-based hardware will arrive?

Third, build smarter cameras. This approach puts vision-processing

and vision-analysis tasks where they belong—close to the sensor. Why stream masses of raw data through a bottleneck, or interface, only to process it in a PC and discard most of the collected pixels? Texas Instrument's Open Multimedia Application Platform (OMAP) ICs and the Blackfin signal-processing devices from Analog Devices, for example, will help developers quickly extract useful information from raw image data. Low-power field-programmable gate arrays (FPGAs) also let engineers put custom image-analysis algorithms within a camera. These types of proven chips and associated design tools already exist. Take advantage of them. **T&MW**

### SIGNING OFF

I tend to have careers that last nine or 10 years, so after writing about inspection and machine vision for over a dozen years, I decided it's time to have someone else write this column. But no retirement for me. You'll continue to see my byline in electronics publications and on related Web sites.—*Jon Titus*

### Toshiba announces 12-Mpixel camera

Toshiba Teli America has introduced a CMOS-based machine-vision camera with a 12-Mpixel, 1.9-in. CMOS monochrome progressive-scan sensor. The CleverDragon CSC12M25BMP19 offers 4096x3072 resolution along with a 25-fps full-frame speed. A Camera Link interface is standard. [www.toshiba-teli.com](http://www.toshiba-teli.com).



### AXI system offers 2-D and 3-D capabilities

The X-Series automated x-ray inspection (AXI) system from YESTech rapidly gathers multiple oblique images of a sample to construct a 3-D rendering used for identifying solder and component-related defects on both single- and double-sided printed-circuit boards. The X3 can selectively use 2-D or 3-D technology to inspect specific regions of interest, and it separates the top and bottom images of double-sided boards for automated inspection of solder joints. [www.yestechinc.com](http://www.yestechinc.com).

### Dalsa extends software capability

Dalsa has released a color version of the iNspect software for its Vision Appliance line of embedded machine-vision products. The iNspect Color software segments images by color so technicians can apply standard measurement tools for verification, sorting, and inspection of parts and assemblies. In addition, the software offers on-the-fly image rotation and multi-camera tiling. [www.dalsa.com](http://www.dalsa.com).





# Your Ticket to International Markets.

## Securing Safe Product Access Worldwide

Our experienced engineers work with you through the entire product development cycle to create comprehensive product safety testing strategies.

By combining multiple tests in a single session, you get to market quicker and more cost-effectively.

We have a network of experts in over 30 countries worldwide. TÜV SÜD America's integrated testing approach encompasses:

**Product Safety Services** – From single product tests to innovative International Compliance Management strategies, we ensure your product meets the appropriate requirements.

**EMC** – Testing for the most demanding markets.

**Field Evaluations\*** – On-site inspections to comply with local electrical safety requirements.

**Contact us today to discover how we can help. Or visit [TUVamerica.com/webinars](http://TUVamerica.com/webinars) and view our FREE on-demand webinar sessions.**

### We Now Offer Expanded Testing Capabilities In:

- ▶ Electrical Equipment for Medical Use
- ▶ Household and Similar Equipment
- ▶ Measuring Instruments
- ▶ Electronics Entertainment

**Call 1-800-TUV-0123 or visit [TUVamerica.com](http://TUVamerica.com).**

Please reference code T 708.

\*Services only available in U.S.



America

**Choose certainty.  
Add value.**

**TÜV®**

*For the leading companies that provide the instruments for electronics test, the past year produced sharply contrasting results.*



# Test's **SPLIT** PERSONALITY

BY LAWRENCE D. MALONEY, CONTRIBUTING EDITOR

**U**pbeat and downcast. The mood of the test field's giant companies swung both ways in the turbulent year of 2007.

Companies selling general-purpose test equipment notched respectable sales, and those with test platforms that target fast-growing communications applications like WiMAX reported banner years.

But for companies producing big-ticket automated test equipment (ATE) systems for semiconductor test, it was surely a year to forget. Many saw their sales dive sharply compared to their 2006 figures, as manufacturers found themselves with excess capacity in a slumping global economy.

"Semiconductor test is once again in one of its down cycles," said S. Vidyasankar, a senior research analyst for Frost & Sullivan. "And that has put downward pressure on ATE equipment prices, which hurts profitability."

Meanwhile, the ranks of the test industry's Top 10 publicly held companies were rocked by two major acquisitions. Danaher, a diversified industrial powerhouse, brought Tektronix under its corporate umbrella last October. And last July, Aeroflex, the ninth largest publicly held test company in 2006, was acquired by private equity funds managed by Veritas Capital, Golden Gate Private Equity, and Goldman Sachs.

## **Communications sets the pace**

One thing was clear in analyzing company results for 2007: Companies heavily focused on equipment aimed at communications test led the pack in terms of percentage growth. For example, JDSU saw sales of its communications test and measurement products jump by 25% in fiscal 2007. Among its hot products: the T-BERD 8000 field instrument for high-speed fiber networks.

"The test solutions we offer for the installation and maintenance of IP-based triple-play services, such as IPTV and VoIP, and for the deployment of FTTx networks have been very well received by customers and contributed significantly to our growth," noted JDSU senior VP Dave Holly.

Japan's Anritsu views communications test as a prime opportunity. President Hiromichi Toda pointed to growing opportunities for test devices resulting from deployment of 3G and 3.5G throughout the world, as well as from next-generation networks and the popularity of WiMAX and wireless LAN. Said Toda: "With the spread of the Internet and the increase in transmission capacity, the transmission speed of the backbone is becoming faster, from 2.5 Gbps to 10 Gbps. We even saw a 40-Gbps system commercialized recently." As for Anritsu products aimed at such applications, Toda cited a new signal quality analyzer for testing optical transceivers and modules up to 12.5 Gbps, and the com-



pany's spectrum analyzers and master base-station analyzers for deploying and maintaining mobile WiMAX networks.

Industry kingpin Agilent Technologies, by far the industry leader with sales of \$3.4 billion in 2007, has been shifting more of its resources into test products for wireless and aerospace and defense applications. Ron Nersesian, GM of the company's Wireless Business Unit, said Agilent's new E6620 wireless test set for



**Dave Holly says that test products for triple-play services have contributed significantly to JDSU's growth.**

LTE designers is a good example of a hot-selling communications product. Another is the firm's E6651A platform for WiMAX applications, including base-station emulation and protocol performance test. Agilent also has launched a new organization, called the Signal Net-

working Division, to focus company test technologies on such aerospace applications as electronic warfare, networked communications systems, military ATE, portable test, and data converters.

Even so, the sheer breadth of Agilent's product line makes it difficult for the firm to sharply increase year-to-year sales. In 2007, for example, Agilent's revenues in electronic measurement, viewed by analysts as a mature market, grew by just 3.4%. Compare that to a whopping 24% jump in sales for Agilent's bio-analytical measurement business, a market where Agilent has a less dominant market share.

"Agilent is really two companies," said John Harman, an analyst with Needham & Company. "Last year was a tough one for its electronic test business, but its chemical analysis business was hitting on all cylinders, and that's where the company is putting a lot of its investment."

Of course, Agilent doesn't lack competitors seeking to grab market share. Harman singles out National Instruments as a firm that year after year has posted double-digit growth, outperforming most companies in electronics test. In 2007, revenues grew by 12% to

## Top 10 test-and-measurement companies in 2007 revenue (publicly traded companies)

COMPANY	2007 RANK	2006 RANK	2007 REVENUES (MILLIONS US\$)	2006 REVENUES (MILLIONS US\$)	PERCENT CHANGE
Agilent Technologies	1	1	3,415.0 <sup>1</sup>	3,302.0	3.4
Advantest	2	2	1,824.0 <sup>2</sup>	1,999.0	-8.8
Tektronix	3	4	1,105.0 <sup>3</sup>	1,039.9	3.0
Teradyne	4	3	1,102.2	1,356.2	-18.7
Fluke	5	5	1,091.8 <sup>4</sup>	1,011.0	8.0
Anritsu	6	6	1,005.0 <sup>2</sup>	842.0	19.3
Verigy	7	7	761.0	778.0	-2.2
National Instruments	8	8	740.3	660.4	12.0
JDSU	9	10	619.2	494.5	25.2
Credence	10	—	461.1	493.4	-6.5

<sup>1</sup>Agilent revenues include only electronic measurement operations. Instrumentation for bio-analytical measurement totaled \$2.005 billion in 2007.

<sup>2</sup>Revenues shown for 2007 for Japanese companies Advantest and Anritsu reflect the sharp rise in the value of the yen versus the dollar over the past year.

<sup>3</sup>Tektronix became part of Danaher in October 2007. Figures are for the fiscal year ending May 2007, prior to the acquisition.

<sup>4</sup>Danaher does not report separate sales figures on its Fluke/Fluke Networks units. The figures in this table are an estimate, based on the reported business increase in 2007 for the company's electronic test businesses.

### Notes:

Rohde & Schwarz, a privately held company, reported annual sales of 1.4 billion euros in the fiscal year ending June 2007, a 7.6% increase over the previous year.

Aeroflex (last year's number 9 company) became privately held in July 2007 and thus was not eligible for inclusion in this chart. Its latest report as a public company (nine months ending March 2007) showed sales of \$432 million and projected sales of \$162 million for the final quarter.

more than \$740 million. "NI's product pipeline is full in such areas as general-purpose and communication test, and it has leveraged LabView into other applications like industrial control, em-



**Advantest America's R. Keith Lee: Customers want to expand parallel test capacity.**

bedded systems, and mechatronics," said Harman.

NI CEO James Truchard sees attractive opportunities in such areas as multicore- and emulation-based test systems. The firm will also continue to invest heavily in LabView FPGA technology. "It's been amazing to see what users have been able to do with this technology—from implementing complex custom protocols to test missile systems to creating a software-defined radio," said Truchard. Among other prime areas for new product investment: PXI and PXI Express.

## Preparing for the upturn

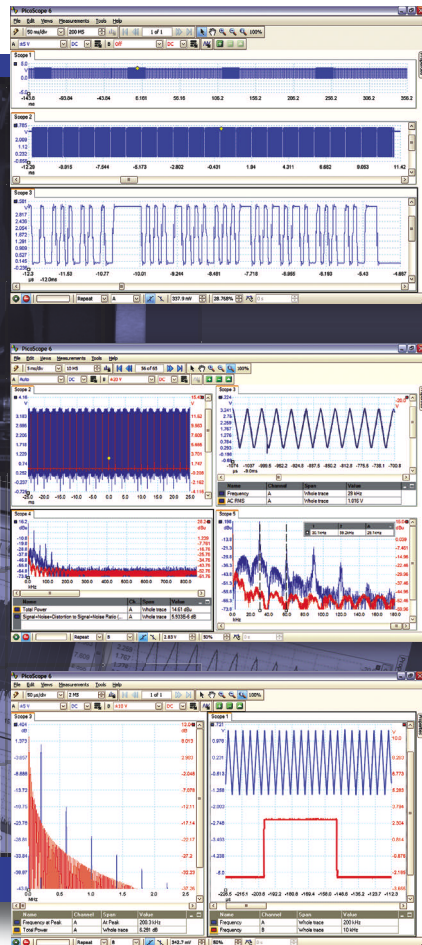
The mood is far more subdued in semiconductor test. Advantest, the world's leading equipment supplier in that segment, saw sales decline by 8.8%, much of it as a result of industry overcapacity in system-on-chip (SOC) testers and the stagnation of semiconductor prices. In recent years, Advantest has been expanding beyond commoditized memory ATE and into logic test, especially SOC test.

In the face of such market pressures, the company is developing lower-cost solutions for SOC test, such as its new T2000 GS compact test system. R. Keith Lee, CEO of Advantest America, speculates that more companies will be seeking to increase their parallel test capacity, and that could fuel sales for the company's high-volume SOC test cell, the T2000 LS mainframe, integrated with the company's M4841 dynamic handler. "Our SOC test innovations all are aimed at weathering the cycles of supply and demand and the resultant pressures on average selling prices," said Lee.

Teradyne, another major player in the SOC test market, also endured a tough

From the market leaders in pc oscilloscopes...

# USB Connected High Speed PC Oscilloscopes and Spectrum Analyzer



5000 SERIES

## PicoScope 5000 Series

### The No Compromise PC Oscilloscopes

With class-leading bandwidth, sampling rate, memory depth and an array of advanced high end features, the PicoScope 5000 PC Oscilloscopes give you the features and performance you need without any compromise.

**250 MHz bandwidth**  
**1 GS/s real-time sample rate**  
**128 Megasample record length**

3000 SERIES

The 3000 Series of oscilloscopes from Pico Technology include general purpose and high resolution models: With 12 bit resolution and 1% accuracy, the 10MHz PicoScope 3424 is able to detect changes as small as 0.024% (244ppm) – making it the ideal 4-channel oscilloscope for analog design and analysis. The higher speed 8 bit models in the PicoScope 3000 series feature sampling rates up to 200MS/s and up to 1 MS/s record lengths for general purpose and portable applications.



2000 SERIES

The PicoScope 2000 series oscilloscopes offer single and dual channel units that offer highly portable/low cost solutions to general purpose testing. The award winning 25MHz handheld 2105 fits comfortably into the palm of your hand yet still includes the powerful features found in larger oscilloscopes.



### Advanced Triggers

In addition to the standard triggers the PicoScope 5000 series comes standard with pulse width, window, dropout, delay, and logic level triggering.

### 250MHz Spectrum Analyzer

### High speed USB 2.0 Connection

### Automatic Measurements

### Arbitrary Waveform Generator

Define your own waveforms or select from 8 predefined signals with the 12 bit, 125MS/s arbitrary waveform generator.

### Waveform Playback Tool

PicoScope software now allows you to go back, review, and analyze up to 1000 captures within its waveform playback tool.



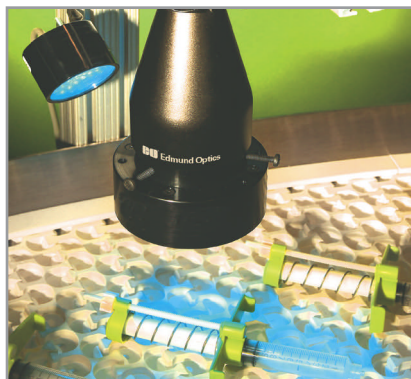
**pico**  
Technology

VISIT

[www.picotech.com/pco419](http://www.picotech.com/pco419)

to check out our full line of pc based instruments or call 1.800.591.2796 for information and a product catalog





**BUILD THE  
RIGHT SYSTEM  
EVERY TIME**

**TECHSPEC®**



LONG WORKING  
DISTANCE OBJECTIVES



SILVER SERIES  
TELECENTRIC LENSES



LARGE FORMAT  
LENSES



TELECENTRIC  
ILLUMINATORS

**NEW LENS SELECTION GUIDE**



Match Imaging  
Needs with Lenses  
and Cameras

[www.edmundoptics.com/selectionguide](http://www.edmundoptics.com/selectionguide)

**NEW!**  
404 - page  
Master  
Source  
Book



Request your  
FREE copy today!

**800.363.1992**

[www.edmundoptics.com/TM](http://www.edmundoptics.com/TM)

**EO Edmund**  
optics | worldwide

Visit us at SPIE Optics +  
Photonics Booth 353

**TOPS IN TEST**

2007, with sales off 18.7% from the previous year. Frost & Sullivan analyst Vidyasankar, however, views the late 2007 acquisition of Nextest Systems as a positive development for Teradyne, since it strengthens the company's capability in flash memory test, a sector that rides the booming interest in consumer electronics. Of Nextest's \$95.8 million in revenue in 2006, sales of flash memory testers accounted for \$80 million.

Verigy, the company that emerged from Agilent's 2006 spinoff of its ATE business, fared better than most firms in the ATE sector in 2007, with only a slight decline in sales. And its first quarter 2008 revenues were up 21% over the same period in 2007. Early this year, the company also completed the acquisition of Inovys, which provides products for design debug, failure analysis, and yield acceleration. Commented CEO Keith Barnes: "This acquisition allows us to further differentiate Verigy from other automated test equipment suppliers by offering a completely integrated solution, which leverages our proven SOC

and memory test platforms with a best-in-class, time-to-yield solution for semiconductor manufacturing."



**Hiromichi Toda of Anritsu sees prime opportunities in 3G, 3.5G, WiMAX, and WLAN.**

For Credence, on the bottom rung of the Top 10 list, revenues were down 6.5% in 2007, but CEO Lavi Lev this year is stressing a strategy of focusing R&D on test platforms, such as the Diamond, that are used particularly in Asia-driven consumer semiconductor markets.

**The changing landscape**

Two other leading companies, Tektronix and Aeroflex, began 2008 under new corporate umbrellas. Following its best performance in six years as an independent company, with sales of more than \$1.1 billion in fiscal 2007, Tektronix was acquired by Danaher last October. While some observers wondered whether the instrument maker would lose some of its high-tech focus as part of industrial giant

Danaher, analyst Vijay Mathew of Frost & Sullivan predicted the change will be beneficial for the Tektronix brand, just as it was for Fluke—another perennial member of the top 10 list—when it was acquired by Danaher a decade ago. A key reason: Danaher's operating efficiencies



**Agilent Technologies' global sales pacesetters, says VP Ron Nersesian, include new test sets for wireless communications.**

could free up more development funds for further expansion of the Tektronix product line, which recently added new entries in signal sources, mixed-signal oscilloscopes, and real-time spectrum analyzers.

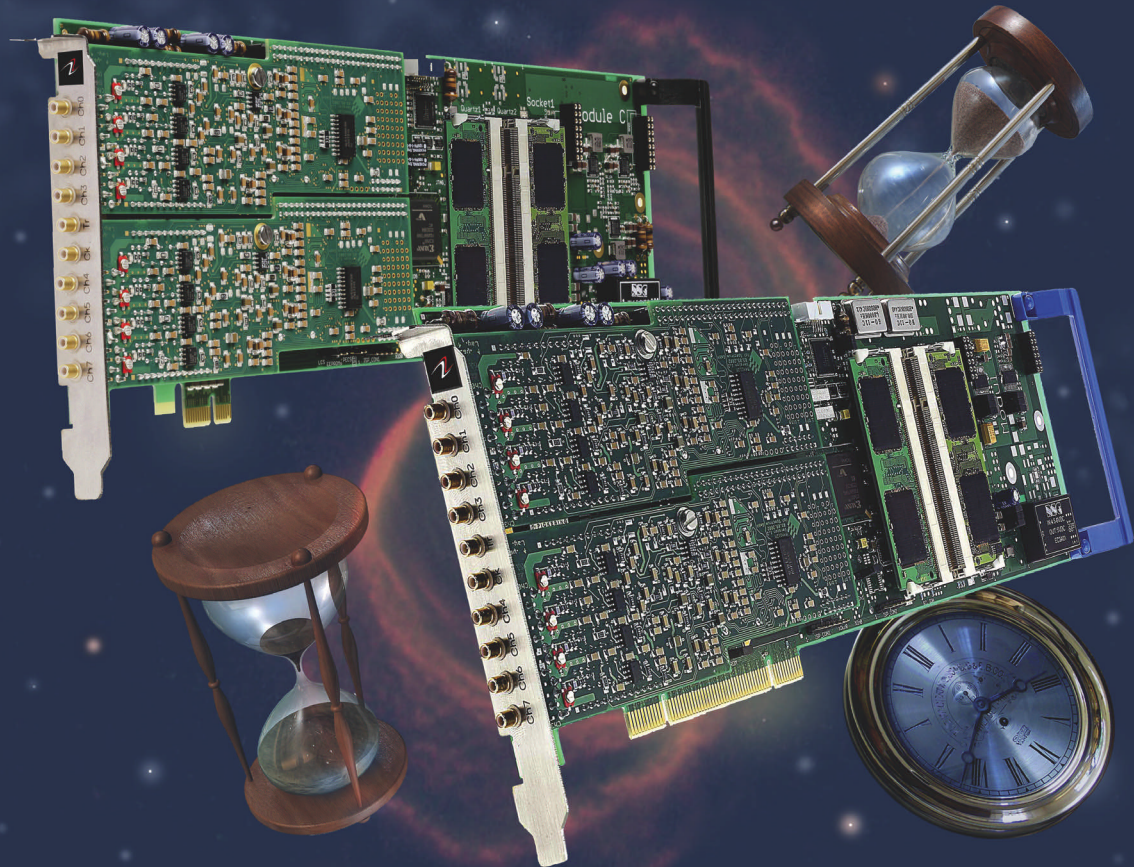
Rick Wills, who continues to head Tektronix operations, also sees synergies with Dana-

her's other major electronic test unit, Fluke. "While the Tektronix and Fluke brands will remain separate operating entities, our customers will see benefits from focused R&D that drives continuous innovation."

Aeroflex, which has been focusing increasingly on equipment for wireless test, also made its corporate switch on a high note. Prior to being purchased by the private equity firms last summer (which made it ineligible for this year's top 10 list), the company reported a sales increase of just under 8% for the nine-month period ending March 2007 versus the prior year. It also had order backlogs totaling \$253 million. Like the situation for Tektronix, Aeroflex could also gain from the change. "It's going to allow Aeroflex to increase its R&D investment," predicted Vidyasankar of Frost, "and they got a very good offer from Veritas."

Such acquisitions, some would say, have whittled down the big players in test's public arena. Yet, there are always up-and-coming firms that are looking for a niche to exploit. Perhaps the best example, argues Harman of Needham & Company, is EXFO. Targeting test opportunities in telecom, the Canadian company increased its sales in 2007 by nearly 20% to \$152.9 million and is laying the groundwork for even more growth with key acquisitions in 2008. T&MW

# NOW WITH BIGGER MEMORY



## For Longer Measurement and Generation Times

Strategic Test now supplies its PC-based instruments with 256 MByte of onboard memory at no extra cost. That's 4x more than the previous entry-level 64 MByte and it applies to all of the PCI Express and PCI-based Digitizers/Oscilloscopes, Arbitrary Waveform Generators, high-speed Digital I/O and Digital Pattern Generators - there are more than 100 models to choose from.

If you need even more memory all of these instruments can be upgraded to 4 GByte onboard. As standard, the ST cards also support streaming making it possible to record or generate for hours or days using a RAID controller and multiple hard disks.

The instrument cards include drivers for Windows Vista, XP, 2000 and most popular flavors of Linux. Source code program examples are supplied for C/C++, VB, Delphi, VB.NET, J#,

C#, Gnu C and LabWindows/CVI. Drivers for MATLAB, LabVIEW, Agilent-VEE and DASLab are available as cost-options.

The cards come with a two year hardware warranty, life-time software updates that includes future OS drivers and our super-responsive life-time technical support, at no extra cost.

To learn more about the versatility and value of the ST instruments, visit our website where you will find datasheets with detailed specifications and user manuals:

**[www.strategic-test.com](http://www.strategic-test.com)**



USA : (617)621-0080  
Europe : +46 854 400 490

© 2008 Strategic Test Corporation. All rights reserved. UltraFast and 'The High-Speed Specialist' are trademarks of Strategic Test. Other products are trademarks or of their respective companies.



# 3 Wishes Only?

To Fulfill All Your Wishes by GW Instek  
New GDS-1000/2000 Series



What if you are only allowed to have three wishes?!

GW Instek will change the dilemma!

With bandwidth range from 25MHz to 200MHz, high speed sampling rate and long memory, GDS-1000/2000 Series make it possible for you to restore the original signal accurately.

Within 5.6" TFT color display, all series offer standard interface RS-232C, USB port and more than ten additional Auto Measurement functions, Advanced Trigger functions, Go/NoGo testing, multi-language operation environment and more functions. What's more, the unbeatable price will make the best offer than ever. GDS-1000/2000 not only satisfies your three wishes, but also any more.

## GDS-2000 Series

- 200/100/60 MHz Bandwidth; 2/4 Input Channels
- 1GSa/s Real-Time and 25GSa/s Equivalent-Time Sampling Rate
- Maximum 25k Points Record Length
- USB Host/Device : USB Printer and USB Flash Drive Support
- Battery Operation (optional)

## GDS-1000 Series

- 100/60/40/25MHz Bandwidth; 2 Input Channels
- 250MSa/s Real-Time and 25GSa/s Equivalent-Time Sampling Rate
- 4k Memory Length Per Channel; Peak Detect as Fast as 10ns
- Save/Recall of 15 Front Panel Settings & Waveforms
- Interfaces : USB Device Connector and SD Card Slot

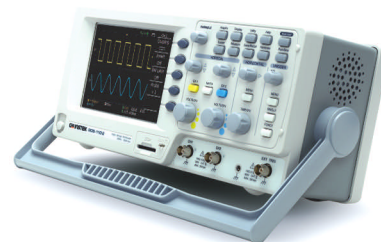
## GDS-2000 Series

200/100/60MHz Digital Storage Oscilloscope



## GDS-1000 Series

100/60/40/25MHz Digital Storage Oscilloscope



## INSTEK AMERICA CORP.

3661 Walnut Avenue Chino, CA 91710, U.S.A.

T +1-909-5918358 F +1-909-5912280

E-mail: sales@instek.com

**GW INSTEK**

Made to Measure

[www.instek.com](http://www.instek.com)



# Take a good look at your data acquisition provider



## ARE YOU SEEING ONLY PART OF THE PICTURE?

- ▶ **PRICE** Are they low priced? or just cheap?
- ▶ **HARDWARE** Do they have exactly what you want? or just what they want you to buy?
- ▶ **SOFTWARE** Do they have the right software for *your* application, budget, and skill set?
- ▶ **QUALITY** Do they back up their claims with lifetime warranties? Why not?
- ▶ **CONTINUITY** Will the application you wrote today work with their next-generation products?
- ▶ **SETUP TIME** Can you start taking measurements within minutes?
- ▶ **SUPPORT** Is your first phone contact an experienced engineer?

### FEATURED THIS MONTH

Single Shot Generation  
Square Wave Generation  
Pulse Width Modulation  
Frequency Measurement  
Event Counter

### "IT'S ALL IN THE BOX"

READY TO RUN!

**\$249**



**USB-4301** Low-cost, 5-channel counter/timer

LOW-COST SOLUTION REPLACES EXPENSIVE INSTRUMENTATION

**MORE INFO**

[www.mccdaq.com/ctr](http://www.mccdaq.com/ctr)

IF YOU'RE NOT GETTING **EVERYTHING** YOU NEED FROM YOUR DATA ACQUISITION SUPPLIER, IT'S TIME TO CALL MEASUREMENT COMPUTING.

▶ Call us today at (508) 946-5100

**A complete selection of low-cost DAQ hardware—and software for every skill set**

**MEASUREMENT COMPUTING**

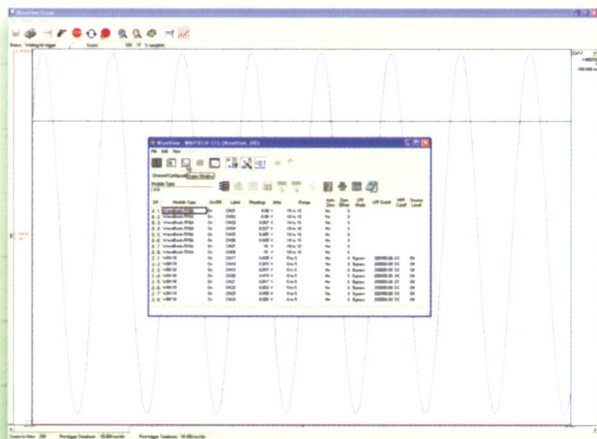
**[www.mccdaq.com/look](http://www.mccdaq.com/look)**

©2007 Measurement Computing Corporation, 10 Commerce Way, Norton, MA 02766 • 508 946-5100 • [info@mccdaq.com](mailto:info@mccdaq.com)



*Out-of-the-Box™*

# DATA ACQUISITION



## *Setup, Acquisition, & Real-Time Display*

### *WaveView™ Software*

- Scope mode for real-time waveform display
- Optional **eZ-Analyst™** for real-time spectrum analysis
- Support for Visual Studio® and Visual Studio® .NET, including examples for Visual C++®, Visual C#®, Visual Basic®, and Visual Basic® .NET
- Comprehensive drivers for DASyLab® and LabVIEW®



## *Ethernet-Based High-Speed Waveform Acquisition*

### *WaveBook™ Series*

- 16-bit, 1-MHz A/D with 8 built-in inputs
- Programmable pre- and post-trigger sampling rates
- Operable from AC line, a 10 to 30 VDC source, such as a car battery or optional rechargeable battery module
- SYNC connection allows multiple units to sample synchronously
- DSP-based design provides real-time digital calibration on all channels
- 1  $\mu$ s/channel scanning of any combination of channels

*Complete Solution*

**iOtech®**

[iotech.com/wavebook](http://iotech.com/wavebook) (888) 890-3011 [sales@iotech.com](mailto:sales@iotech.com)

©Copyright 2007, IOtech. All trademarks are property of their respective holders. For a complete listing of IOtech worldwide sales offices, see [www.iotech.com/sales](http://www.iotech.com/sales). 070204. T&M.

## In this section

- Stand-Alone Test Instruments, below
  - Modular Instruments, p. 45
  - Sensors, p. 52
  - Software, p. 54
  - Accessories, p. 55
  - Third-Party Suppliers, p. 55
  - Services/Labs/Test Houses, p. 56
- Vendor contact information begins on p. 106.

## STAND-ALONE TEST INSTRUMENTS

### Analyzers, Logic and Bus

Agilent Technologies  
Catalyst Enterprises  
FuturePlus Systems  
GOEPEL Electronics  
Intellitech  
LeCroy  
NCI Logic Analyzers  
Tektronix  
VMETRO

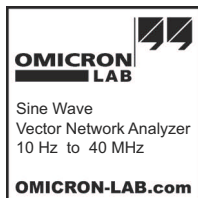
### Analyzers, Time Interval

EADS North America  
Test & Services  
Fluke  
GuideTech  
Pendulum Instruments  
Photon  
Stanford Research  
Systems  
Wavecrest  
Yokogawa Corp. of  
America

### Analyzers, Waveform/Signal

Agilent Technologies  
Anritsu  
Audio Precision  
Berkeley Nucleonics  
Boonton Electronics  
Briel & Kjaer  
Crystal Instruments  
Data Physics  
Dewetron  
EADS North America  
Test & Services  
Fluke  
GHI Systems  
GOEPEL Electronics  
Hioki USA  
Hi-Techniques  
IOtech  
Krohn-Hite

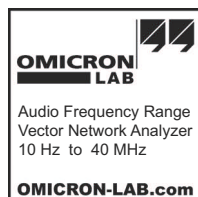
LDS Test and  
Measurement  
Leader Instruments  
LeCroy  
LMS North America



OROS  
Pendulum Instruments  
QualityLogic  
Sencore  
Signal Recovery  
Stanford Research  
Systems  
SyntheSys Research  
Tektronix  
Vibration Research  
Wavecrest  
Yokogawa Corp. of  
America

### Audio Test Sets

Agilent Technologies  
Audio Precision  
AudioControl  
Industrial  
Boonton Electronics  
Briel & Kjaer  
Data Physics  
EADS North America  
Test & Services  
Exttech Instruments



IET Labs  
LMS North America  
Opticom  
Prism Sound  
Rohde & Schwarz  
Sencore  
Tecpel  
Tektronix

### Calibration Standards

Agilent Technologies  
Anritsu  
Beamex  
Boonton Electronics  
Cascade Microtech  
Clarke-Hess  
EXFO  
Fluke  
Gigahertz-Optik  
Guildline Instruments  
IET Labs  
Krohn-Hite  
Newport Electronics  
Noise Com  
North Atlantic  
Industries  
Novatech Instruments  
Owens Design  
Pacific Instruments  
Pendulum Instruments  
Precision Test Systems  
Ross Engineering  
Rotek Instrument  
Spectracom  
Symmetricom  
VLSI Standards

### Calibrators, Multifunction

Beamex  
Clarke-Hess  
Data Physics  
Exttech Instruments  
Fluke

GMC-I Gossen  
Metrawatt  
Newport Electronics  
Omega Engineering  
Owens Design  
Protek Test and  
Measurement  
Rotek Instrument  
Tecpel  
Xitron Technologies  
Yokogawa Corp. of  
America

### Calibrators, Temperature

Beamex  
Everest Interscience  
Exttech Instruments  
Fluke  
Guildline Instruments  
Lake Shore Cryotronics  
Newport Electronics  
Omega Engineering  
Sun Electronic Systems  
Tecpel  
ThermaCal  
Xitron Technologies  
Yokogawa Corp. of  
America

### Counters/Timers

ACCES I/O Products  
Aeroflex  
Agilent Technologies  
B&K Precision  
EADS North America  
Test & Services  
Exttech Instruments  
Fluke  
Instek America  
Monarch Instrument  
Pendulum Instruments  
Protek Test and  
Measurement  
Spectracom  
Stanford Research  
Systems  
Tabor Electronics  
Thurlby-Thandar  
Instruments (TTI)  
Wavecrest  
Yokogawa Corp. of  
America

### Current Meters, Clamp-on

AEMC Instruments  
Amprobe Test Tools  
Flex-Core  
Protek Test and  
Measurement  
Sperry Instruments

Sypris Test &  
Measurement  
Tecpel



### Data-Acquisition Systems, Networked

ACCES I/O Products  
Advantech  
Agilent Technologies  
Astro-Med  
Campbell Scientific  
Dalsa  
DAQ Systems  
Data Physics  
Dataq Instruments  
Dewetron  
Diversified Technical  
Systems  
Fluke  
Heim Data  
Hi-Techniques  
ICS Electronics  
IMC DataWorks  
Intelligent  
Instrumentation  
IOtech  
Keithley Instruments  
Lawson Labs  
LDS Test and  
Measurement  
Computing  
Microstar Laboratories  
Monarch Instrument  
Moxa Americas  
National Instruments  
Neff Instrument  
OROS  
Pace Scientific  
Pacific Instruments  
Photon  
Pico Technology  
Saelig  
Scientific Solutions

TECPEL  
Electronic and Electric  
Test Instruments  
Fax: 886-2-2737-3343  
E-mail: sales@tecpele.com  
http://www.oka.com.tw  
http://www.tecpele.com

### Data-Acquisition Systems, Requiring PC

ACCES I/O Products  
Advantech  
Agilent Technologies  
B & B Electronics  
Campbell Scientific  
Dalsa  
DAQ Systems  
Data Physics

Data Translation  
Dataforth  
Dataq Instruments  
Dewetron  
EADS North America  
Test & Services  
Fluke  
GHI Systems  
GOEPEL Electronics  
Heim Data  
Hi-Techniques  
IMC DataWorks  
Innovative Integration  
Intelligent  
Instrumentation  
IOtech  
Keithley Instruments  
Lawson Labs  
LDS Test and  
Measurement  
LMS North America  
m + p international  
Measurement  
Computing  
Microstar Laboratories  
Monarch Instrument  
Moxa Americas  
National Instruments  
Neff Instrument  
OROS  
Pace Scientific  
Pacific Instruments  
Photon  
Pico Technology  
Saelig  
Scientific Solutions



United Electronic  
Industries  
Vibration Research  
VXI Technology

### Data-Acquisition Systems, Stand-Alone

ACCES I/O Products  
Advantech  
Agilent Technologies  
Astro-Med  
B & B Electronics  
Bustec  
Campbell Scientific  
Dalsa  
DAQ Systems

Continued >



## > STAND-ALONE TEST INSTRUMENTS *Continued*

Data Physics  
Data Translation  
Dataq Instruments  
Daytronic  
Dewetron  
DGH  
Diversified Technical Systems  
Fluke  
GE Energy  
GOEPEL Electronics  
Hioki USA  
Hi-Techniques  
IMC DataWorks  
Innovative Integration  
Instrumented Sensor Technology  
Intelligent Instrumentation  
IOtech  
Lawson Labs  
LDS Test and Measurement  
LMS North America  
Macro Sensors  
Microstar Laboratories  
Monarch Instrument

MTI Instruments  
Onset Computer  
Pace Scientific  
Pacific Instruments  
Pico Technology  
R.C. Electronics  
Sony Manufacturing Systems America  
Tecpel  
United Electronic Industries  
VMETRO  
Yokogawa Corp. of America

### Dataloggers and Event Recorders

ACCES I/O Products  
ACR Systems  
Advantech  
AEMC Instruments  
Astro-Med  
Campbell Scientific  
Conduant  
DAQ Systems  
Data Physics  
Dataforth

Dataq Instruments  
DCC Corp.  
Dewetron  
Diversified Technical Systems  
Exttech Instruments  
Fluke  
Givens Control Engineering  
GMC-I Gossen Metrawatt  
GOEPEL Electronics  
Graphtec America  
Heim Data  
Hioki USA  
Hi-Techniques  
IMC DataWorks  
Innovative Integration  
Instrumented Sensor Technology  
Intelligent Instrumentation  
IOtech  
Keithley Instruments  
LDS Test and Measurement  
Linseis  
m + p international

M/RAD  
Measurement Computing  
Monarch Instrument  
National Instruments  
Newport Electronics  
Omega Engineering  
Onset Computer  
OptoTest  
Pace Scientific  
Pacific Instruments  
Pico Technology  
Rotronic Instrument  
Saelig  
SOLTEC  
Sony Manufacturing Systems America  
Tecpel  
Telatemp  
United Electronic Industries  
VMETRO  
VXI Technology  
Yokogawa Corp. of America

### DMMs, Benchtop/System

Agilent Technologies  
Amprobe Test Tools  
B&K Precision  
Fluke  
GMC-I Gossen Metrawatt  
Hioki USA  
Instek America  
Keithley Instruments  
Protek Test and Measurement  
Rigol Technologies  
Signal Recovery  
Tecpel  
Thurlby-Thandar Instruments (TTi)  
Yokogawa Corp. of America

### DMMs, Handheld

AEMC Instruments  
Agilent Technologies  
Amprobe Test Tools  
B&K Precision  
Exttech Instruments

Fluke  
GMC-I Gossen Metrawatt  
Hioki USA  
Instek America  
Linseis  
Newport Electronics  
Omega Engineering  
Protek Test and Measurement  
Sencore  
Sperry Instruments  
Tecpel

**TECPEL**  
Electronic and Electric Test Instruments  
Fax: 886-2-2737-3343  
E-mail: sales@tecpe.com  
http://www.oka.com.tw  
http://www.tecpe.com

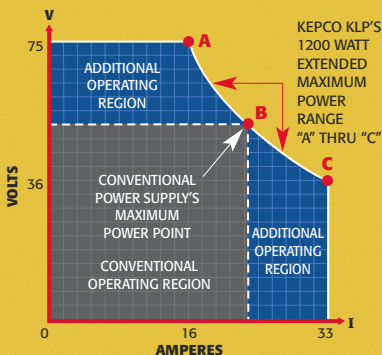
### Electronic Filters

Alligator Technologies  
DL Instruments  
Frequency Devices  
Kemo

*Continued >*

## KEPCO IS AHEAD WITH OUR CURVE.

**KEPCO'S EXCLUSIVE TECHNOLOGY REPLACES THE NEED FOR MULTIPLE POWER SUPPLIES BY EXPANDING THE OPERATING REGION OF THE KLP POWER SUPPLY. THE BREAKTHROUGH OF A HYPERBOLIC POWER LIMIT DELIVERS A FULL 1200 WATTS OVER AN EXPANDED OPERATING RANGE, NOT JUST A SINGLE POINT.**



Kepco's Series KLP is programmable in many languages, using many common interfaces: GPIB and isolated analog control are standard and an LXI-approved LAN (Ethernet, RJ-45) connector is also available.



Call us to **TALK** about the Series KLP Power Supplies or visit [www.kepcopower.com/klp.htm](http://www.kepcopower.com/klp.htm)

**KEPCO, INC.** 131-38 Sanford Avenue  
Flushing, NY 11355 USA  
Tel: (718) 461-7000 • Fax: (718) 767-1102  
Email: [hq@kepcopower.com](mailto:hq@kepcopower.com) • [www.kepcopower.com](http://www.kepcopower.com)



## Wide Band Clamp-on Current Monitor



Pearson Electronics is pleased to introduce a new line of Wide Band Clamp-on Current Monitors. The new design features a 1/2 inch or 1 inch aperture with a hinged type opening for easy operation. The new design incorporates Pearson's wide band frequency response in a demountable configuration for use on fixed conductors.

The model 411C, typical of the group, has a sensitivity of 0.1 V/A, a 3dB bandwidth from 25 Hz to 20 MHz, and a 5,000 amp peak current rating. Pulse rise times down to 20 nanoseconds can be viewed. Accuracy of 1%, or better, is obtainable across the mid-band.

Other models feature a 2.0 nanosecond rise time, or droop as low as 0.003% per microsecond.

**Contact Pearson Electronics for application information.**

### Pearson Electronics

4009 Transport St. Palo Alto, CA 94303 USA  
Telephone: (650) 494-6444 FAX (650) 494-6716  
[www.pearsonelectronics.com](http://www.pearsonelectronics.com)



Smart choice for power™

**xantrex**™

[www.programmablepower.com](http://www.programmablepower.com)

## Your Complete Source for Programmable Power Solutions

# **ELGAR**™ **Sorensen**™ **xantrex**™ **POWER**TEN™

When you want power, think Xantrex Programmable Power. Xantrex is now the proud manufacturer of a larger family of trusted brands: Elgar, Sorensen, Power Ten and Xantrex. From benchtop to battleship, from laboratory to production, from clean room to factory... Xantrex is your complete source for programmable power solutions.

- ▶ DC Bench Supplies
- ▶ DC High Power, Rack-mount Supplies
- ▶ DC Modular & Configurable Systems
- ▶ AC Power Sources
- ▶ AC & DC Electronic Loads
- ▶ Custom Solutions

To find your solution, go to:

[www.programmablepower.com](http://www.programmablepower.com)

Programmable Division of Xantrex Technology Inc.  
9250 Brown Deer Road, San Diego, CA 92121

858-458-0223 ■ [sales@programmablepower.com](mailto:sales@programmablepower.com)



© 2008 Xantrex Technology Inc. — All rights reserved. [www.xantrex.com](http://www.xantrex.com)  
Xantrex and Smart choice for power are registered trademarks of Xantrex International.  
Sorensen, Elgar & Power Ten are registered trademarks of Programmable Division of Xantrex Technology Inc.



## > STAND-ALONE TEST INSTRUMENTS *Continued*

Krohn-Hite  
Pacific Instruments  
Precision Filters  
Signal Recovery  
Stanford Research  
Systems

### Electronic Loads

Advanced Power  
Designs  
AMREL  
Autotest Co.  
California Instruments  
Chroma Systems  
Solutions  
Instek America

Keithley Instruments  
Kikusui America  
Murata Power  
Solutions  
Protek Test and  
Measurement  
Sencore  
TDI Power

Thurlby-Thandar  
Instruments (TTi)

### Generators, Pulse, Function, Arbitrary

Agilent Technologies  
Amprobe Test Tools  
Anritsu

AR, RF/Microwave  
Instrumentation  
Avtech Electrosystems  
B&K Precision  
Berkeley Nucleonics  
Chase Scientific  
Data Physics  
Directed Energy  
Fluke  
Highland Technology  
Hioki USA  
Instek America  
Keithley Instruments  
Kikusui America  
Krohn-Hite  
Leader Instruments  
Noise Com  
Picosecond Pulse  
Labs  
Protek Test and  
Measurement  
Rigol Technologies  
Signal Recovery  
Stanford Research  
Systems  
Tabor Electronics  
Tecpel  
Tegam  
Tektronix  
Thurlby-Thandar  
Instruments (TTi)  
Yokogawa Corp. of  
America


Tecpel

### Intermittent Fault Testers/Analyzers

CableTest Systems  
Photon  
Sovtest

### LCR Meters/ Bridges

Agilent Technologies  
Amprobe Test Tools  
B&K Precision  
Boonton Electronics  
Chroma Systems  
Solutions  
Exttech Instruments  
Fluke  
Hioki USA  
IET Labs  
Instek America  
Keithley Instruments



R, L, C, Q  
Impedance Meter  
10 Hz to 40 MHz  
**OMICRON-LAB.com**

Protek Test and  
Measurement  
QuadTech  
Stanford Research  
Systems  
Tecpel



**TECPEL**  
Electronic and Electric  
Test Instruments  
Fax: 886-2-2737-3343  
E-mail: sales@tecpe.com  
<http://www.oka.com.tw>  
<http://www.tecpe.com>

Tegam  
Thurlby-Thandar  
Instruments (TTi)

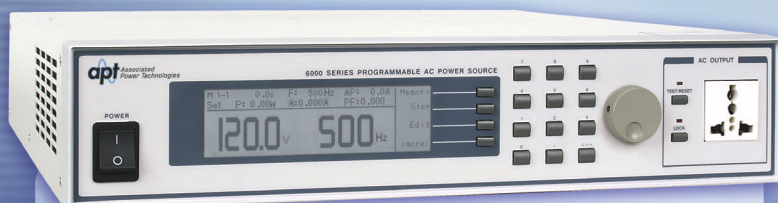
### Magnetic Field Meters

Applied Physics  
Systems  
Lake Shore Cryotronics  
Magnetic Shield  
Sypris Test &  
Measurement  
Tecpel

### Microprocessor/ IC Troubleshoot- ing Tools

Agilent Technologies  
*Continued >*

# AC Power Sources



## High-Performance at a Low Price

- Switching Power Technology
- Direct Coupled Output
- Intuitive User Interface
- Manual and Programmable Models

**Guaranteed Delivery**  
**Standard Models Ship within 24 Hrs!**

MANUAL  
MODELS  
STARTING AT  
**\$1,995<sup>00</sup>**

PROGRAMMABLE  
MODELS  
STARTING AT  
**\$2,595<sup>00</sup>**

• 500 VA • 1 KVA • 2 KVA • 4 KVA MODELS

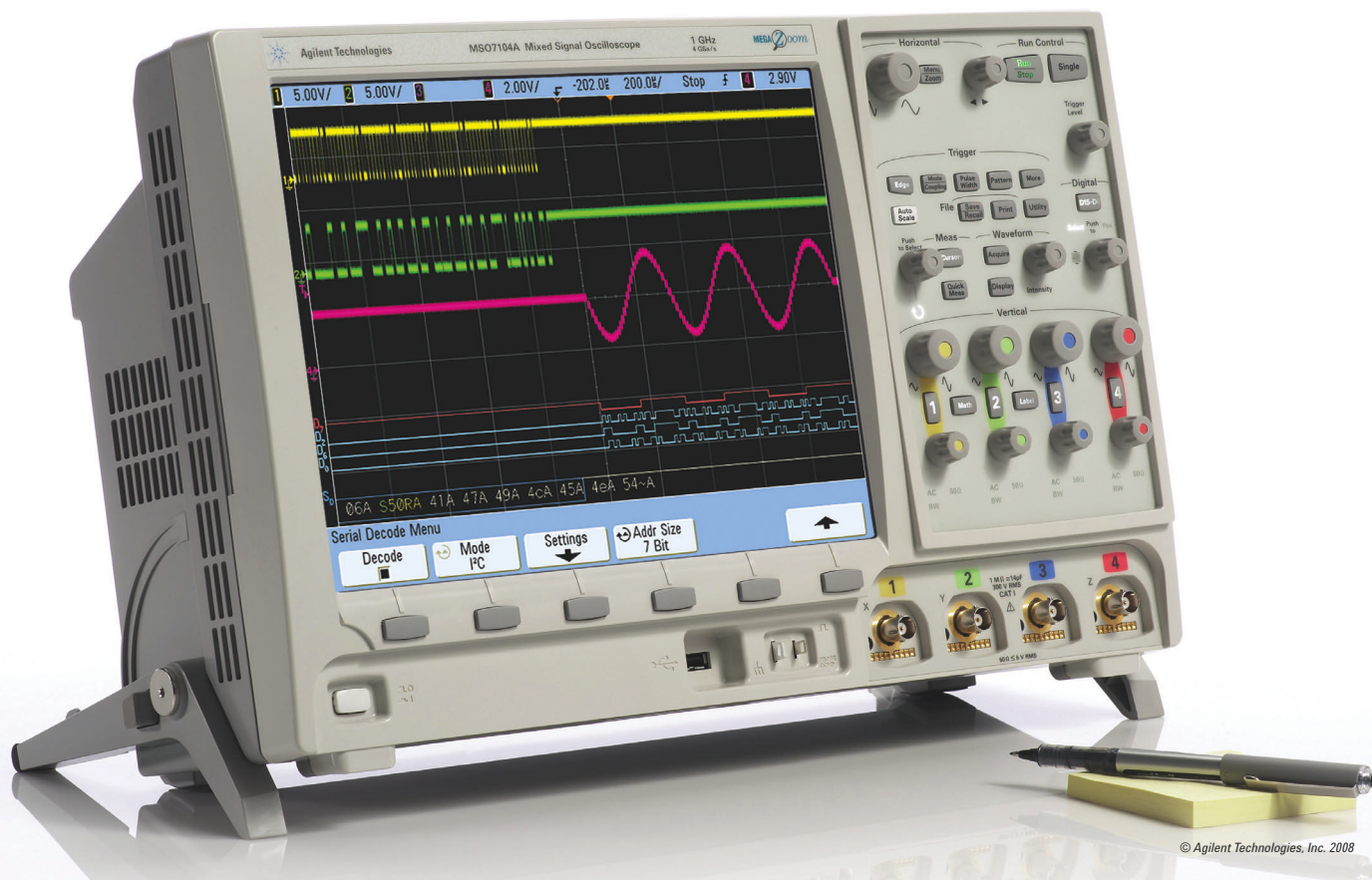
**apt** Associated  
Power Technologies™

Visit our website to request a product demo.

Toll Free: 1-877-322-7693  
[www.aspowertechologies.com](http://www.aspowertechologies.com)

# Biggest Screen. Best signal visibility.

Introducing Agilent's newest oscilloscope.



© Agilent Technologies, Inc. 2008

## Agilent InfiniiVision 7000 Series oscilloscopes

Bandwidth	350 MHz, 500 MHz, 1 GHz
Channels	2 or 4 analog +16 digital on MSOs
Waveform update rate	Up to 100,000 waveforms per second
Connectivity	USB, LAN, XGA-out
Display	12.1" XGA LCD
Footprint	6.5" deep, 13 lbs.
Applications	I <sup>2</sup> C, SPI, CAN/LIN/FlexRay, RS-232/UART, Xilinx and Altera FPGA, Segmented Memory, Vector Signal Analysis, Offline PC-based analysis of acquired data, Power

5 new digital scope models and 5 new mixed-signal scope models

u.s. 1-800-829-4444

canada 1-877-894-4414

[www.agilent.com/find/7000appnote](http://www.agilent.com/find/7000appnote)

More than a decade ago Agilent introduced the industry's first mixed signal oscilloscope. Now you can experience 3rd generation MSO technology and the industry's fastest DSO update rates with the new InfiniiVision 7000 Series.

1. **Industry's biggest (12.1") screen** so you see analog, digital and serial signals better – in one instrument.
2. **Fastest uncompromised update rate** shows you critical signal detail and infrequent events that other scopes miss.
3. **Industry's only hardware accelerated serial decode** gives you faster insight.

See an online demo and get a free app note at  
[www.agilent.com/find/7000appnote](http://www.agilent.com/find/7000appnote)



Agilent Technologies



## > STAND-ALONE TEST INSTRUMENTS *Continued*

Fluke  
Huntron  
Navatek Engineering

### Oscilloscopes, Benchtop, Analog

Agilent Technologies  
B&K Precision  
Fluke  
Instek America  
Leader Instruments  
Protek Test and  
Measurement  
Sencore  
Tecpel

### Oscilloscopes, Benchtop, Digital, 1 GHz and Above

Agilent Technologies  
B&K Precision  
LeCroy  
SyntheSys Research  
Tektronix  
Wavecrest

Yokogawa Corp. of  
America

### Oscilloscopes, Benchtop, Digital, Below 1 GHz

Agilent Technologies  
Data Physics  
Fluke  
Hameg Instruments  
Hi-Techniques  
Instek America  
LDS Test and  
Measurement  
LeCroy  
Rigol Technologies  
Tecpel



Tektronix

Yokogawa Corp. of  
America

### Oscilloscopes, Handheld

AEMC Instruments  
Agilent Technologies  
Data Physics  
Fluke  
Protek Test and  
Measurement  
Saelig

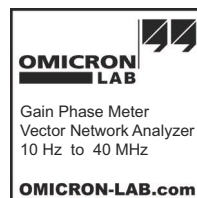
### Pattern Generators, Digital

Agilent Technologies  
Anritsu  
Berkeley Nucleonics  
Centellax  
Chroma Systems  
Solutions  
Klein Instruments  
Leader Instruments  
LeCroy  
Sencore  
SyntheSys Research

Tabor Electronics  
Tektronix  
VMETRO

### Phase Meters/ Phase Angle Voltmeters

Agilent Technologies  
Audio Precision  
Clarke-Hess  
Colby Instruments  
Extech Instruments  
Flex-Core  
Hioki USA  
Krohn-Hite



North Atlantic  
Industries  
Signal Recovery  
Sperry Instruments

Tecpel  
Xitron Technologies  
Yokogawa Corp. of  
America

### Power Amplifiers

AR, RF/Microwave  
Instrumentation  
AudioControl  
Industrial  
California Instruments  
Chroma Systems  
Solutions  
Clarke-Hess  
Data Physics  
Krohn-Hite  
Ophir RF  
Tabor Electronics  
TREK

### Power Monitors/ Analyzers

Advanced Power  
Designs  
AEMC Instruments  
Agilent Technologies  
Berkeley Varitronics  
Systems

Bird Electronic  
Chroma Systems  
Solutions  
Dewetron  
Extech Instruments  
Flex-Core  
Fluke  
GMC-I Gossen  
Metrawatt  
Hioki USA  
IOtech  
Magtrol  
National Instruments  
Ross Engineering  
Sencore  
Tektronix  
Xitron Technologies  
Yokogawa Corp. of  
America

### Power Sources & Conditioners

Absopulse Electronics  
Advanced Power  
Designs  
Aeroflex

*Continued >*

# Good information is hard to come by

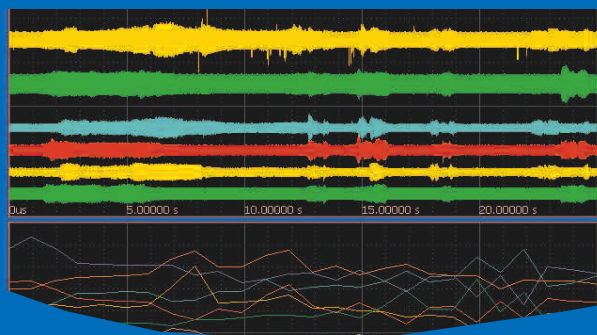
That's why at TMWorld.com we are dedicated to providing you with the best technical information we can. Get the in-depth information you need to perform your job better. Visit us for our current issue, or browse our archives.

**Technical how-to information about test,  
measurement and inspection.**

## TMWorld.com

Visit the **new** TMWorld.com.

The industry's best source for test, measurement, and inspection information.



Time	1-1	1-2	2-1	2-2	3-1	3-2
0us	0.200mV	-0.200mV	-0.625mV	0.625mV	-3.7375mV	2.8437mV
50us	-1.550mV	1.250mV	-1.250mV	1.563mV	-3.5844mV	3.0844mV
100us	-1.700mV	1.250mV	-1.625mV	1.375mV	-3.3375mV	3.3125mV
150us	-1.850mV	1.150mV	-1.563mV	1.563mV	-3.3188mV	3.0969mV
200us	-1.900mV	1.350mV	-1.500mV	1.500mV	-2.9556mV	2.5063mV
250us	-1.850mV	0.900mV	-1.625mV	1.500mV	-1.0188mV	1.6719mV
300us	-1.800mV	1.050mV	-1.812mV	1.375mV	1.8594mV	-0.9875mV
350us	-2.100mV	1.100mV	-1.563mV	1.500mV	3.5719mV	-2.6156mV
400us	-2.000mV	1.150mV	-1.625mV	1.438mV	4.0094mV	-2.3031mV
450us	-2.100mV	1.250mV	-1.063mV	1.125mV	3.8906mV	-2.5719mV
500us	0.150mV	0.450mV	0.875mV	-0.125mV	3.6812mV	-2.8719mV
550us	2.000mV	-1.000mV	1.750mV	-0.875mV	4.1938mV	-2.3938mV
600us	2.000mV	-1.400mV	1.688mV	-0.937mV	3.8438mV	-2.7281mV
650us	1.900mV	-1.050mV	1.688mV	-0.937mV	3.4375mV	-2.8687mV
700us	1.950mV	-1.250mV	1.812mV	-0.937mV	3.0563mV	-2.2563mV
750us	1.900mV	-1.650mV	1.750mV	-0.937mV	1.4344mV	-0.8281mV
800us	2.400mV	-1.650mV	1.750mV	-0.937mV	-1.9437mV	1.2094mV
850us						2.7750mV



IF THE BEST IN TECHNOLOGY  
IS IMPORTANT TO YOU,  
YOU NEED TO HAVE THE NEXT GENERATION  
OF HYBRID RECORDERS



# HIOKI

6 CORPORATE DRIVE • CRANBURY, NEW JERSEY  
PHONE: 609.409.9109 • FAX: 609.409.9108

[www.hiokiusa.com](http://www.hiokiusa.com)

CAT IV 600V  
CAT III 1000V



ISO 9001  
JMI-0216



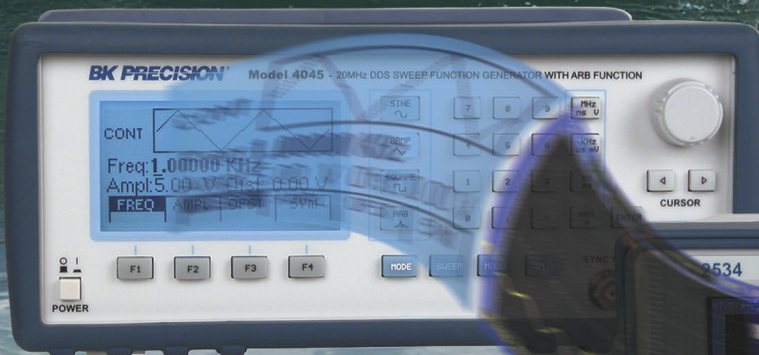
ISO 14001  
JQA-E-90091

## Introducing HIOKI's 8860-50 HYBRID RECORDER

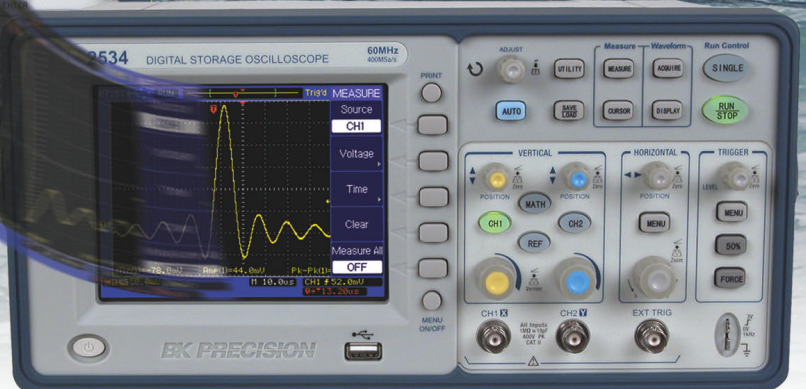
- Runs Windows CE
- Advanced Math Functions
- Advanced Trigger and Search Functions
- Dual Compact Flash card
- LAN Port
- Built-in web browser
- 16 Logic Inputs



# You don't need to be a surfer to catch this wave



**Capture the moment**  
**Generate your own perfect waveform and capture it too**



## New Generation of Function/Arbitrary Generators

*Industry's broadest range*

- DC to 120 MHz
- Low cost educational to performance laboratory grade
- Full featured programmable DDS generators with arbitrary waveform capability



## New Line of Digital Storage Oscilloscopes

*Enjoy reliable performance without busting your budget*

- 25/40/60 MHz bandwidth models
- 4000 point record length each channel
- Color or monochrome LCD
- User friendly interface combined with powerful debugging tools

Go to [www.bkprecision.com/wave](http://www.bkprecision.com/wave) to learn more

Ph.: 714.921.9095  
[www.bkprecision.com](http://www.bkprecision.com)



**BK PRECISION**  
ELECTRONIC TEST INSTRUMENTS

## > STAND-ALONE TEST INSTRUMENTS *Continued*

Agilent Technologies  
AMREL  
Associated Power Technologies  
Autotest Co.  
B&K Precision  
Behlman Electronics  
California Instruments  
Chroma Systems Solutions  
Extech Instruments  
Glassman High Voltage  
Hameg Instruments  
Hioki USA  
Instek America  
Keithley Instruments  
Kepco  
Kikusui America  
Lake Shore Cryotronics  
Lambda Americas  
Murata Power Solutions  
Pacific Power Source  
Programmable Division of Xantrex Technology  
Pulizzi Engineering  
Qualmark  
Sens-Tech  
Spellman High Voltage Electronics  
Superior Electric  
Tamura Corp. of America  
Tecpel  
Thurlby-Thandar Instruments (TTi)  
Tracewell Systems  
Vektrex Electronic Systems  
Vigor

B & B Electronics  
Brüel & Kjær  
Dataforth  
Dataq Instruments  
Dewetron  
DL Instruments  
Endevco  
Flex-Core  
Futek Advanced Sensor Technology  
Hi-Techniques  
IOtech  
Keithley Instruments  
Kistler Instrument  
Krohn-Hite  
LDS Test and Measurement  
Macro Sensors  
Measurement Computing  
Microstar Laboratories  
Murata Power Solutions  
National Instruments  
Neff Instrument  
Newport Electronics  
Omega Engineering  
Pacific Instruments  
PCB Piezotronics  
Pico Technology  
Picosecond Pulse Labs  
Precision Filters  
R.C. Electronics  
Ross Engineering  
Signal Recovery  
Stanford Research Systems  
Tabor Electronics  
TREK  
Yokogawa Corp. of America

### Serial Bus Testers/Debuggers

Catalyst Enterprises  
Connecticut Technology Products  
Finisar  
FuturePlus Systems  
GOEPEL Electronics  
Ixia  
LeCroy  
Synthesys Research  
Tektronix  
VMETRO  
Wavecrest

### Signal Conditioners

Advantech

### Sound/Audio Level Meters

AEMC Instruments  
Brüel & Kjær  
Casella USA  
Extech Instruments  
IET Labs  
Leader Instruments  
m + p international  
Protek Test and Measurement  
Sencore  
Tecpel  
Tektronix  
Yokogawa Corp. of America

### Spectrum Analyzers, Audio

Agilent Technologies  
Audio Precision  
AudioControl  
Industrial  
Brüel & Kjær  
Casella USA  
Data Physics  
Electronic Systems of Wisconsin  
LDS Test and Measurement  
LMS North America  
m + p international  
Opticom  
OROS  
Sencore  
Stanford Research Systems  
Tektronix  
Thurlby-Thandar Instruments (TTi)

### Tachometers

AEMC Instruments  
IET Labs  
LDS Test and Measurement  
Polytec  
Tecpel

### Temperature Meters, Bench

Data Translation  
Fluke  
Keithley Instruments  
Lake Shore Cryotronics  
Monarch Instrument  
National Instruments  
Newport Electronics  
Omega Engineering  
Pyrometer Instrument  
Stanford Research Systems  
Xitron Technologies

### Temperature Meters, Handheld

AEMC Instruments  
Amprobe Test Tools  
Casella USA  
Everest Interscience  
Extech Instruments  
Fluke  
Hioki USA  
Linseis  
Monarch Instrument  
National Instruments

Newport Electronics  
Omega Engineering  
Pyrometer Instrument  
Rotronic Instrument  
Saelig  
Sperry Instruments  
Tecpel

### TECPEL Electronic and Electric Test Instruments

Fax: 886-2-2737-3343  
E-mail: sales@tecpe.com  
http://www.oka.com.tw  
http://www.tecpe.com

Tegam  
Telatemp  
Yokogawa Corp. of America

### Time/Frequency/Phase Standards

Agilent Technologies  
Berkeley Nucleonics  
Clarke-Hess  
Colby Instruments  
Fluke  
Novatech Instruments  
Pendulum Instruments  
Schomandl  
Spectracom  
Stanford Research Systems  
Symmetricom  
Tabor Electronics

### Transformer Testers

Chroma Systems Solutions  
Hipotronics  
QuadTech  
Xitron Technologies

### Wattmeters

Bird Electronic  
Boonton Electronics  
Chroma Systems Solutions  
Clarke-Hess  
Flex-Core  
Tecpel  
Xitron Technologies

## Quality Hipot Testers!

(SAFETY TESTER)

No.1 Manufacturer in Japan

## Standard Model

Standard type suitable for production and inspection lines

ACW 5kV/100mA(500VA)  
DCW 5kV/10mA

RS-232C Timer



TOS5051A

## TOS5000A SERIES

The TOS5000A series offers testers specifically designed to conduct hipot testing on electronic devices and components in accordance with the relevant safety standards. Two models are available - TOS5051A with 5 kV AC/DC output and TOS5050A with 5 kV AC output. While inheriting the basic performance of our best-selling TOS5000 series testers, TOS5000A has an additional feature - RS-232C interface - that comes standard with the tester. Because the tester can be connected directly to a PC and a serial printer, test data can be recorded and saved with ease, leading to further enhancement in quality control.

- Complies with various safety standards
- AC/DC output (TOS5051A)
- Large color display
- Digital voltmeter and ammeter
- Digital timer
- Window comparator type employed for PASS/FAIL judgement.
- Equipped with remote control function
- Various signal outputs
- Automatic discharge function (TOS5051A: during DC operation)
- Provided with zero turn-on switch
- Equipped with RS-232C as standard
- Data acquisition software (SD004-TOS5000A/Option)



www.kikusui.us

1-800-KIKUSUI (1-800-545-8784)



Continued >



# Switch On to Pickering LXI and PXI Switching



## Switching - Dual LXI and PXI Capability

Pickering uniquely supports both LXI and PXI Test platforms, with full software compatibility and support for all popular environments including Linux and RTOS.

- **LXI (LAN):** Dozens of switching solutions, RF/Microwave, High Current, Optical, High Voltage and especially Matrix configurations with over 4000 relays in a 1U "Pizza box". Nobody beats Pickering on Switch density.
- **PXI:** Pickering have over 500 PXI Switching Modules, more than all other PXI vendors combined! So whatever your application Pickering have a great switching solution.
- **PXI in LXI:** Have your cake and eat it too! - all Pickering PXI Switch cards operate seamlessly in LXI (LAN) using our 60-100A Modular Switching Chassis.



Pickering Interfaces Inc., Grants Pass, OR.  
Tel: +1 541 471 0700  
E-mail: [ussales@pickeringtest.com](mailto:ussales@pickeringtest.com)  
(East Coast Regional Office) Woburn, MA.  
Tel: +1 781 897 1710

### LXImate & PXImate (FREE on request)

Want to know more about either LXI or PXI? Pickering has two publications to help you get started. Get your free copies by registering at either [www.pickeringtest.com/lximate](http://www.pickeringtest.com/lximate) or [www.pickeringtest.com/pximate](http://www.pickeringtest.com/pximate).



[www.pickeringtest.com](http://www.pickeringtest.com)

Direct Sales Offices in USA, UK, Sweden,  
Germany, Czech Republic, France and China

**pickering**

## MODULAR INSTRUMENTS

### Bus Interfaces & Extenders

ACCES I/O Products  
Adlink Technology  
Advanced Vehicle Technologies  
Advantech  
Agilent Technologies  
ASSET Intertech  
B & B Electronics  
Elan Digital Systems  
ELMA Electronic  
FuturePlus Systems  
Geotest - Marvin Test Systems  
GOEPEL Electronics  
ICS Electronics  
ines  
Intellitech  
IOtech  
JTAG Technologies  
Keithley Instruments  
M3 Electronics  
Measurement Computing  
MEN Micro  
Moxa Americas  
National Instruments  
Pickering Interfaces  
PLDA  
Scientific Solutions  
Sealevel Systems  
VMETRO

### CompactPCI/PXI Analog I/O Cards

Acromag  
Adlink Technology  
Advantech  
C&H Technologies  
DaqScribe Technology  
Exacq Technologies  
GaGe  
Geotest - Marvin Test Systems  
GOEPEL Electronics  
Innovative Integration  
KineticSystems  
Measurement Computing  
MEN Micro  
National Instruments  
North Atlantic Industries  
Spectrum  
Strategic Test  
Tabor Electronics  
United Electronic Industries

### CompactPCI/PXI Arbitrary Waveform Generators

Adlink Technology  
Advanced Power Designs  
Advantech  
Agilent Technologies  
C&H Technologies  
DaqScribe Technology  
Geotest - Marvin Test Systems  
GOEPEL Electronics  
National Instruments  
Pickering Interfaces  
Strategic Test  
Tabor Electronics  
United Electronic Industries  
ZTEC Instruments

### CompactPCI/PXI Counters/Timers

Acromag  
Adlink Technology  
Advantech  
B & B Electronics  
Geotest - Marvin Test Systems  
KineticSystems  
MEN Micro  
National Instruments  
Signametrics  
Spectracom  
United Electronic Industries

### CompactPCI/PXI Digital I/O Cards

Acromag  
Adlink Technology  
Advantech  
C&H Technologies  
Conduant  
Geotest - Marvin Test Systems  
Giga-tronics  
GOEPEL Electronics  
Innovative Integration  
KineticSystems  
Measurement Computing

MEN Micro  
National Instruments  
Navatek Engineering  
Pickering Interfaces  
Spectrum  
Strategic Test  
United Electronic Industries

### CompactPCI/PXI Digitizers/Oscilloscopes

Adlink Technology  
Advantech  
Aeroflex  
Agilent Technologies  
DaqScribe Technology  
GaGe  
Geotest - Marvin Test Systems  
KineticSystems  
Measurement Computing  
National Instruments  
Pickering Interfaces  
Strategic Test  
ZTEC Instruments

### CompactPCI/PXI DMMs

Geotest - Marvin Test Systems  
Giga-tronics  
MEN Micro  
National Instruments  
Pickering Interfaces  
Signametrics

### CompactPCI/PXI DSP Cards

DaqScribe Technology  
Exacq Technologies  
Innovative Integration  
MEN Micro  
VMETRO

### CompactPCI/PXI Logic Analyzers

Geotest - Marvin Test Systems  
National Instruments  
VMETRO

### CompactPCI/PXI Multifunction I/O Cards

ACCES I/O Products  
Acromag  
Adlink Technology  
Advantech  
Ballard Technology  
DaqScribe Technology  
Geotest - Marvin Test Systems  
GOEPEL Electronics  
Innovative Integration  
KineticSystems  
National Instruments  
Sealevel Systems  
United Electronic Industries  
VMETRO

### CompactPCI/PXI RF Measurement Cards

Aeroflex  
DaqScribe Technology  
Innovative Integration  
National Instruments

### CompactPCI/PXI Signal Conditioners

Alligator Technologies  
DaqScribe Technology  
Frequency Devices  
Innovative Integration  
MEN Micro  
National Instruments  
Pickering Interfaces  
United Electronic Industries

### CompactPCI/PXI Spectrum Analyzers

National Instruments

### CompactPCI/PXI Switches/Multiplexers

Adlink Technology  
Advantech  
Chroma Systems Solutions  
Cytec  
Digalog Systems  
Geotest - Marvin Test Systems  
Giga-tronics  
GOEPEL Electronics

## Quality Hipot Testers!

(SAFETY TESTER)

No.1 Manufacturer in Japan

## High-End Model

High-performance type suitable for R&D, Quality Assurance, and Automatic Testing Systems

ACW	5kV/100mA(500VA)
DCW	6kV/10mA
IR	0.01MΩ - 9.99GΩ (DC25V - 1000V)



GP1B

RS-232C



TOS9201

## TOS9200 SERIES

The TOS9200 Series has been developed to meet a wide diversity of customer needs. Including the refinement and enforcement of Kikusui's former series, its specifications reflect the results of detailed study of our large database of user's requirements including special orders and modifying specifications.

The TOS9200 Series consists of four products: the testers TOS9200 and TOS9201, and the high-voltage scanners TOS9221 and TOS9220. The TOS9200 is equipped with AC hipot and insulation resistance testing functions, while the TOS9201 has a DC hipot testing function in addition to these two functions. The power block, a core component, employs a high-efficiency switching power supply and a switching amplifier based on PWM systems. These features realize high power and enhanced stability, as well as reducing the size and weight of the unit. When combined with the ground bond tester TOS6200, the TOS9200 Series integrates three or four types of tests in a single process.

Furthermore, when used together with the high-voltage scanner TOS9220/9221 (equipped with a contact check function), the tester is capable of automatically checking test points for up to 16 channels, thereby facilitating a safe, reliable automatic testing system.

- Rise-time control function
- Fall-time control function
- Offset cancel function
- Measured-value hold function
- Output voltage monitoring function
- Memory function
- Program function
- Interlock function
- DC discharge function



www.kikusui.us

1-800-KIKUSUI (1-800-545-8784)





# PicoScope 9201

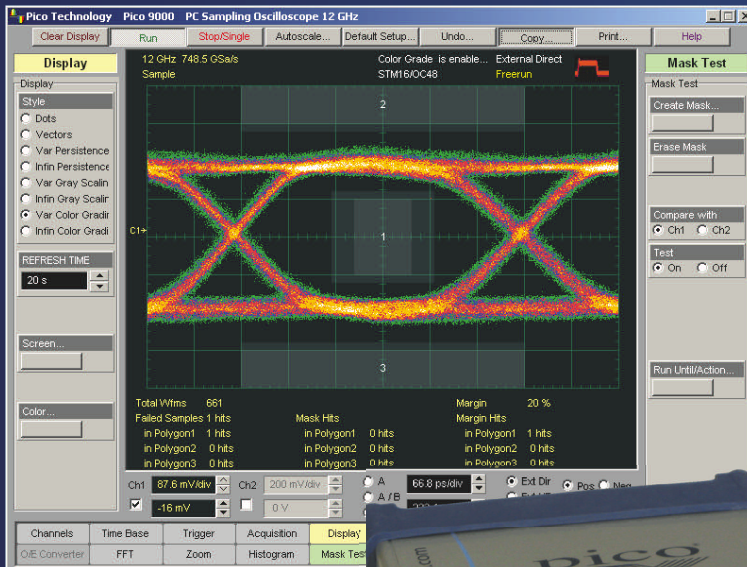
Sampling Oscilloscope for Windows PCs

Telecoms  
engineering

Production  
testing

R&D

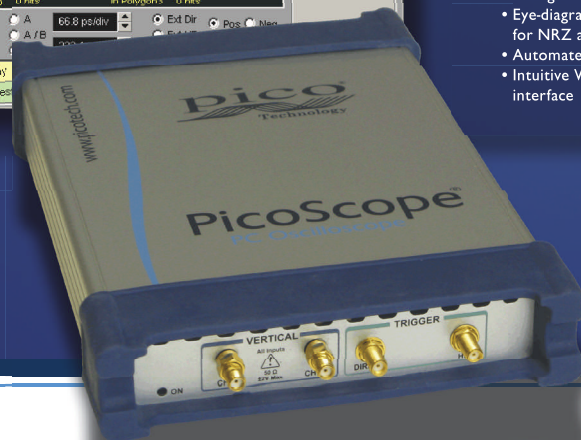
Semiconductor  
characterization



*New from Pico Technology*  
*the Market Leader in USB PC oscilloscopes*

12 GHz bandwidth on 2 channels  
Dual timebase from 10 ps/div  
Up to 10 GHz trigger bandwidth  
5 TS/s equivalent time sample rate

- High-resolution cursor and automatic waveform measurements with statistics
- Waveform processing including FFT
- Time and voltage histograms
- Eye-diagram measurements for NRZ and RZ
- Automated mask test
- Intuitive Windows user interface
- Electrical standards compliance testing
- Semiconductor characterization
- Telecom service and manufacturing
- Timing analysis
- Digital system design and characterization
- Electronic mask drawing and display
- Automatic pass/fail limit testing
- High-speed serial bus pulse response



for product information and brochures call **1.800.591.2796**  
or visit us online at **[www.picotech.com/pco418](http://www.picotech.com/pco418)**

## > MODULAR INSTRUMENTS *Continued*

KineticSystems  
MEN Micro  
National Instruments  
Pickering Interfaces  
Signametrics

### CompactPCI/PXI Time and Frequency Measurement Cards

Geotest - Marvin Test  
Systems  
KineticSystems  
MEN Micro  
National Instruments  
Signametrics  
Spectracom  
Symmetricom  
United Electronic  
Industries

### Instrument Cards, Analog I/O

ACCES I/O Products  
Acromag  
Adlink Technology  
Advantech  
Bustec  
C&H Technologies  
Curtiss-Wright  
DaqScribe Technology  
Data Translation  
Dataq Instruments  
Diamond Systems  
EADS North America  
Test & Services  
Elan Digital Systems  
Exacq Technologies  
Frequency Devices  
GaGe  
Geotest - Marvin Test  
Systems  
GOEPEL Electronics  
Highland Technology  
ICS Electronics  
Innovative Integration  
Intelligent  
Instrumentation  
IOtech  
Keithley Instruments  
KineticSystems  
Lawson Labs  
LMS North America  
Measurement  
Computing  
MEN Micro

Microstar Laboratories  
National Instruments  
Neff Instrument  
Pacific Instruments  
Pentek  
Pico Technology  
Scientific Solutions  
Sealevel Systems  
Strategic Test  
United Electronic  
Industries  
VMETRO  
VXI Technology

### Instrument Cards, Counter/Timer

ACCES I/O Products  
Acromag  
Adlink Technology  
Advantech  
Bustec  
C&H Technologies  
EADS North America  
Test & Services  
Geotest - Marvin Test  
Systems  
Intelligent  
Instrumentation  
KineticSystems  
Measurement  
Computing  
MEN Micro  
Microstar Laboratories  
National Instruments  
Neff Instrument  
Scientific Solutions  
Signametrics  
Spectracom  
United Electronic  
Industries  
VXI Technology

### Instrument Cards, Digital I/O

ACCES I/O Products  
Acromag  
Adlink Technology  
Advantech  
Bustec  
C&H Technologies  
DaqScribe Technology  
Data Translation  
Diamond Systems  
EADS North America  
Test & Services  
Elan Digital Systems  
Exacq Technologies

Frequency Devices  
GaGe  
Geotest - Marvin Test  
Systems  
GOEPEL Electronics  
ICS Electronics  
Innovative Integration  
Intelligent  
Instrumentation  
IOtech  
Keithley Instruments  
KineticSystems  
Measurement  
Computing  
MEN Micro  
Microstar Laboratories  
National Instruments  
Navatek Engineering  
Neff Instrument  
Pacific Instruments  
Pentek  
Scientific Solutions  
Sealevel Systems  
Strategic Test  
United Electronic  
Industries  
Viewpoint Systems  
VMETRO  
VXI Technology

### Instrument Cards, Digitizers, Oscilloscopes

Adlink Technology  
Agilent Technologies  
Bustec  
Chase Scientific  
Dewetron  
EADS North America  
Test & Services  
GaGe  
Geotest - Marvin Test  
Systems  
Keithley Instruments  
KineticSystems  
Measurement  
Computing  
MEN Micro  
National Instruments  
Pacific Instruments  
Pickering Interfaces  
Pico Technology  
Saelig  
Strategic Test  
United Electronic  
Industries  
VXI Technology  
ZTEC Instruments

### Instrument Cards, DMM

C&H Technologies  
Data Translation  
EADS North America  
Test & Services  
Geotest - Marvin Test  
Systems  
Giga-tronics  
Keithley Instruments  
MEN Micro  
National Instruments  
Pickering Interfaces  
Signametrics  
VXI Technology

### Instrument Cards, DSP

Bustec  
DaqScribe Technology  
Data Translation  
Innovative Integration  
Intelligent  
Instrumentation  
LMS North America  
MEN Micro  
Microstar Laboratories  
National Instruments  
Pentek  
VMETRO

### Instrument Cards, Frequency, Time, Synchro-Resolver

C&H Technologies  
EADS North America  
Test & Services  
Geotest - Marvin Test  
Systems  
GuideTech  
Highland Technology  
Intelligent  
Instrumentation  
Keithley Instruments  
KineticSystems  
Measurement  
Computing  
MEN Micro  
North Atlantic  
Industries  
Pacific Instruments  
Signametrics  
Spectracom  
Symmetricom

### Instrument Cards, Logic Analyzers

Geotest - Marvin Test  
Systems  
National Instruments  
VMETRO

## Quality Hipot Testers!

for use in production  
and inspection lines



## TOS8830/8040/8030

The model TOS8830, TOS8040, TOS8030 are hipot and insulation resistance testers developed by KIKUSUI, an international brand in the field of electrical safety testers, and are designed specifically for use in production and inspection lines in factories. While retaining the high levels of quality and reliability inherent to our products, these testers are geared to provide what manufacturers want - compact, light weight, and reasonable price.

### ● Model TOS8830

**Withstanding voltage:**

**4 kVac/100 mA,**

**Insulation resistance:**

**500 V/999.9MΩ**

**Withstanding voltage/insulation  
resistance tests in one model  
supporting the standard test**

### ● Model TOS8040

**Withstanding voltage:**

**4 kVac/100 mA**

**Withstanding voltage tester  
supporting standard tests**

### ● Model TOS8030

**Withstanding voltage:**

**3 kVac/10 mA**

**Compact model supporting the  
simplified test**



> MODULAR INSTRUMENTS *Continued*

## Instrument Cards, MIL-STD-1553/ ARINC

AIM USA  
Ballard Technology  
Bustec  
Curtiss-Wright  
Geotest - Marvin Test  
Systems

KineticSystems  
Pickering Interfaces

## Instrument Cards, Prototype

C&H Technologies  
EADS North America  
Test & Services

Geotest - Marvin Test  
Systems  
Innovative Integration  
KineticSystems  
MEN Micro  
National Instruments  
Pacific Instruments  
Pickering Interfaces

## Instrument Cards, Signal Sources

Adlink Technology  
C&H Technologies  
Chase Scientific  
Data Physics  
Data Translation  
EADS North America  
Test & Services

Frequency Devices  
Geotest - Marvin Test  
Systems  
Highland Technology  
Keithley Instruments  
LMS North America  
Measurement  
Computing  
MEN Micro  
National Instruments  
Novatech Instruments  
Pacific Instruments  
Pentek  
Pickering Interfaces  
Signametrics  
Strategic Test  
United Electronic  
Industries  
VXI Technology  
ZTEC Instruments

## Instrument Cards, Video Test

Agilent Technologies  
EADS North America  
Test & Services  
National Instruments  
ZTEC Instruments

## Instrument Controllers/ Computers

Acromag  
Adlink Technology  
Agilent Technologies  
Bustec  
Dewetron  
EADS North America  
Test & Services  
Geotest - Marvin Test  
Systems  
ines  
Innovative Integration  
IOtech  
KineticSystems  
MEN Micro  
National Instruments  
Onset Computer  
United Electronic  
Industries  
VXI Technology

## Instrument Cards, Spectrum Analyzers

Data Physics  
Dewetron  
LMS North America  
National Instruments  
Pico Technology  
Saelig

## Instrument Cards, Switches, Multiplexers

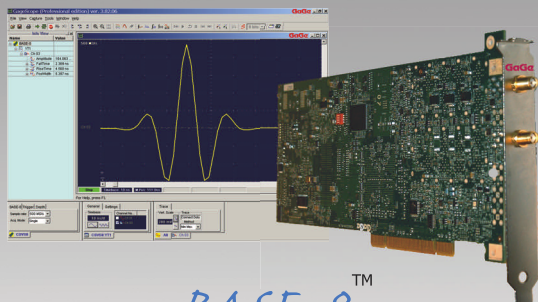
Adlink Technology  
Advantech  
Bustec  
C&H Technologies  
Chroma Systems  
Solutions  
Colby Instruments  
Cytec  
EADS North America  
Test & Services  
Geotest - Marvin Test  
Systems  
ICS Electronics  
Keithley Instruments  
KineticSystems  
National Instruments  
Neff Instrument  
Pacific Instruments  
Pickering Interfaces  
Precision Filters  
Tracewell Systems  
United Electronic  
Industries  
VXI Technology

## Instrument Mainframes/ Chassis

Adlink Technology  
Agilent Technologies  
Dewetron  
EADS North America  
Test & Services  
ELMA Electronic  
Frequency Devices  
GaGe  
Geotest - Marvin Test  
Systems  
Hi-Techniques  
IMC DataWorks  
Keithley Instruments  
KineticSystems  
Neff Instrument  
Pacific Instruments  
Pickering Interfaces  
Precision Filters  
Tracewell Systems  
United Electronic  
Industries  
VXI Technology

# PC-based Oscilloscope

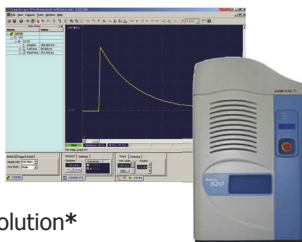
*Ideal for ATE or OEM Applications*



**BASE-8<sup>TM</sup>**  
Introductory price **\$2895**

Easily and cost effectively integrated into your custom application.

Ultrasonics  
Disk Drive Testing  
Laser Optics  
and many more



## Key Features

- 1 digitizing channel with 8-bit vertical resolution\*
- 500 MS/s maximum sampling rate\*
- 200 MHz bandwidth
- Timing synchronization with external trigger input
- Optional memory upgrades available
- Programming-free operation with GageScope® oscilloscope software
- SDKs available for LabVIEW, MATLAB, C/C# and more
- Custom on-board eXpert™ (FPGA) signal processing functionality available

\*Higher channel counts, sampling rates and AWG available

[www.gage-applied.com/BASE-8](http://www.gage-applied.com/BASE-8)  
**1-800-567-GAGE**

# GaGe

*Continued* >



A photograph of a blue and black Agilent U1242A True RMS Multimeter. The device features a large LCD screen displaying '10000' and '235'. Below the screen are several function buttons (HOLD, REL, MAX, MIN, PEAK, RANGE, OFF) and a large rotary selector switch. At the bottom, there are four input jacks: two red (VΩ) and two black (COM), with a central ground terminal. The Agilent logo and model number 'U1242A' are visible at the top.

- 10,000 count dual display
- True RMS capability and basic DCV accuracy of 0.09%
- Feature-rich: harmonic ratio, switch counter, dual and differential temperature capabilities.



# Agilent Technologies



## > MODULAR INSTRUMENTS *Continued*

### LXI Instruments

Agilent Technologies  
C&H Technologies  
Colby Instruments  
Data Physics  
ICS Electronics  
Kepco  
Pickering Interfaces  
Universal Switching  
VXI Technology  
ZTEC Instruments

### PC Card (PCMCIA) Modules

ACCES I/O Products  
B & B Electronics  
Ballard Technology  
Data Physics  
Data Translation  
FuturePlus Systems  
GOEPEL Electronics  
Innovative Integration  
Keithley Instruments  
Measurement Computing

National Instruments  
Pickering Interfaces  
Sealevel Systems

### PXI Embedded Controllers

ACCES I/O Products  
Geotest - Marvin Test Systems  
GOEPEL Electronics  
KineticSystems  
MEN Micro  
National Instruments  
United Electronic Industries

### PXI Mainframe Interconnects (Receivers)

Geotest - Marvin Test Systems  
MAC Panel  
National Instruments  
Virginia Panel

### PXI System Mainframes

Adlink Technology  
Chroma Systems Solutions  
Digalog Systems  
ELMA Electronic  
Geotest - Marvin Test Systems  
KineticSystems  
National Instruments  
Pickering Interfaces  
Tracewell Systems  
United Electronic Industries

### Signal-Conditioning Modules & Boards

ACCES I/O Products  
Acromag  
Advantech  
Alligator Technologies  
Bustec

DaqScribe Technology  
Data Translation  
Dataforth  
Dataq Instruments  
Dewetron  
DGH  
EADS North America Test & Services  
Endevco  
Frequency Devices  
Highland Technology  
ICS Electronics  
Innovative Integration  
Intelligent Instrumentation  
IOtech  
Keithley Instruments  
KineticSystems  
Krohn-Hite  
Lawson Labs  
Measurement Computing  
Microstar Laboratories  
National Instruments  
Neff Instrument

North Atlantic Industries  
Pacific Instruments  
Pentek  
Pickering Interfaces  
Pico Technology  
Precision Filters  
R.C. Electronics  
Sealevel Systems  
Teradyne  
United Electronic Industries  
VXI Technology

### VXI Instruments

Advanced Power Designs  
Agilent Technologies  
Boonton Electronics  
Bustec  
C&H Technologies  
Chroma Systems Solutions  
Cytec  
Data Physics

EADS North America Test & Services  
ELMA Electronic  
Giga-tronics  
Highland Technology  
ICS Electronics  
JTAG Technologies  
Kepco  
KineticSystems  
National Instruments  
Noise Com  
North Atlantic Industries  
Pentek  
Phase Matrix  
Pickering Interfaces  
Signametrics  
Spectracom  
Symmetricom  
Teradyne  
Tracewell Systems  
Universal Switching  
Virginia Panel  
VXI Technology  
ZTEC Instruments

*Continued >*

## 100 Volt, 1 MHz PULSE GENERATOR

Model AV-1011-B

General Purpose ~ featuring IEEE-488.2 GPIB control



100 Volts into 50Ω, 8 Amps into Laser Diode Loads!

- \* GPIB & RS-232 control
- \* LabVIEW driver
- \* 1 MHz repetition rate
- \* 0 to ±100 Volts, to 50Ω
- \* 10 ns rise & fall times
- \* 100 ns - 1 ms pulse width
- \* 20 W average power out
- \* Single pulse mode
- \* Internal or external trigger
- \* Switchable Z<sub>OUT</sub> (2Ω / 50Ω)
- \* PW<sub>IN</sub> = PW<sub>OUT</sub> mode
- \* Average and peak power overload protection

The AV-1011-B is a general-purpose pulser featuring IEEE-488.2 GPIB and RS-232 bus control (ethernet optional) and is perhaps the only pulser you need - it delivers up to ±100V into 50Ω, and it works equally well as a 5V, 1MHz pulser. For laser diode applications, it will deliver up to 8 Amps using an AVX-MR accessory transformer! Model AV-1011B1-B features even shorter rise & fall times (2 ns) and will operate up to 100 kHz. For details on our complete general-purpose line of pulsers and for over 500 faster pulse, impulse, delay and function generators, laser diode drivers, probes, amplifiers, and more, call us or visit our web site and download the latest complete data sheets and application notes.

Online data sheets and pricing - [www.avtechpulse.com](http://www.avtechpulse.com)

**AVTECH**  
ELECTROSYSTEMS

NANOSECOND  
WAVEFORM ELECTRONICS  
SINCE 1975

BOX 265, OGDENSBURG  
NY, 13669-0265  
ph: 888-670-8729, +1-613-226-5772  
fax: 800-561-1970, +1-613-226-2802  
e-mail: [info@avtechpulse.com](mailto:info@avtechpulse.com)  
<http://www.avtechpulse.com>

Germany / Aust / Switz: Schulz-Electronic  
France: K.M.P. Elec. Japan: Hikari, Inc.  
Korea: MJL Crystek Taiwan, China: Quatek

## PCI, PXI, VXI, & LAN Oscilloscopes



- Performance: Up to 1 GHz & 4 GS/s
- Precision: Up to 16 bit resolution
- LabVIEW™, CVI™, & COM Drivers
- High voltage inputs: Up to 300 V<sub>peak</sub>
- C DLLs with support for .NET™ & MATLAB®

Learn More at:  
[www.ztecstruments.com/tmw2](http://www.ztecstruments.com/tmw2)



As you can see, we're  
a lot more than just  
**AnthroCarts®**



It's the way instrument carts should be.

Sure, we're very proud of AnthroCart — it's the very first furniture line we created over 20 years ago. (And still one of the best selling, we might add.) But as you can tell, it's just one of the many solutions we offer that are perfect for labs — like sophisticated workstations that are height adjustable. Or rugged benches that hold a lot of weight. Or even nimble carts that don't take up a lot of space.

Feeling a bit overwhelmed by all of the choices? Anthro can help with that too. Contact the friendly folks of Anthro at **800.325.3841** or **[anthro.com/tmworld](http://anthro.com/tmworld)**.



*Top row (l to r): Convoi®, Security Cart, POC Cart, Power Supply Cart II. Second row (l to r): AnthroCart, Elevate™ Single Surface. Third row (l to r): UltraCompact Cart, Zido®. Fourth row (l to r): Trolley, AnthroBench, Utility Bench, Zido®. Inset: MiniCart.*

AnthroCart®, Convoi®, Elevate™, Zido® and Technology Furniture® are registered trademarks of Anthro.



## SENSORS

### Accelerometers

Analog Devices  
Brüel & Kjær  
Crystal Instruments  
Endevco  
Honeywell Sensing and Control  
IMV  
Instrumented Sensor Technology  
Kistler Instrument  
Omega Engineering  
PCB Piezotronics  
Polytec  
Robert A. Denton  
Summit Instruments

### Current Sensors

A.H. Systems  
AEMC Instruments  
Analog Devices  
Campbell Scientific  
Dewetron  
ETS-Lindgren

Flex-Core  
GMC-I Gossen  
Metrawatt  
Hioki USA  
Ion Physics  
Marsh Bellofram  
Pace Scientific  
Pearson Electronics  
Reinhardt System und Messelectronic  
Sypris Test & Measurement  
Tecpel  
Vektrex Electronic Systems

### Force & Strain Sensors

Futek Advanced Sensor Technology  
Honeywell Sensing and Control  
Kistler Instrument  
Newport Electronics  
Omega Engineering  
PCB Piezotronics

Robert A. Denton  
Sensor Products  
Tekscan

### Humidity Sensors

AEMC Instruments  
Omega Engineering  
Onset Computer  
Pace Scientific  
Reinhardt System und Messelectronic  
Rotronic Instrument  
Saelig  
SensArray

### Magnetic Field Sensors

ETS-Lindgren  
Ion Physics  
Lake Shore Cryotronics  
Magnetic Shield  
Sypris Test & Measurement

### Position Sensors

Analog Devices  
BI Technologies  
Macro Sensors  
MTI Instruments  
North Atlantic Industries  
PerkinElmer Optoelectronics  
Polytec  
Robert A. Denton  
Sony Manufacturing Systems America  
Sypris Test & Measurement

### Pressure Sensors

American Sensor Technologies  
Brüel & Kjær  
Endevco  
Futek Advanced Sensor Technology  
Honeywell Sensing and Control  
Kistler Instrument

Marsh Bellofram  
Omega Engineering  
Pace Scientific  
PCB Piezotronics  
Pressure Systems  
Sensor Products  
Sensortech  
Tekscan

### Sound Sensors

AEMC Instruments  
Brüel & Kjær

### Temperature Sensors

AEMC Instruments  
Analog Devices  
BetaTHERM Sensors  
Everest Interscience  
Extech Instruments  
FLIR Systems  
Hioki USA  
Honeywell Sensing and Control  
Lake Shore Cryotronics

**compix**

Radiometric  
Thermal Imagers

SDK for custom  
applications  
[www.compix.com](http://www.compix.com)

Marsh Bellofram  
National Instruments  
Omega Engineering  
Onset Computer  
Pace Scientific  
PerkinElmer Optoelectronics  
Pico Technology  
Pyrometer Instrument  
Reinhardt System und Messelectronic  
Rotronic Instrument  
SensArray  
Sensor Products  
Tecpel  
Telatemp  
Thermo Electric

*Continued >*

# Why MetricTest?

## Wide Selection of New Equipment

MetricTest partners with industry-leading manufacturers to offer you the latest products and technology. As a vendor-neutral distributor, MetricTest considers your application requirements to recommend a solution across all manufacturers. You get the highest quality test equipment solution at the best price.

## Quality Refurbished Equipment

Stretch your budget and receive the highest quality unit available. MetricTest experts follow a meticulous 15-step quality assurance process on all refurbished units in our ISO 9001:2000 certified, NIST traceable lab. Most refurbished units come with our industry-leading 12 month warranty. Save up to 70% when you purchase refurbished test equipment!



ISO 9001:2000 Certified

## Worry-Free and Flexible Rental Programs

Fast delivery and flexible terms! To give you maximum flexibility, MetricTest offers two rental programs: month-to-month and rent-to-own. Rent units from all the leading manufacturers.

All rentals come with MetricTest's service warranty. This includes maintenance and calibration on all rented units, technical support, and extended access to MetricTest technicians in our ISO 9001:2000 certified, NIST traceable lab.

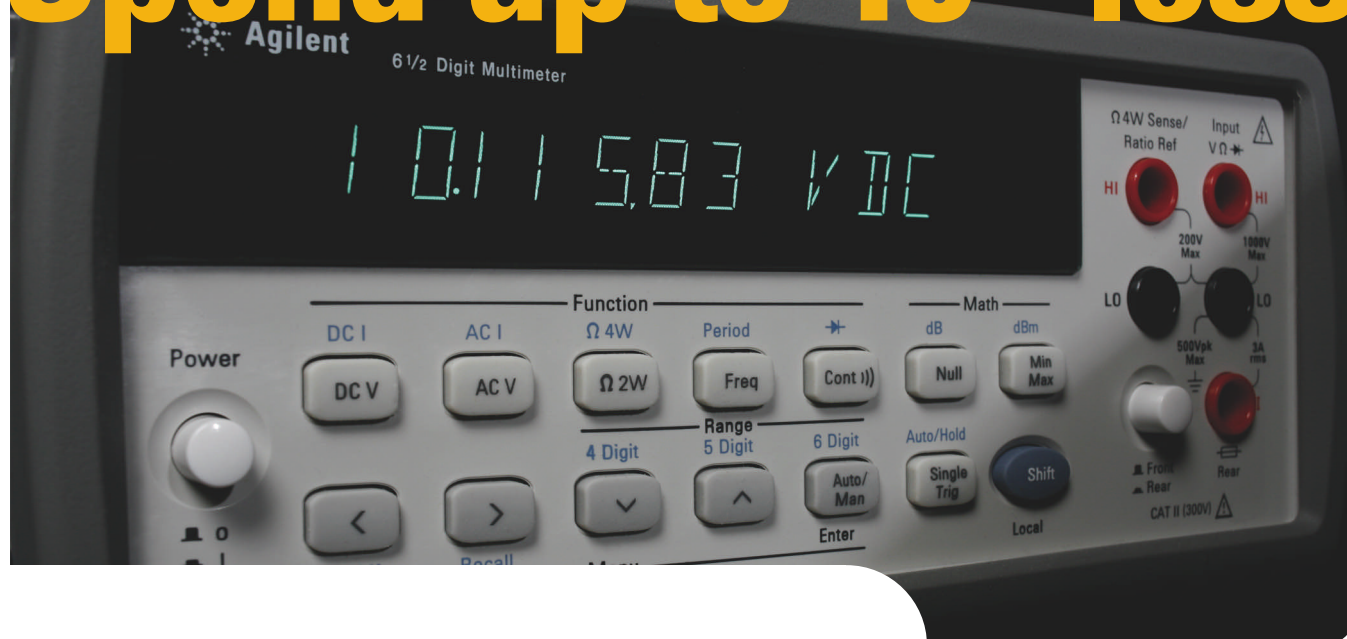
Agilent · Advantest · Rohde & Schwarz · Keithley · Instek  
Xantrex · ASA · Fluke Networks · Fluke · Tektronix



**METRICTEST**<sup>TM</sup>  
6,000 instruments. One source.

[www.metrictest.com](http://www.metrictest.com) · 1.800.432.3424




# Spend up to 19% less



And our 34401A is now even better looking

Agilent's 34401A DMM, the long-held industry standard, now sports a new look along with a 9% price cut. And the high performance 34410A is 19% less than it was before. Take advantage of these new prices today; go to [www.agilent.com/find/dmmcompare](http://www.agilent.com/find/dmmcompare)

## Specification

				
	<b>34405A</b>	<b>34401A</b>	<b>34410A</b>	<b>34411A</b>
Resolution	5½ digits	6½ digits	6½ digits dual display	6½ digits dual display
Basic DC Accuracy	250 ppm	35 ppm	30 ppm	30 ppm
Max Readings/s (continuous to PC)	19	1,000	10,000	50,000
Connectivity	USB	GPIB RS-232	GPIB, USB, LAN LXI Class C	GPIB, USB, LAN LXI Class C
Price	\$745*	<del>\$1,172*</del> <b>\$1,070*</b>	<del>\$1,595*</del> <b>\$1,295*</b>	\$1,995*

© Agilent Technologies, Inc. 2008  
\* Prices in USD and subject to change



Agilent Authorized Distributor



CONTINENTAL RESOURCES, INC.

800-937-4688 Option 2 [www.conres.com/test-equipment](http://www.conres.com/test-equipment)



## SOFTWARE

**Audio Test Software**

CIMTEK  
Data Physics  
SigmaQuest

**C/C++ Libraries**

Agilent Technologies  
Alacron  
CIMTEK  
Dalsa  
Data Translation  
EPIX  
Geotest - Marvin Test Systems  
GOEPEL Electronics  
ICS Electronics  
The Imaging Source  
Innovative Integration  
Intelligent Instrumentation  
JTAG Technologies  
Matrox Imaging  
Measurement Computing  
MVTec Software

National Instruments  
Pacific Instruments  
Pentek  
Rad-icon Imaging  
Scientific Solutions  
United Electronic Industries

Vektrex Electronic Systems  
VI Technology

**Calibration Management Software**

Advint  
AssetSmart  
Averna  
Beamex  
Blue Mountain Quality Resources  
Cascade Microtech  
CyberMetrics  
Data Physics  
Fluke

**Calibrator-Control Software**

Advint  
Beamex  
Data Physics  
Fluke

**Data-Analysis Software**

Aptech Systems  
Averna  
CIMTEK  
Credence Systems  
Dalsa  
Data Physics  
Data Translation  
Dataq Instruments  
Dewetron  
DSP Development  
DYNAFLOW  
EXFO  
GaGe  
Geotest - Marvin Test Systems  
GHI Systems

Givens Control Engineering  
GOEPEL Electronics  
Golden Software  
GraphPad Software  
Hermon Labs  
Hi-Techniques  
IMC DataWorks  
Innovative Integration  
Integrated Sciences Group  
IOtech  
JMP  
Keithley Instruments  
LDS Test and Measurement  
LMS North America  
LogicVision  
m + p international  
M/RAD  
The MathWorks  
Measurement Computing  
Microstar Laboratories  
National Instruments  
Network Instruments  
NorPix  
Northwest Analytical  
OriginLab  
Pintail Technologies  
Proligent  
SigmaQuest  
Signalysis  
StataCorp  
Statit Software  
StatSoft  
Synergy Software  
Systat Software  
TAL Technologies  
Tektronix  
Test Advantage  
TestEdge  
VI Technology  
Wavecrest  
ZTEC Instruments

**EMC Test Software**

AR, RF/Microwave Instrumentation  
EMCC DR. RAŠEK  
ETS-Lindgren  
Mentor Graphics  
Rohde & Schwarz  
TDK RF Solutions

**Instrument Control Software, Stand-Alone Executables**

Advint  
Averna  
Dewetron  
EADS North America Test & Services  
Geotest - Marvin Test Systems  
Giga-tronics  
ICS Electronics  
Intelligent Instrumentation  
IOtech  
Keithley Instruments  
KineticSystems  
Measurement Computing  
Microstar Laboratories  
National Instruments  
Neff Instrument  
Northwest Analytical  
Pace Scientific  
Pacific Instruments  
SigmaQuest  
TAL Technologies  
Tektronix  
United Electronic Industries  
Vektrex Electronic Systems  
VXI Technology  
Wavecrest  
ZTEC Instruments

**Statistical Process-Control Software**

Aptech Systems  
Averna  
CyberMetrics  
Integrated Sciences Group  
JMP  
The MathWorks  
MatriX Technologies  
National Instruments  
Northwest Analytical  
Pintail Technologies  
Proligent  
SigmaQuest  
StataCorp  
Statit Software  
StatSoft  
TAL Technologies  
Test Advantage  
VI Technology  
Viscom

**Test Software Add-ins**

Adlink Technology  
Advint  
Agilent Technologies  
Aptech Systems  
Averna  
Bloomy Controls  
Cascade Microtech  
CIMTEK  
Corelis  
Data Translation  
Dewetron  
EADS North America Test & Services  
Geotest - Marvin Test Systems  
GOEPEL Electronics  
ICS Electronics  
IET Labs  
Intelligent Instrumentation  
Keithley Instruments  
m + p international  
Matrox Imaging  
Measurement Computing  
National Instruments  
Pacific Instruments  
Scientific Solutions  
SeaSolve Software  
SigmaQuest  
TAL Technologies  
United Electronic Industries  
Vektrex Electronic Systems  
VI Technology  
Wavecrest

**Web-Based Collaboration Software**

A.T.E. Solutions  
Advint  
Averna  
EADS North America Test & Services  
The Fanfare Group  
Northwest Analytical  
Proligent  
Siemens  
PLM Software  
SigmaQuest  
Statit Software  
TestEdge  
VI Technology  
Viewpoint Data Management

**Rentals  
Leases  
Sales**

The Knowledge. The Equipment. The Solution.



*Rentals Made Easy*

**Advanced Test Equipment Rentals**

Measurement Inspection Environmental

**Meeting all of your test & measurement equipment needs**

**EMC Test Systems  
Safety & Compliance Instruments  
General Purpose Test Equipment  
Environmental Chambers  
Electrical Maintenance Testers  
Inspection & QA Equipment  
...and more**




**800-404-ATEC**

**www.atecorp.com**

## ACCESSORIES

### Connectors/ Clips/Cables

Advanced Interconnections  
Advint  
Agilent Technologies  
Amphenol Interconnect Products  
Aries Electronics  
B & B Electronics  
Brüel & Kjær  
Cables on Demand  
CablesCan  
Cal Test Electronics Components Corp.  
Conec  
Connect2it  
Dynamic Signal  
Emulation Technology  
Endevco  
ETS-Lindgren  
EXFO  
E-Z-Hook  
FCI  
Fischer Connectors  
Fluke  
Huber+Suhner  
Huntron  
Hypertronics  
ICS Electronics  
Interconnect Devices (See ad next column)  
ITT Electronic Components  
Keithley Instruments

### RESISTANCE THAT'S VIRTUALLY UNDETECTABLE

**INTERCONNECT  
DEVICES, INC.**  
•SPRING CONTACT PROBES  
•CONNECTORS  
•INTERFACES  
•SYNERGETIX® TEST SOCKETS  
**PHONE:** 913.342.5544  
**WEB:** www.idinet.com



Lemo USA  
MAC Panel  
Magtrol  
MegaPhase  
Micro-Coax  
Mill-Max Mfg.  
National Instruments  
OptoTest  
Pickering Interfaces  
Plastronics  
Pomona Electronics  
Rika Denshi America  
Superior Electric  
Teledyne Storm Products--Microwave  
Virginia Panel  
W.L. Gore  
Winchester Electronics  
Xitron Technologies

Yamaichi Electronics  
ZTEC Instruments

### Eyewear viewers Myvu

### Instrument Carts

Agilent Technologies  
Anthro  
GOEPEL Electronics  
Terra Universal

### Instrument Enclosures/ Containers

Agilent Technologies  
ELMA Electronic  
Emcor Enclosures  
Fieldtex Products  
Geotest - Marvin Test Systems  
ICS Electronics  
MAC Panel  
Measurement Computing  
Pacific Instruments  
Schroff  
Tracewell Systems  
VI Technology

### Probes, Instrument

AEMC Instruments  
Agilent Technologies

AR, RF/Microwave Instrumentation  
B&K Precision  
Boonton Electronics  
Cal Test Electronics  
DFT Microsystems  
Emulation Technology  
ETS-Lindgren  
EXFO  
E-Z-Hook  
FuturePlus Systems  
GOEPEL Electronics  
Hioki USA  
Huntron  
Instek America  
Lake Shore Cryotronics  
LeCroy  
Micromanipulator  
National Instruments  
Network Instruments  
Omega Engineering  
Owens Design  
Pearson Electronics  
Pomona Electronics  
Probe Master  
Ross Engineering  
Sypris Test & Measurement  
Tecpel  
Tektronix  
Terahertz Technologies  
Vektrex Electronic Systems  
ZTEC Instruments

## THIRD-PARTY SUPPLIERS

### Distributors: Cards & Modules

Advint  
Avalon Equipment  
CAS Data Loggers  
Denver Test Systems  
EADS North America Test & Services  
KineticSystems  
m + p international  
Saelig  
TestEquity  
Testforce  
TestMart

### Distributors: Software

Acugen Software  
Advint  
DaqScribe Technology  
Intellitech  
PTL Test Equipment

### Distributors: Test Instruments

Advint  
Allied Electronics  
Avalon Equipment  
Bell Electronics NW  
CAS Data Loggers  
Circuit Specialists  
Continental Resources  
Digi-Key  
Direct Industry  
GMW Associates  
Huntron  
Knight Electronics  
Madell Technology  
MCM Electronics  
Measurement Assurance Technology  
MetricTest  
Meunier Electronic Supply  
Miller Industrial  
PTL Test Equipment

S.R.S. Market Solutions  
Saelig  
Stanley  
Tequipment.net  
Terra Universal  
Test Equipment Depot  
TestEquity  
Testforce  
TestMart  
Transcat  
Tucker Electronics

### Manuals

Manuals Plus  
PTL Test Equipment  
Tektronix

### Online Auction Sites

Auktionenhaus Dechow  
BidItUp.com

DoveBid  
eBay  
LabX

### Rental/Lease: Test Instruments

Advanced Test Equipment Rentals  
Agilent Technologies  
Avalon Equipment  
Bell Electronics NW  
CAS Data Loggers  
Continental Resources  
Electro Rent  
Industrial Resources  
Krohn-Hite  
Lake Shore Cryotronics  
MetricTest  
Microlease  
Noise Com  
PTL Test Equipment  
QuadTech

## UNIQUE PRODUCTS

with free  
lifetime support!

### New Advanced Triggering



**Pico** - 2-ch 250MHz Scope with 32 or 128 MS and single-shot sampling of 1GS/s. Adv triggering. 250MHz spec. analyzer and 125MS/s waveform gen.

Winner!

Best of Show

PS5203 / PS5204 \$2237 / \$3360



### Bargain LCD Scopes

**Owon** - 25 or 60MHz color LCD 2-ch bench scope OR 20MHz handheld scope/meter. USB interface for printouts.

PDS5022S/PDS6062T \$325 / \$599

HDS1022M/HDS2062M \$499 / \$699

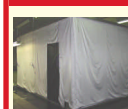
### USB Bus Analyzers



**Ellisys TR110 / EX200 / PRO** high-performance, economical USB 1.1/2.0 protocol analyzers. \$999 / \$2999 / \$5999

**USBEX300** for debugging USB wireless WiMedia, **USBEX260** for USB3.0 **CALL**

### EMI Tents



EMI shielding tents made from Ni/Ag fabric. -86dB 20MHz to 18GHz. Tabletop to room/lab size for on-site, on-demand precompliance testing.

EMI Tents from \$3500



### Scope / Analyzers

25/100MHz 2-ch/16 logic scope and logic analyzers. 2000 wfms refresh rate. See waveforms and logic data simultaneously. Trigger on data or signal edge.

DS1022CD/DS1102CD \$699 / \$1499

### EMC Spectrum Analyzer



Handheld PalmPC-based 2.7GHz Spectrum Analyzer. Continuous/single/peak-hold/avg sweeps - unlimited storage for wfms, set-ups, etc. Built-in Wi-Fi/Bluetooth/IR.

PSA2701T \$1990

### Mixed-Signal Scope



**CleverScope** - 100MHz Scope, Spectrum/Logic Analyzer, & SigGen. for PCs. 4 or 8 M/sample storage! Easy A-B, math, & filters! 2 ch x 10, 12 or 14-bit, 8 dig. I/P. (Opt. 0-10 MHz SigGen.- \$299)

CS328A-4 (4MS Buffer) \$1259

CS328A-8 (8MS Buffer) \$1474



### USB Logic Analyzer

**ZeroPlus** - Intuitive full-featured 16-ch w/ 4mb memory. Sophisticated triggering. I2C, SPI, and UART monitoring. Includes clipleads, USB cable and software.

LAP-16128U \$299

### Thousands More!

USB to 24 I/O lines.....\$69  
USB to 8 Thermocouple Logger.....\$466  
USB to I2C.....\$89  
CANbus, VME, cPCI, etc.....\$300+  
easyRadio modules.....\$40  
USB-Serial adapters.....\$19  
Stepper Motor Controller.....\$85

**FREE STARBUCKS CARD WITH \$50 ORDER**

**New products arriving daily!**

**See our website for specials!**

**Saelig.com**  
unique electronics  
888-75SAELIG info@saelig.com

Continued >



## > THIRD-PARTY SUPPLIERS *Continued*

Spectratest  
Test Equipment  
Connection  
TestEdge  
TestEquity  
TREK  
Trek Equipment  
TRS-RenTelco  
Tucker Electronics

### Software Training

A.T.E. Solutions  
ASSET Intertech  
Averna  
Bloomy Controls  
Corelis  
Dewetron  
Geotest - Marvin Test Systems  
GOEPEL Electronics  
Integrated Sciences Group  
Intellitech  
LogicVision  
LTX  
Matrox Imaging  
OptEM Engineering

QualityLogic  
Rohde & Schwarz  
Spirent  
Communications  
Statit Software  
Vektrex Electronic Systems  
VI Technology

### Training: PC-Based Instruments

A.T.E. Solutions  
Bloomy Controls  
Data Physics  
Dewetron  
Geotest - Marvin Test Systems  
JTAG Technologies

### Used Equipment: Cards & Modules

Avalon Equipment  
CAS Data Loggers  
Continental Resources  
Denver Test Systems  
m + p international

TestEquity  
TestMart  
TRS-RenTelco

### Used Equipment: Test Instruments

A-Comm Electronics  
AR, RF/Microwave Instrumentation  
Avalon Equipment  
Bell Electronics NW  
Bizi International  
CableTest Systems  
CAS Data Loggers  
Continental Resources  
EXFO  
IET Labs  
Industrial Resources  
LabX  
Lake Shore Cryotronics  
Measurement Assurance Technology  
MetricTest  
Microlease  
Micromanipulator  
Naptech Test Equipment

ORIX Rentec USA  
PTL Test Equipment  
Rohde & Schwarz  
Sencore  
Spectratest  
SurplusEq.com  
TechRecovery  
Tektronix  
Test & Measurement Global Exchange  
Test Equipment Connection  
Test Equipment Depot  
Test Equipment Solutions Today  
TestEdge  
TestEquity  
TestMart  
Trek Equipment  
TRS-RenTelco  
Tucker Electronics  
Valuetronics  
Wavecrest  
Xitron Technologies

## SERVICES/LABS/TEST HOUSES

### Calibration/ Maintenance

A.H. Systems  
Advint  
Agilent Technologies  
Anritsu  
Boonton Electronics  
CIMTEK  
Cincinnati Sub-Zero  
Endevco  
Envirotronics  
ETS-Lindgren  
Exttech Instruments  
Fluke  
Geller Microanalytical Lab  
Keithley Instruments  
Measurement Assurance Technology  
MetricTest  
Nevada Automotive Test Center  
Noise Com  
OptoTest  
Pikes Peak Test Labs  
Ross Engineering  
Sypris Test & Measurement  
Tektronix  
Test Site Services  
Thunder Scientific  
Transcat  
Tucker Electronics  
VLSI Standards  
World Cal

Invisar  
Measurement Assurance Technology  
MegaPhase  
Pikes Peak Test Labs  
Premier Semiconductor Services  
Sypris Test & Measurement  
Tektronix  
Transcat  
Tucker Electronics

### SPC/Quality Consultants

Agilent Technologies  
Averna  
National Quality Assurance—USA  
Statit Software  
TUV SUD America  
VI Technology

### Standards Documents

Agilent Technologies  
Averna

### Web-Based Collaboration Subscription Services

A.T.E. Solutions

### Web-Based Test Services (Fee)

National Technical Systems  
TestEdge  
VI Technology

T&MW

### Repair Services

Agilent Technologies  
Cincinnati Sub-Zero  
Data Physics  
Dynamic Solutions  
Environment Associates  
Envirotronics  
ETS-Lindgren  
Fluke

# Is Bigger Better?

## Better

## Bigger

New  
SMU2055  
\$695  
0.8 lb

### The competition

Reading rate: 50/s  
A/D counts: 1,000,000  
Power: 25W/line  
Made in: China  
Price \$845

### Signametrics

250/s  
2,400,000  
1.5W/USB bus  
USA  
\$695

Additional PXI, PCI, VXI and USB DMMs available

## Signametrics

(206) 524-4074 sales@signametrics.com

www.signametrics.com



# "SURPASSING THE LIMITS—FORGING AHEAD"



**AUTOTESTCON is the world's premier annual conference that gathers the military/aerospace automatic test industry to share new technologies, introduce innovative applications, discuss technology trends, overcome obstacles, and exhibit products and services. AUTOTESTCON 2008 will feature:**

- Two special plenary sessions
- Eight technical seminars
- Over 125 top quality technical papers and panels
- Over 150 exhibitors displaying the latest test technologies and services

**For more information, including schedules, events, and registration, visit [www.autotestcon.com](http://www.autotestcon.com)**



## **IEEE AUTOTESTCON 2008**

**SALT LAKE CITY, UTAH 8 - 11 SEPTEMBER 2008**

**SALT PALACE CONVENTION CENTER**

[www.autotestcon.com](http://www.autotestcon.com)



# We can fix this.



**Get Better Integration with ECT.** We round up all the complex elements of Semiconductor Test, the right way, every time. No matter how wild the job, our global team of simulation experts, designers and application engineers has your total, optimized solution. No bull.



Simulation



+

Design



+

Fabrication



+

Probe Towers



+

Test Contactors



+

Assembly



**One World. One Stop. [www.ectinfo.com](http://www.ectinfo.com)**

Contact us today for your comprehensive semiconductor test solution. 651-407-7777

iPod® is a registered trademark of Apple Inc.

[semitest@ectinfo.com](mailto:semitest@ectinfo.com)

**ECT**  
Everett Charles  
Technologies

**In this section**

- ATE/Production Test/QA, below
- ATE/DFT/BIST Software, p. 62
- Accessories, p. 64
- Third-Party Suppliers, p. 68
- Services/Labs/Test Houses, p. 68

Vendor contact information begins on p. 106.

**ATE/PRODUCTION TEST/QA****ATE, Parametric Testers**

Agilent Technologies  
CIMTEK  
Keithley Instruments  
Materials Development  
ProductionLine Testers  
Qmax Test Equipments  
QualiTau  
Reinhardt System und Messelectronic  
Seica

SPEA  
Telco Testing Solutions

**ATE, Printed Circuit Board**

A.T.E. Solutions  
Acculogic  
Advanced Testing Technologies  
Advint  
Aeroflex  
Agilent Technologies  
C&H Technologies

Checksum  
CIMTEK  
Corelis  
DiagnoSYS Systems  
Digalog Systems  
Digitaltest  
EADS North America Test & Services  
GOEPEL Electronics  
Huntron  
Invisar  
JTAG Technologies  
Landrex Technologies  
Luther & Maelzer

Micro Control  
Navatek Engineering  
Owens Design  
Qmax Test Equipments  
Reinhardt System und Messelectronic  
Seica  
SPEA  
Teradyne  
Test Research  
Thermotron Industries  
VI Technology  
VXI Technology

**ATE, Semiconductor**

Advantest America  
Agilent Technologies  
Boonton Electronics  
Chroma Systems Solutions  
Corelis  
Credence Systems  
DiagnoSYS Systems  
EADS North America Test & Services  
Eagle Test Systems

FocusTest  
GOEPEL Electronics  
In-Phase Technologies  
Intellitech  
Keithley Instruments  
LTX  
Micro Control  
ProductionLine Testers  
Qmax Test Equipments  
SPEA  
Telco Testing Solutions  
Teradyne  
UltraTest International  
Verigy  
VI Technology

**Bare Board Testers**

CablesCan  
CableTest Systems  
Caris Network Solutions  
Checksum  
Cirris Systems  
Digitaltest

Everett Charles Technologies  
Luther & Maelzer  
Qmax Test Equipments  
ScanCAD International  
Seica  
SPEA

**Boundary-Scan Test Tools**

A.T.E. Solutions  
Acculogic  
Agilent Technologies  
ASSET Intertech  
Checksum  
CIMTEK  
Corelis  
DiagnoSYS Systems  
Digitaltest  
Flynn Systems  
GOEPEL Electronics  
Huntron  
Intellitech  
JTAG Technologies

Continued >

# NAVATEK

[www.navatek.com](http://www.navatek.com)

**USB or PXI Based JTAG/BDM Test Systems**

- USB or PXI single slot, 3U format
- Troubleshooting of processor based boards via JTAG or BDM debug port
- Boundary scan test, view and control JTAG pins in real time
- Run SVF files for programming FPGA/CPLD devices
- On Board Flash ROM programming
- 16 channels of general purpose digital I/O
- High speed logic probe for nodal diagnostics
- Supports PXI triggering

**Applications**

- Automated Test Equipment (ATE)
- Service and Repair
- Engineering Evaluation

Navatek Eng. Corp. • 22582 Avenida Empresa • Rancho Santa Margarita, CA 92688 • Tel: (949) 888-2222 • Fax: (949) 635-3141



## &gt; ATE/PRODUCTION TEST/QA Continued

Navatek Engineering  
Qmax Test Equipments  
Ricreations  
Seica  
Teradyne

Sefelec  
Slaughter  
Y.P. Unitesters

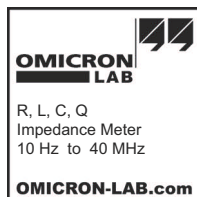
**Device Programmers**

ASSET Intertech  
BPM Microsystems  
CheckSum  
Corelis  
Data I/O  
Digitaltest  
GOEPEL Electronics  
JTAG Technologies  
Navatek Engineering  
Reinhardt System und Messelectronic  
Stag Programming Solutions

**Discrete Component Testers**

Agilent Technologies  
CableTest Systems  
Corelis  
Digalog Systems

EADS North America Test & Services  
Eagle Test Systems  
FETtest  
Integrated Technology Corp.  
Keithley Instruments  
National Instruments



ProductionLine Testers  
QuadTech  
QualiTau  
Scientific Test  
Semitek  
Sencore  
SPEA  
Telco Testing Solutions

**Functional System Testers**

A.T.E. Solutions  
Advanced Testing Technologies  
Advint  
Aeroflex  
Averna  
CableTest Systems  
CheckSum  
Chroma Systems Solutions  
CIMTEK  
DiagnoSYS Systems  
Digalog Systems  
Digitaltest  
EADS North America Test & Services  
Electronic Systems of Wisconsin  
GOEPEL Electronics  
Invisar  
Landrex Technologies  
National Instruments  
Navatek Engineering  
Qmax Test Equipments



Reinhardt System und Messelectronic  
Seica  
Symtx  
Teradyne  
Thermotron Industries  
VI Technology

**Handlers/Sorters**

Advantest America  
Electroglas  
ic automation  
Micro Component Technology  
Multitest  
Elektronische Systeme  
SPEA  
Zmation

**Memory Testers**

Advantest America  
Micro Control  
Tanisys Technology  
Teradyne  
Verigy

**MEMS Testers**

FocusTest  
ic automation  
Multitest  
Elektronische Systeme  
Suss MicroTec  
Tamar Technology

**Power Sources, Frame-Mounted**

Absopulse Electronics  
AMREL  
Autotest Co.  
Behlman Electronics  
Chroma Systems Solutions  
Glassman High Voltage  
Keithley Instruments

Continued &gt;

# 30 Lbs. 300 Test Points. Unlimited Access.

*Introducing the lightweight, portable field tester ideal for maintenance applications.*



DIT-MCO's Model 2135 wiring analyzer takes maintenance testing exactly where you need it: cockpits, submarines, locomotive cabs. And you can quickly conduct complex tests for mission critical electrical systems such as auto-pilot, flight control and weaponry systems.

- Less than 30 lbs.
- Rugged, portable design
- Insulation, isolation, hipot testing
- Fault locator option
- 300 test points (expansion available)
- AC or battery powered
- Programmable stimulus 0.225 up to 1000 volts, 2 amps

**Call 800-821-3487 or visit [www.ditmco.com](http://www.ditmco.com) for more information.**



© 2003 DIT-MCO® International Corporation. All brands and products are registered trademarks or trademarks of their respective holders. All rights reserved. EOE.

Advanced semiconductor test technology and solutions



# we transform

SCALABLE PLATFORM ARCHITECTURE | LOWERS LIFETIME COST-OF-OWNERSHIP | SPEEDS TIME TO MARKET | IMPROVES YIELD | SUPPORTED GLOBALLY

Our customers create the products that transform the way we live, work and play, by delivering bold new functionality and ever-increasing performance to the consumer. And Verigy's solutions are transforming to meet the changing needs of our customers. Our powerful, flexible, and innovative tools help our customers compress development time and increase yield, supporting faster time to market and lower production costs. Learn how Verigy can help you transform your business to produce brilliant results: [www.verigy.com/go/transform](http://www.verigy.com/go/transform).



## ARIES® test sockets: with more of what you want... and less of what you don't!

**More Performance...** Aries ultra high frequency sockets have a mere 1 dB signal loss at up to 40 GHz!!! Center probe and Microstrip sockets deliver more than a half million insertions with no loss of electrical performance.

**More Choices...** Aries offer a full range of sockets for handler-use, manual test and burn-in...for virtually every device type, including the highest density BGA and CSP packages. Choice of molded or machined sockets for center probe and Kapton interposer models, too!

**Less Cost...** in addition to extremely competitive initial cost, Aries replacement parts and repair costs beat the competition, assuring you of lowest total cost of ownership.

**Less Wait...** Aries can deliver the exact sockets you need within 6 weeks.

So why settle? Aries makes it easy to get the world's best test sockets. Call or visit our web site to find out how!



Bristol, PA 19007-6810  
(215) 781-9956 fax: (215) 781-9845  
e-mail: [info@arieselec.com](mailto:info@arieselec.com)

[www.arieselec.com](http://www.arieselec.com)

**Sensible Solutions... Fast!**



## ATE/DFT/BIST

> ATE/PRODUCTION TEST/QA *Continued*

### Kepeco

Lambda Americas  
Pacific Power Source  
Pickering Interfaces  
Programmable  
Division of Xantrex  
Technology  
Pulizzi Engineering  
Spellman High  
Voltage Electronics  
Tamura Corp. of  
America  
Tracewell Systems  
Vicor

### Power Supply Testers

Absopulse Electronics  
Advanced Power  
Designs  
Autotest Co.  
California Instruments  
Chroma Systems  
Solutions  
EADS North America  
Test & Services  
Hipotronics  
Keithley Instruments  
National Instruments  
Pacific Power Source  
Programmable  
Division of Xantrex  
Technology  
Reinhardt System und  
Messelectronic  
SPEA  
Xitron Technologies

### Probe Stations & Accessories

Accuprobe  
Aehr Test Systems  
Cascade Microtech  
Electroglas  
FormFactor  
GOEPEL Electronics  
Huntron  
Integrated  
Technology Corp.  
inTEST  
Materials  
Development  
Micromanipulator  
Multiprobe  
QualiTau  
Reinhardt System und  
Messelectronic  
Suss MicroTec  
Temptronic  
Wentworth  
Laboratories

### Switching Matrices, Stand-Alone

Agilent Technologies  
C&H Technologies  
Colby Instruments  
Cytac  
EADS North America  
Test & Services  
Giga-tronics  
JFW Industries  
Keithley Instruments  
Pickering Interfaces  
Precision Filters  
Sun Electronic Systems  
Universal Switching  
VXI Technology

### Test System Components and Subassemblies

Advint  
Aerotech  
Altera  
Analog Devices  
Averna  
CIMTEK  
Data Physics  
DFT Microsystems  
Digalog Systems  
FocusTest  
Giga-tronics  
GOEPEL Electronics  
ICS Electronics  
Interconnect Devices  
inTEST  
KineticSystems  
MAC Panel  
MegaPhase  
Micromanipulator  
National  
Semiconductor  
Pickering Interfaces  
PLDA  
Reinhardt System und  
Messelectronic  
Semitek  
SPEA  
Sunstone Circuits  
Texas Instruments  
Vektrex Electronic  
Systems  
Vicor  
Virginia Panel  
W.L. Gore  
Wavecrest  
Xilinx

## ATE/DFT/BIST SOFTWARE

### BIST Software

A.T.E. Solutions  
Acculogic  
ASSET Intertech  
Credence Systems  
JTAG Technologies  
LogicVision  
Mentor Graphics  
SynTest Technologies

Corelis  
Flynn Systems  
GOEPEL Electronics  
Intellitech  
JTAG Technologies  
LogicVision  
Mentor Graphics  
Rcreations  
Synopsys  
SynTest Technologies  
Teradyne

### Boundary-Scan Software

Acculogic  
Acugen Software  
Agilent Technologies  
ASSET Intertech  
CIMTEK

### Design Verification Software

ASSET Intertech  
Atrenta  
Averna

Cadence  
Credence Systems  
GOEPEL Electronics  
Intellitech  
Intusoft  
LPKF Laser and  
Electronics  
Mentor Graphics  
National Instruments  
Novas Software  
OptEM Engineering  
PDF Solutions  
SeaSolve Software  
Siemens  
PLM Software  
SigmaQuest

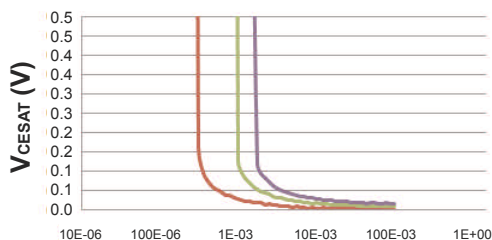
*Continued >*

## CURVE TRACER SERIES 5000

## Need a Curve Tracer?

**Under \$24,000**  
(Limited Time Offer)

**V<sub>CESAT</sub> VS. I<sub>B</sub>**



- Wide Selection of Available Curves
- Programmable Data Point Increments
- Increments may be Linear or Logarithmic
- Saved Recall
- Run up to 10 Curve Programs
- Standard Fixture Pattern

**Contact Us  
for a FREE  
Brochure  
and a  
Demo CD**

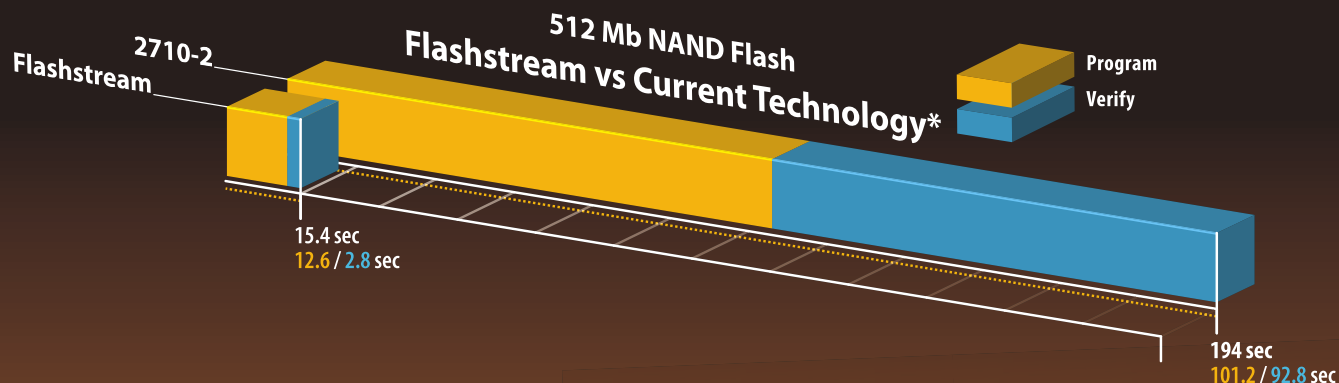


**Your Discrete Test Source  
Scientific Test, Inc.**

1110 E. Collins Blvd., Ste 130,  
Richardson, TX 75081  
**972.479.1300 | FAX 972.479.1301**  
E-Mail [info@scitest.com](mailto:info@scitest.com)  
Website [www.scitest.com](http://www.scitest.com)



# The **Fastest** Flash Programming Solution on the Planet.



## Breakthrough Flash Programming Technology

Our new Flashstream™ Flash Vector Programming System is the fastest flash memory programmer on the market today designed specifically to program NAND and NOR flash memory devices at amazing rates of speed.

## Next-Gen Processing Power

Featuring the Vector Engine Co-Processor™, which gives the Flashstream the programming industry's lowest programming overhead, while maintaining the highest production quality programming signal; an industry first for production programming.

## Beyond Fast. Beyond Competition.

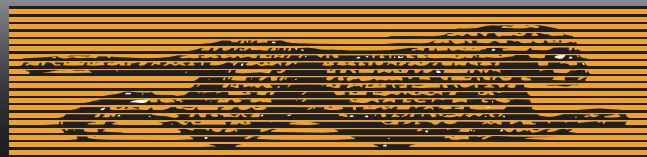
12 times faster?\*\*. Would you expect anything less from the leader in device programming?



For more information, visit:  
[flashstream.bpmmicro.com](http://flashstream.bpmmicro.com)

\*Times are for quantity 4 of 512 Mb Samsung OneNAND™ KFG1216Q2A-DEB5 with functions of Erase, Program, and Verify. Erase function is inside the programming time listed. Full address range of device programmed with random pattern.

\*\*Times will vary based on device characteristics.



**FLASHSTREAM**  
FLASH VECTOR PROGRAMMING SYSTEM

**BPM**   
MICROSYSTEMS  
Setting the Standard in Device Programming

5373 West Sam Houston Pkwy N, Suite 250  
Houston, Texas 77041 USA  
[www.bpmmicro.com](http://www.bpmmicro.com)

Tel: 800.225.2102 (US only)  
713.688.4600  
Fax: 713.688.0920

Flashstream Flash Vector Programming System and Vector Engine Co-Processor are trademarks of BPM Microsystems. Samsung OneNAND is a trademark of Samsung.



> ATE/DFT/BIST SOFTWARE *Continued*

Teradyne  
Teseda  
Verigy  
VI Technology

**Device Defect-Analysis Software**

Cadence  
Credence Systems  
GOEPEL Electronics  
LogicVision  
LPKF Laser and Electronics  
Mentor Graphics  
phoenix x-ray Systems + Services  
Rudolph Technologies  
SigmaQuest  
SynTest Technologies  
Teseda  
Test Advantage  
Verigy  
VI Technology

**DFM/DFY Software**

Cadence  
LogicVision  
Synopsys  
Verigy  
VI Technology

**DFT Board Software**

A.T.E. Solutions  
Acculogic  
ASSET Intertech  
Corelis  
Credence Systems  
Flynn Systems  
GOEPEL Electronics  
Intellitech  
JTAG Technologies  
LogicVision  
SPEA  
Teradyne  
Unisoft

**DFT Device Software**

A.T.E. Solutions  
Acugen Software  
Cadence  
Credence Systems  
Flynn Systems  
GOEPEL Electronics  
LogicVision  
Mentor Graphics  
Synopsys  
SynTest Technologies  
Teseda  
Verigy

**Electronic Simulation Software, Board**

ANSOFT  
Geotest - Marvin Test Systems  
GOEPEL Electronics  
Intusoft  
LPKF Laser and Electronics  
Mentor Graphics

National Semiconductor  
OptEM Engineering  
Paravirtual  
Texas Instruments

**Electronic Simulation Software, Device**

Acugen Software  
ANSOFT  
Cadence  
Intusoft  
LPKF Laser and Electronics  
Mentor Graphics  
National Semiconductor  
OptEM Engineering  
Paravirtual  
Texas Instruments

**Programming Languages**

Acculogic  
Agilent Technologies  
Aptech Systems  
ASSET Intertech  
Corelis  
Credence Systems  
Data Translation  
EADS North America Test & Services  
Flynn Systems  
Geotest - Marvin Test Systems  
GOEPEL Electronics  
Intelligent Instrumentation  
Intellitech  
JTAG Technologies  
The MathWorks  
Measurement Computing  
Mentor Graphics  
National Instruments  
Navatek Engineering  
Scientific Solutions  
SPEA

Teradyne  
Test Advantage  
TYX

**Semiconductor Yield-Enhancement Software**

Bloomy Controls  
LogicVision  
Mentor Graphics  
OptimalTest  
PDF Solutions  
Pintail Technologies  
Rudolph Technologies  
Synopsys  
Teseda  
Test Advantage  
Verigy  
VI Technology

# VPC's InterConnect Solutions

## Consolidate multiple test resources into one interface



Mix your I/O with the easy-to-engage

**iCon**

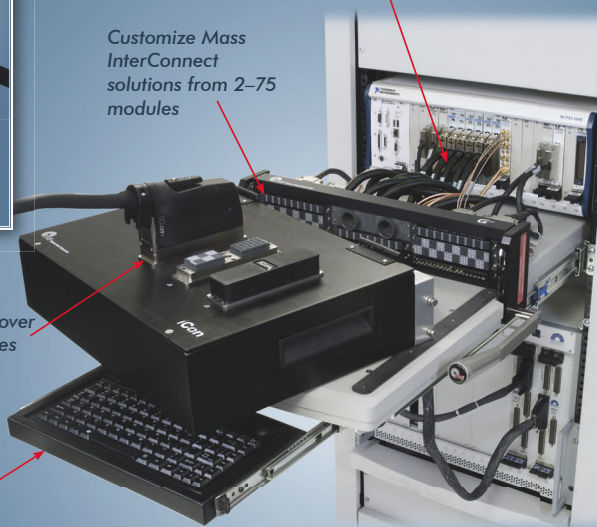
The New Connector Standard for Test & Measurement

Complete your interface solution with VPC's **WIRE+** products

Customize Mass InterConnect solutions from 2-75 modules

Reliable connections over 10,000+ mating cycles

Many customizable accessories available

**VPC** Virginia Panel Corporation

To learn more visit [vpc.com/TM4](http://vpc.com/TM4)

**Mass InterConnect Solutions**

...creating order out of wiring chaos

**ACCESSORIES****Adapters**

Advanced Interconnections  
Advint  
Agilent Technologies  
Anritsu  
Aries Electronics  
B & B Electronics  
Bird Electronic  
Cables on Demand  
CableTest Systems  
Cal Test Electronics  
CIMTEK  
Cirris Systems  
Corelis  
Digalog Systems  
Dynamic Solutions  
Emulation Technology  
Everett Charles Technologies  
EXFO  
Extch Instruments  
Fluke  
FuturePlus Systems  
Huber+Suhner  
Leader Instruments  
MAC Panel  
MegaPhase  
Reinhardt System und Messelectronic  
Robson Technologies

RS Tech  
SPEA  
Tektronix  
Teledyne Storm Products--Microwave  
Virginia Panel  
W.L. Gore  
Yamaichi Electronics

**Board-Test Fixtures & Probes**

Aeroflex  
Antares Advanced Test Technologies  
Cascade Microtech  
Checksum  
Circuit Check  
Connect2it  
Corelis  
DFT Microsystems  
Digalog Systems  
Everett Charles Technologies  
GOEPEL Electronics  
H+W Test Products  
Huntron

> *Continued*

# AIR BEARING

## Solutions for Non-Destructive Testing and Measurement

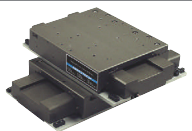
### Aerotech also offers:



ABRS series rotary air-bearing stages



Multi-axis air-bearing with granite bridge and a machine base



ABL1000 miniature, linear air-bearing stage

See us at this upcoming tradeshow:

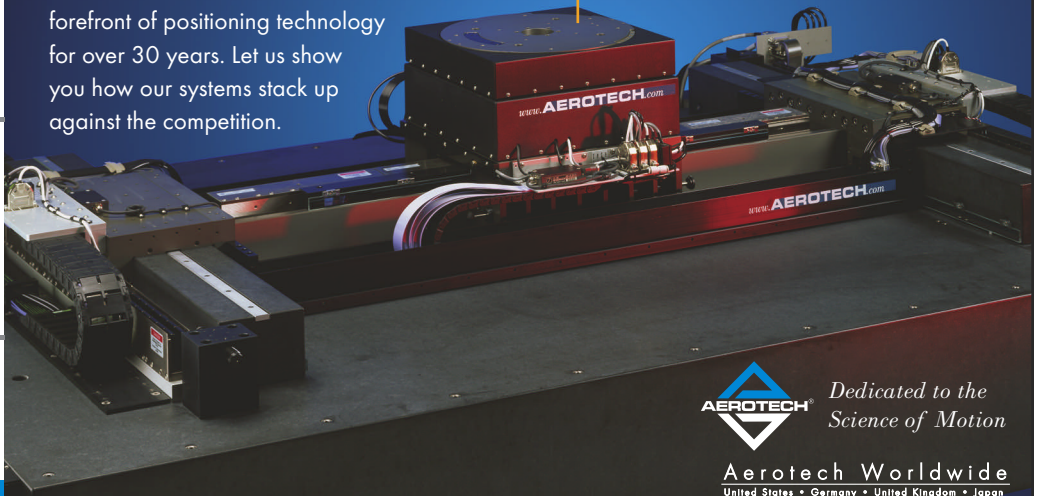
**SEMICON<sup>®</sup>**  
**West2008**

Moscone Center • Booth 5861  
San Francisco, CA • July 15-17

Aerotech air bearings are the highest-performance positioning systems available, and we have been at the forefront of positioning technology for over 30 years. Let us show you how our systems stack up against the competition.

$Z\theta$

Our innovative  $Z\theta$  positioner provides 15° travel at  $\pm 1$  arc second accuracy and 1 mm vertical travel at  $\pm 0.5 \mu\text{m}$  accuracy.



*Dedicated to the  
Science of Motion*

**Aerotech Worldwide**  
United States • Germany • United Kingdom • Japan

[www.aerotech.com](http://www.aerotech.com)

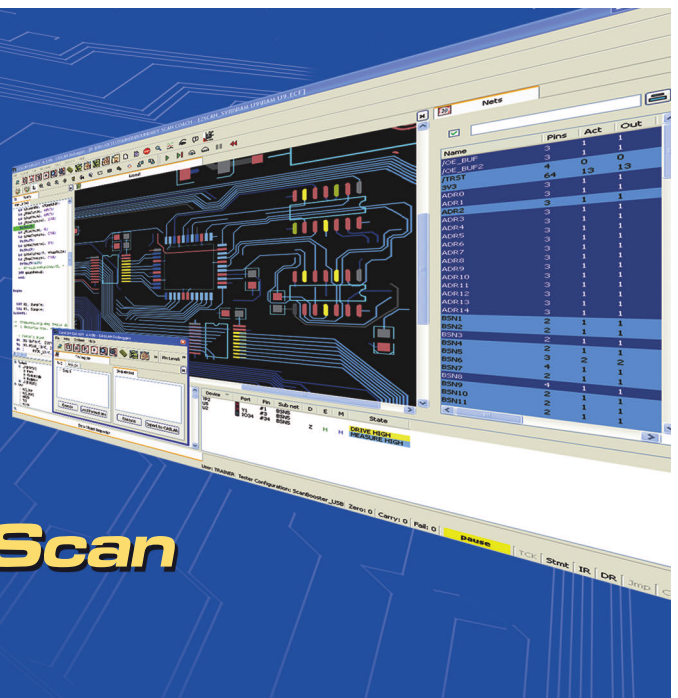
AH0608A

Aerotech, Inc., 101 Zeta Drive, Pittsburgh, PA 15238 • Phone: 412-963-7470 • Fax: 412-963-7459 • E-mail: [sales@erotech.com](mailto:sales@erotech.com)



# ScanAssist™

## Interactive JTAG/Boundary Scan Debugger



[www.goepel.com](http://www.goepel.com)

**GOPEL**  
**electronic**  
Get the total Coverage!





**Test Tooling Solutions Group**

delivering quality & reliable solutions

# Integrated Provider for ATE test & tooling

PCB  
DESIGN

ATE  
BOARD

TEST PROBE

BURN-IN  
BOARD

PCB  
FABRICATION

PCB  
ASSEMBLY

As one of the leading manufacturer of Burn-in and ATE Boards for the Semiconductor industry, **Test Tooling Solutions Group** put great emphasis on lowering the total cost of final test for our customers through relentless pursuit of innovation, yield, quality, reliability and on-time delivery in both our products and services to ensure the outmost satisfaction of our customers.

With our in-house design and fabrication capability for test probe and PCB coupled with the latest SMT technology, we specialize in providing a one-stop solution for ATE test and tooling. Our services include build to order, design and build and reverse engineering.

Our Research and Development Lab continuously experiences with different materials of various electrical, mechanical and thermal characteristics to ensure a continuous improvement in quality and reliability of our products and solutions. All our products and solutions go through a vigorous regime of simulation and validation before being shipped to customers.

**Visit us at Semicon West booth# 8335**

for further information please contact us at [sales@tts-grp.com](mailto:sales@tts-grp.com) or visit us at [www.tts-grp.com](http://www.tts-grp.com)

## &gt; ACCESSORIES Continued

Interconnect Devices

**THE ULTIMATE SOURCE FOR YOUR TESTING NEEDS**

**INTERCONNECT DEVICES, INC.**  
 • SPRING CONTACT PROBES  
 • CONNECTORS  
 • INTERFACES  
 • SYNERGETIX® TEST SOCKETS

PHONE: 913.342.5544  
 WEB: www.idinet.com



Landrex Technologies

Luther &amp; Maelzer

Micromanipulator

QA Technology Co.

Qmax Test

Equipments

Reinhardt System und Messelectronic

Robson Technologies

Sovtest

SPEA

Suss MicroTec

Tektronix

Test Tooling Solutions Group

Wentworth Laboratories

Zmation

**IC Probes**

Accuprobe

Cal Test Electronics

Connect2it

Emulation Technology

Everett Charles Technologies

Interconnect Devices

**THE ULTIMATE SOURCE FOR YOUR TESTING NEEDS**

**INTERCONNECT DEVICES, INC.**  
 • SPRING CONTACT PROBES  
 • CONNECTORS  
 • INTERFACES  
 • SYNERGETIX® TEST SOCKETS

PHONE: 913.342.5544  
 WEB: www.idinet.com



Micromanipulator

Pomona Electronics

QA Technology Co.

Rika Denshi America

Suss MicroTec

**IC Test Fixtures & Load Boards**

Advanced Interconnections

Aeroflex

Antares Advanced Test Technologies

Cascade Microtech

Circuit Check

Everett Charles Technologies

Qmax Test

Equipments

Robson Technologies

SPEA

SV Probe

Teradyne

Wentworth

Laboratories

**IC Test Sockets**

Advanced Interconnections

Antares Advanced Test Technologies

Aries Electronics

Armel Electronics

Cascade Microtech

DFT Microsystems

Emulation Technology

Everett Charles Technologies



**WE SPEAK THE LANGUAGE OF INNOVATION**

**SYNERGETIX INTERCONNECT DEVICES, INC.**  
 • SPRING CONTACT PROBES  
 • CONNECTORS  
 • INTERFACES  
 • SYNERGETIX® TEST SOCKETS

PHONE: 913.342.5544  
 WEB: www.idinet.com



Ironwood Electronics

Johnstech

International

3M Electronics

Multitest

Elektronische Systeme

Plastronics

Precision Contacts

Rika Denshi America

Robson Technologies

RS Tech

Synergetix

Yamaichi Electronics

**Pressure-Sensing Film**

Sensor Products

**Probe Cards & Adapters**

Accuprobe

Advantest America

Cascade Microtech

Everett Charles Technologies

FuturePlus Systems

Keithley Instruments

Lake Shore Cryotronics

Micromanipulator

SPEA

Suss MicroTec

SV Probe

Tektronix

Teradyne

Wentworth

Laboratories

Continued &gt;

## Looking to INCREASE your Profit\$ from Test?



**Focus on Johnstech!** Test Contactor choice directly affects your Profits from Test, which Johnstech increases in 3 main ways. First, the long life of Johnstech's Test Contactors & Components reduces rebuild frequency and spares costs for **LOWER Cost of Ownership**. Second, maintenance time and frequency are better with Johnstech Test Contactors, providing more Test uptime and **HIGHER OEE**. And finally, Johnstech's outstanding electrical and mechanical performance provides **HIGHER First-Pass Yields** and an enhanced Upbinning ability, sending more profits to your bottom line. **Isn't it time you focused on increased Profits from Test with Johnstech?**

**High Performing Products.  
 Superior Service.  
 Exceptional Value.**

**Johnstech®**

**Johnstech is Your Partner-in-Test!**

Johnstech will hold daily In-Booth Informational Presentations at SEMICON West 2008. To learn more, go to [www.johnstech.com/SEMICONWest](http://www.johnstech.com/SEMICONWest).



## THIRD-PARTY SUPPLIERS

**Distributors:  
Accessories**

Avalon Equipment  
Bell Electronics NW  
CAS Data Loggers  
Digi-Key  
MetricTest  
Miller Industrial  
TestMart  
Transcat  
Tucker Electronics

**Distributors: ATE**

Advint  
Avalon Equipment  
Averna  
Denver Test Systems  
Huntron  
KineticSystems  
Landrex Technologies  
Macrotron Scientific  
Engineering  
Testforce  
W.M. Hague

**Rental/Lease:  
ATE/Production  
Test Equipment**

Agilent Technologies  
Avalon Equipment  
Continental Resources  
Credence Systems  
LTX  
Microlease  
Rocky Mountain Test  
Equipment  
TestEdge  
TRS-RenTelco

**Training:  
ATE/Production  
Test/QA**

A.T.E. Solutions  
ASSET Intertech  
CIMTEK  
Circuit Check  
Corelis  
Digitaltest  
Geotest - Marvin Test  
Systems  
GOEPEL Electronics

Intellitech



JTAG Technologies  
LTX  
Northwest Analytical  
SPEA  
Technology Training  
TUV SUD America  
Unisoft

**Training:  
BIST/Testability**

A.T.E. Solutions  
ASSET Intertech  
Corelis  
GOEPEL Electronics  
Intellitech  
JTAG Technologies

LogicVision  
SynTest Technologies

**Used Equipment:  
ATE**

Agilent Technologies  
Comware Technical  
Services  
Credence Systems  
Denver Test Systems  
JMC Worldwide  
K & Us Equipment  
LabX  
Measurement  
Assurance Technology  
Micromanipulator  
NEA  
Rocky Mountain Test  
Equipment  
TEAM A.T.E.  
Teradyne  
Test Advantage  
TestEdge  
TRS-RenTelco

## SERVICES/LABS/TEST HOUSES

**Electronic Testing  
Services**

A.T.E. Solutions  
Accolade Engineering  
Solutions  
Agilent Technologies  
Alion Science &  
Technology  
Amkor Technology  
Averna  
CIMTEK  
Circuit Check  
Corelis  
D.L.S. Electronic  
Systems  
Digalog Systems  
Elite Electronic  
Engineering  
ETS-Lindgren  
Everett Charles  
Technologies  
Garwood Laboratories  
Geotest - Marvin Test  
Systems  
GOEPEL Electronics  
Hartman Associates  
Integra Technologies

Intellitech  
Intertek  
Invisar  
JTAG Technologies  
MegaPhase  
Motorola Product  
Testing Services  
National Technical  
Systems  
Oneida Research  
Services  
Pikes Peak Test Labs  
Premier Semiconductor  
Services  
Product Safety  
Consulting  
QualiTau  
Sensor and Antenna  
Systems, Lansdale  
Stephen Halperin &  
Associates  
Sypris Test &  
Measurement  
Telco Testing  
Solutions  
Telops  
Test Coach

*Continued >**multitest in your everyday life >>>*

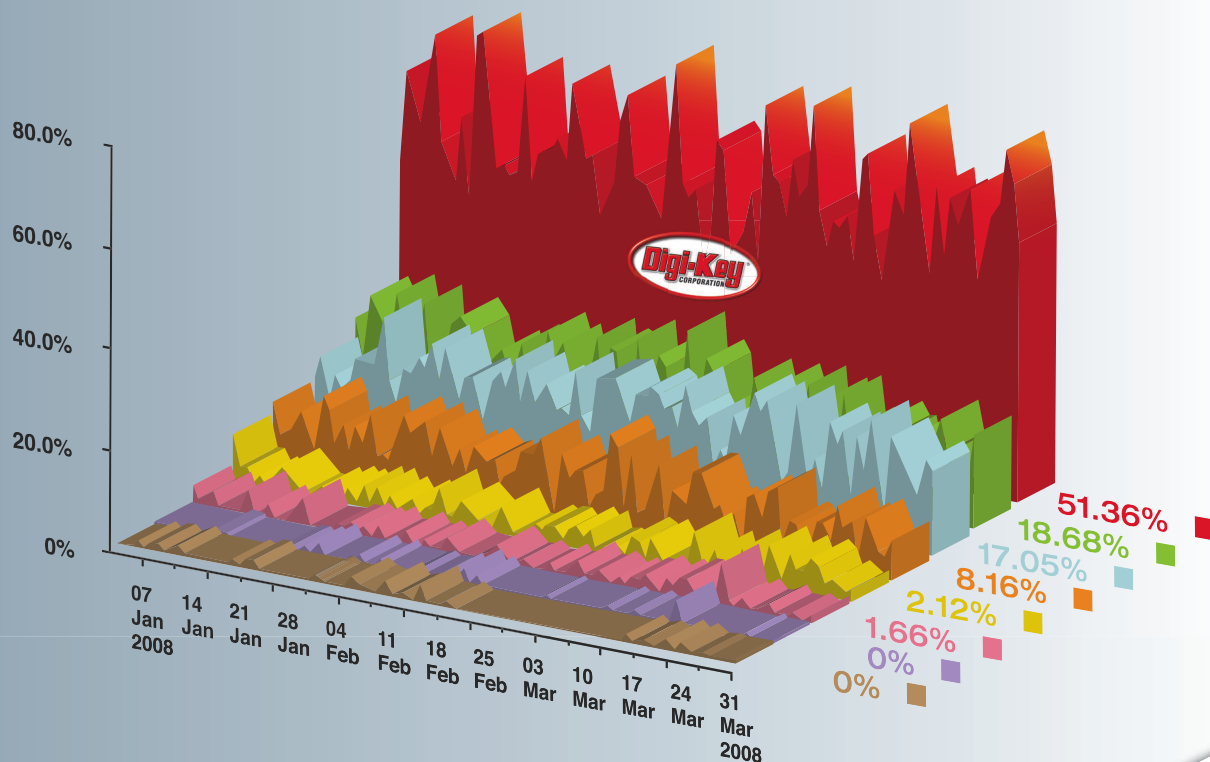
*Multitest contactors  
last a lifetime.*

**Worldwide Europe Asia USA**

www.multitest.com • info@multitest.com

**multitest**  
A DOWER COMPANY

# America's Online DISTRIBUTOR of CHOICE!



■ www.digikey.com 
 ■ distributor #2 
 ■ distributor #3  
■ distributor #4 
 ■ distributor #5 
 ■ distributor #6  
■ distributor #7 
 ■ distributor #8

© Copyright 1998-2008 Hitwise Pty, Ltd.

**hitwise**  
An Experian company



*Quality Electronic Components, Superior Service*

**www.digikey.com**  
**1.800.344.4539**





> SERVICES/LABS/TEST HOUSES *Continued*

The Test Connection  
Test Site Services  
TestEdge  
TUV Rheinland of  
North America  
TUV SUD America  
VI Technology

**Failure Analysis  
Services**

Accolade Engineering  
Solutions  
Agilent Technologies  
Alion Science &  
Technology  
Amkor Technology  
Cincinnati Sub-Zero  
Credence Systems  
ESSC  
Geller Microanalytical  
Lab  
Integra Technologies  
Intellitech  
Intertek  
Invisar  
National Technical  
Systems  
Nevada Automotive  
Test Center

Oneida Research  
Services  
Pikes Peak Test Labs  
Product Safety  
Consulting  
Reliability Analysis  
Laboratory, Raytheon  
Sensor and Antenna  
Systems, Lansdale  
Sypris Test &  
Measurement  
Test Tooling Solutions  
Group  
TUV SUD America  
YXLON International

**Fixturing Services**

Advint  
Agilent Technologies  
Amkor Technology  
Averna  
C&H Technologies  
Cablesan  
Checksum  
Circuit Check  
Custom Systems  
Integration  
Digalog Systems  
Elite Electronic  
Engineering

Environment  
Associates  
FocusTest  
Hartman Associates  
Instrumentation  
Engineering  
Integra Technologies  
Intrinsic Quality  
Invisar  
Landrex Technologies  
M/RAD  
National Technical  
Systems  
ProbeStar  
ReMaTek  
The Test Connection  
TestEdge  
TUV SUD America  
Vektrex Electronic  
Systems  
VI Technology  
Wentworth  
Laboratories  
Zmation

**System  
Integrators**

A.T.E. Solutions  
Advint

Agilent Technologies  
Averna  
Bloomy Controls  
C&H Technologies  
CAS Data Loggers  
CIMTEK  
Circuit Check  
CMT Engineering  
Crystal Instruments  
Custom Systems  
Integration  
Digalog Systems  
FocusTest  
Geotest - Marvin Test  
Systems  
In-Phase Technologies  
Instrumentation  
Engineering



Invisar  
m + p international  
Materials  
Development  
MegaPhase  
Microstar Laboratories  
Nanotran  
Omron Electronics  
QIOPTIQ Imaging  
Solutions  
Sharetree  
SVS-Vistek  
Symtx  
TDK RF Solutions  
Thermotron Industries  
Tracewell Systems  
Vektrex Electronic  
Systems  
VI Technology  
Viewpoint Systems  
Zmation

**Test Consultants**

A.T.E. Solutions  
Accolade Engineering  
Solutions  
Acculogic  
Advanced Testing  
Technologies  
Advint  
Agilent Technologies  
Alion Science &  
Technology  
Amkor Technology  
ASSET Intertech  
Averna  
Bloomy Controls  
CIMTEK  
Communication  
Certification Lab  
Corelis  
Custom Systems  
Integration  
D.L.S. Conformity  
Assessment  
D.L.S. Electronic  
Systems  
Digalog Systems  
DYNALFLOW  
Elite Electronic  
Engineering  
Equipment Reliability  
Institute  
FocusTest  
Geller Microanalytical  
Lab  
Geotest - Marvin Test  
Systems  
GL Communications  
GOEPEL Electronics  
HALT&HASS Systems  
Hartman Associates  
Hobbs Engineering  
Instrumentation  
Engineering  
Intellitech  
Intertek  
Intrinsic Quality  
Invisar  
JTAG Technologies  
LMS North America  
LTX  
m + p international  
MegaPhase  
MET Laboratories  
Motorola Product  
Testing Services  
National Technical  
Systems  
Nevada Automotive  
Test Center  
OptEM Engineering  
Pikes Peak Test Labs  
Premier  
Semiconductor  
Services  
Product Safety  
Consulting  
Spirent  
Communications  
Sensor and Antenna  
Systems, Lansdale  
Spirent  
Communications  
Sypris Test &  
Measurement  
Test Advantage

Test Coach  
The Test Connection  
Test Site Services  
TestEdge  
TUV SUD America  
Unisoft  
Vektrex Electronic  
Systems  
VI Technology

**Test  
Programming  
Services**

A.T.E. Solutions  
Acculogic  
Acugen Software  
Advanced Testing  
Technologies  
Advint  
Agilent Technologies  
Amkor Technology  
ASSET Intertech  
Averna  
Bloomy Controls  
Checksum  
Circuit Check  
Corelis  
Custom Systems  
Integration  
DaqScribe Technology  
Digalog Systems  
Flynn Systems  
FocusTest  
Geotest - Marvin Test  
Systems  
GOEPEL Electronics  
Hartman Associates  
Instrumentation  
Engineering  
Intellitech  
Invisar  
JTAG Technologies  
LTX  
m + p international  
Nevada Automotive  
Test Center  
Pikes Peak Test Labs  
Premier Semiconductor  
Services  
Product Safety  
Consulting  
Spirent  
Communications  
Sypris Test &  
Measurement  
Test Advantage  
Test Coach  
The Test Connection  
TestEdge  
Unisoft  
VI Technology

T&amp;MW

# Get your facts STRAIGHT

At TMWorld.com you can. That's because we are dedicated to providing you with the best technical information we can. With a team of technical editors who are all previous engineers themselves, we have the access and background to bring you the information that matters to you most.

**See for yourself—browse our  
current issue, the latest news,  
or our archives.**

## TMWorld.com

Visit the **new** TMWorld.com.

The industry's best source for test, measurement,  
and inspection information.

The Future of Test  
Speed, Simplicity, Connectivity

# VERSATILE

## Testing is our business.

You've expected us to provide the best solutions for your test requirements. You've expected innovative products.

We've given you GPIB, VXI, PXI, and Ethernet-controlled instruments.

Coming in September, you can expect even more.

## Excellence is what we know.

For your versatile test solution, contact:

**EADS North America Test and Services**

800.722.2528 | [www.ts.eads-na.com](http://www.ts.eads-na.com) | [info@ts.eads-na.com](mailto:info@ts.eads-na.com)



## Implementing Your Vision

- Racal Instruments™ Switching Systems
- Racal Instruments™ Stimulus Products
- Talon Instruments™ Digital Applications
- Modular, Scalable Solutions
- Best-in-Class Multi-Vendor ATE
- Semiconductor Burn-in Test Systems
- Legacy Modernization
- Total System Life Management



# Want to save time and money on **INDUSTRIAL EQUIPMENT?**

## Let BuyerZone do the heavy lifting so you don't have to.

Save time and money on industrial equipment purchases. Get free advice and pricing articles on everything from forklifts, to pallet racks to floor cleaning equipment and more. BuyerZone is here to do the heavy lifting of finding all the suppliers. You just need to make the final decision. At BuyerZone, you're in control. We're just here to make your work easier.

Join the millions who've already saved time and money on many of their Industrial Equipment purchases by taking advantage of BuyerZone's FREE, no obligation services like:

- Quotes from multiple suppliers
- Pricing articles
- Buyer's guides
- Supplier ratings
- Supplier comparisons

**REQUEST FREE QUOTES NOW!**

**Call (866) 623-5565 or visit  
BuyerZoneIndustrial.com**

**BuyerZone**  
Where Smart Businesses Buy and Sell

A division of  
 Reed Business Information.

## In this section

- Machine-Vision & Inspection Equipment, below
- Machine-Vision Software, p. 76
- Third-Party Suppliers, p. 77
- Services/Labs/Test Houses, p. 77

Vendor contact information begins on p. 106.

## MACHINE-VISION & INSPECTION EQUIPMENT

### CAD Navigation Tools

Credence Systems  
Unisoft

### Camera Cables

Basler Vision Technologies  
Cognex  
The Imaging Source  
Intercon 1, Div. of Nortech Systems  
MicroImage Video Systems  
National Instruments

### Cameras, Area Scan

Adimec  
Basler Vision Technologies  
Cognex  
Dalsa  
Dewetron  
EPIX  
Fast-Vision  
Hamamatsu  
Illunis  
The Imaging Source  
Imperx  
Integrated Design Tools

JAI  
KAPPA optoelectronics  
Leutron Vision  
Lumenera  
MicroImage Video Systems  
NAC Image Technology  
National Instruments  
NET USA  
Panasonic Vision Systems  
PCO  
Photron  
Pixelink

Point Grey Research  
PPT VISION  
Princeton Instruments  
Rad-Icon Imaging  
Sentech America  
Silicon Imaging  
Sony Electronics  
SVS-Vistek  
Thermo Fisher Scientific  
Videology Imaging Solutions  
Vision Components  
Vision Research  
Wintriss Engineering

### Cameras, Line Scan

Basler Vision Technologies  
Cognex  
Dalsa  
EPIX  
Fast-Vision  
Hamamatsu  
JAI  
Lord Ingenierie

PerkinElmer Optoelectronics  
Sentech America  
Vision Components  
Wintriss Engineering

### Cameras, Microscope

Basler Vision Technologies  
Chroma Systems Solutions  
Huntron  
The Imaging Source  
Integrated Design Tools  
KAPPA optoelectronics  
Lumenera  
NAC Image Technology  
Nikon Instruments  
Panasonic Vision Systems  
Photron  
QIOPTIQ Imaging Solutions  
Sentech America  
Silicon Imaging

Sony Electronics  
Tamar Technology  
Vision Engineering  
WESCO

### Coordinate/Dimensional Measuring Equipment

Aerotech  
Immersion  
KAPPA optoelectronics  
MicroImage Video Systems  
Micro-Metric  
Micro-Vu  
Mitutoyo America  
Optical Gaging Products  
Polytec  
RAM Optical Instrumentation  
Rudolph Technologies  
Solarius Development  
Sony Manufacturing Systems America

Continued >

### Area Scan Cameras

### Line Scan Cameras

### Intelligent Cameras



## 30 Digital Camera Models with GigE Vision and FireWire-b



### Flexible and cost effective

- Up to 100 meter cable lengths for more flexibility
- Enhanced bandwidth that allows even more cameras on one bus
- Price/performance ratio at its best! Starting at 499 EUR for a 60 fps VGA camera
- Progressive scan CCD sensors ranging in size from VGA to 2 megapixels
- Easy to integrate with a footprint of 29 x 44 mm



[www.baslerweb.com/scout](http://www.baslerweb.com/scout)

**BASLER**  
VISION TECHNOLOGIES

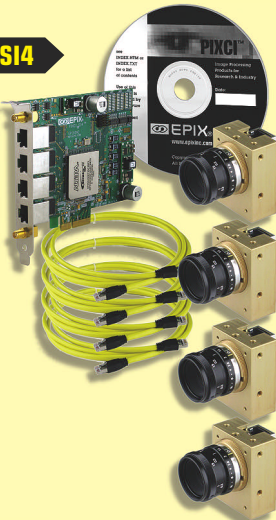
click. see. smile!



# Cameras, Frame Grabbers, & Software

## PIXCI® S14

Four  
camera  
frame  
grabber



## PIXCI® SI

Single  
camera  
frame  
grabber



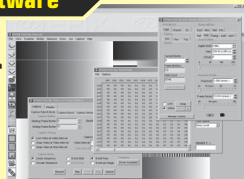
## Inspection System

Ready  
to Run



## XCAP™ Software

Camera  
controls for  
Windows  
& Linux



**epixinc.com**



Buffalo Grove, IL, USA  
Tel - 847 465 1818

© EPIX, Inc.

## MACHINE VISION & INSPECTION

> MACHINE-VISION & INSPECTION EQUIPMENT *Continued*

Tamar Technology  
Ultrafast Sensors  
View Engineering  
Vision Engineering  
WESCO

### Focused Ion Beam Systems

Credence Systems  
FEI Co.  
JEOL USA

### Frame Grabbers

Active Silicon  
Adlink Technology  
Alacron  
BitFlow  
Cognex  
Dalsa  
Data Translation  
EPIX  
Euresys  
Fast-Vision  
Foresight Imaging  
The Imaging Source  
Imperx  
KAPPA opto-electronics  
Leutron Vision  
Matrox Imaging  
National Instruments  
PerkinElmer  
Optoelectronics  
Pleora Technologies  
SVS-Vistek

### Inspection Systems for Packaged Devices

AccuSentry  
Checksum  
Dage Precision  
Industries  
Dalsa  
DiagnoSYS Systems  
Edmund Optics  
MatriX Technologies  
Micromanipulator  
Micro-Vu  
OptoMetrix  
phoenix x-ray Systems  
+ Services  
View Engineering  
WESCO  
Wintriss Engineering  
X-TEK Group  
YesTech  
YXLON International  
Zygo

### Inspection Systems for PCBs/Hybrids

AccuSentry  
Aerotech  
Agilent Technologies  
Chroma Systems  
Solutions  
DiagnoSYS Systems  
Edmund Optics  
EPIX  
GOEPEL Electronics  
Landrex Technologies  
Machine Vision  
Products  
MatriX Technologies  
Metron Optics  
Micromanipulator  
Micro-Vu  
Optical Gaging  
Products  
Panasonic Factory  
Solutions Company of  
America  
phoenix x-ray Systems  
+ Services  
ScanCAD  
International  
Seica  
Sony Manufacturing  
Systems America  
Teradyne  
Test Research  
View Engineering  
Viscom  
Vision Engineering  
WESCO  
X-TEK Group  
YesTech  
YXLON International

### Inspection Systems for Wafers/Dies

AccuSentry  
Aerotech  
Ambios Technology  
Camtek USA  
Dalsa  
Edmund Optics  
Hamamatsu  
JEOL USA  
Lake Shore Cryotronics  
Micromanipulator  
Micro-Vu  
MTI Instruments  
Nikon Instruments  
Olympus, Industrial  
Micro-Imaging  
OptoMetrix  
Panasonic Factory  
Solutions Company of  
America  
phoenix x-ray Systems  
+ Services  
ScanCAD  
International  
Seica  
Sony Manufacturing  
Systems America  
Teradyne  
Test Research  
View Engineering  
Viscom  
Vision Engineering  
WESCO  
X-TEK Group  
YesTech  
YXLON International

Panasonic Factory  
Solutions Company of  
America  
phoenix x-ray Systems  
+ Services  
Rudolph Technologies  
ScanCAD  
International  
Tamar Technology  
View Engineering  
Viscom  
Vision Engineering  
Vistec Semiconductor  
Systems  
WESCO  
YXLON International  
Zmation  
Zygo

### Inspection Systems, Thermal/Infrared

Compix

**compix**

Radiometric  
Thermal Imagers

SDK for custom  
applications  
[www.compix.com](http://www.compix.com)

FLIR Systems  
Hamamatsu  
Iron

### Inspection Systems, Video

AccuSentry  
Aerotech  
Agilent Technologies  
Dalsa  
Edmund Optics  
EPIX  
Huntron  
Image Labs  
International  
Integrated Design  
Tools  
KAPPA opto-electronics  
Keyence  
Landrex Technologies  
Matrox Imaging  
Meiji Techno America  
Microlmage Video  
Systems  
Micro-Vu  
NAC Image  
Technology  
Navitar  
Nikon Instruments  
Optical Gaging  
Products

Panasonic Vision  
Systems  
Photron  
RAM Optical  
Instrumentation  
Rudolph Technologies  
Silicon Imaging  
Tamar Technology  
Unitron  
View Engineering  
Vision Engineering  
Volpi USA  
WESCO  
Wintriss Engineering  
Zmation

### Inspection Systems, X-Ray

Aerotech  
Agilent Technologies  
Dage Precision  
Industries  
Faxitron X-Ray  
Glenbrook  
Technologies  
GOEPEL Electronics  
Hamamatsu  
MatriX Technologies  
phoenix x-ray Systems  
+ Services  
Rad-ikon Imaging  
Sens-Tech  
Teradyne  
Viscom  
VJ Electronix  
X-TEK Group  
YesTech  
YXLON International

### Inspection Targets/Grids

AccuSentry  
Geller Microanalytical  
Lab  
Integrated Design  
Tools  
Microlmage Video  
Systems

### Lenses, Camera

Cognex  
CVI Melles Griot  
The Imaging Source  
LINOS Photonics  
Moritex USA  
Navitar  
NET USA  
PCO  
QIOPTIQ Imaging  
Solutions  
Rolyn Optics  
Sentech America

StingRay Optics  
Tamron USA  
Volpi USA  
WESCO

#### **Lenses, Microscope**

Anchor Optics  
CVI Melles Griot  
The Imaging Source  
Infinity Photo-Optical  
Meiji Techno America  
Navitar  
Nikon Instruments  
QIOPTIQ Imaging  
Solutions  
Rolyn Optics  
StingRay Optics  
Unitron  
WESCO

#### **Lighting, Machine-Vision**

AccuSentry  
Advanced Illumination  
Cognex  
Fiberoptic Systems  
The Imaging Source  
Moritex USA  
NET USA  
PerkinElmer  
Optoelectronics  
Phlox  
QIOPTIQ Imaging  
Solutions  
Schott North America  
StockerYale  
Sunnex  
Tamar Technology  
Volpi USA  
WESCO  
Wintriss Engineering

#### **Lighting, Microscopy**

The Imaging Source  
Meiji Techno America  
QIOPTIQ Imaging  
Solutions  
Schott North America  
StockerYale  
Sunnex  
Tamar Technology  
Volpi USA  
WESCO

#### **Magnifiers**

GEL International  
QIOPTIQ Imaging  
Solutions

Sunnex  
Vision Engineering

#### **Microscopes, Accessories**

Carl Zeiss  
Microlmaging  
Creative Devices  
Geller Microanalytical  
Lab  
Infinity Photo-Optical  
Meiji Techno America  
Micromanipulator  
Prior Scientific  
QIOPTIQ Imaging  
Solutions  
Rolyn Optics  
Tamar Technology  
Unitron  
Vision Engineering  
WESCO  
Zygo

#### **Microscopes, Electron**

FEI Co.  
JEOL USA

#### **Microscopes, Emission**

Hamamatsu  
Micromanipulator

#### **Microscopes, Optical**

AFL  
Telecommunications  
Anchor Optics  
Carl Zeiss  
Microlmaging  
Chroma Systems  
Solutions  
Credence Systems  
Edmund Optics  
GEL International  
Infinity Photo-Optical  
Klein Instruments  
Meiji Techno America  
Metron Optics  
Nikon Instruments  
Olympus, Industrial  
Micro-Imaging  
Optical Gaging  
Products  
Prior Scientific  
QIOPTIQ Imaging  
Solutions  
RAM Optical  
Instrumentation  
Rolyn Optics  
Rudolph Technologies

Continued >

# Think ~~outside~~ the box. *inside*

For ten years, our Matrox 4Sight embedded systems have taken industrial imaging to new places. Our newest addition, **4Sight X**, features **x4 PCIe™ interconnects**, **multi-core CPU** support and a **GPU** for display and even image processing. It's all here: hardware and software support for **GigE Vision™** and **IEEE 1394** through our field-proven Matrox Imaging Library, pre-installed on every unit. And we manufacture in-house with stringent change control, so you have a consistent supply throughout a long life cycle.

**Matrox 4Sight X: everything's inside.**  
**Take a tour:**

[matroximaging.com/4sightx](http://matroximaging.com/4sightx)

Shown with Matrox Nexis camera heads (sold separately).



[matroximaging.com/1-800-804-6243/+1-514-822-6020/](http://matroximaging.com/1-800-804-6243/+1-514-822-6020/)  
[imaging.info@matrox.com](mailto:imaging.info@matrox.com)



## > MACHINE-VISION & INSPECTION EQUIPMENT *Continued*

Sciencescope  
International  
Unitron  
Vision Engineering  
WESCO  
WITec Instruments  
Zygo

### Microscopes, Scanning Probe

Ambios Technology  
JEOL USA  
Multiprobe  
OptoMetrix  
Ultrafast Sensors  
WITec Instruments

### Optical Comparators

GEI International  
Metron Optics  
Micro-Vu  
Nikon Instruments  
Optical Gaging  
Products

QIOPTIQ Imaging  
Solutions  
Rudolph Technologies  
Sencore  
Vision Engineering

### Positioning Stages and Tables

Aerotech  
CGI  
CIMTEK  
Dynamic Solutions  
Micromanipulator  
Piezosystem Jena  
Prior Scientific  
Suss MicroTec  
Tamar Technology  
TDK RF Solutions  
Zmotion

Mitutoyo America  
MTI Instruments  
Olympus, Industrial  
Micro-Imaging  
Optical Gaging  
Products  
Solaris Development  
Tamar Technology  
Ultrafast Sensors  
Wintriss Engineering  
Zygo

### Vision Sensors

Cognex  
Dalsa  
Integral Vision  
LMI Technologies  
Omron Electronics  
PPT VISION  
QIOPTIQ Imaging  
Solutions  
Sentech America  
Teledyne Scientific &  
Imaging  
Vision Components  
Wintriss Engineering  
Zmotion

### Sample Preparation Equipment

JEOL USA

### Surface- Analysis/Profiling Equipment

Ambios Technology  
Carl Zeiss  
Microlmaging  
Geller Microanalytical  
Lab  
JEOL USA

## MACHINE-VISION SOFTWARE

### Image-Analysis Software

Alacron  
BitFlow  
Cognex  
Dalsa  
Data Translation  
EPIX  
Euresys  
Golden Software  
KAPPA opto-  
electronics  
Landrex Technologies  
The MathWorks  
MatriX Technologies  
Matrox Imaging  
Micromanipulator  
MVTec Software  
National Instruments  
NorPix  
Pixelink  
Test Advantage  
YXLON International

BitFlow  
CIMTEK  
Cognex  
Dalsa  
Data Translation  
EPIX  
GOEPEL Electronics  
The Imaging Source  
Landrex Technologies  
LMI Technologies  
Matrox Imaging  
MVTec Software  
National Instruments  
NorPix  
Pixelink  
Pleora Technologies  
ScanCAD  
International  
Stemmer Imaging  
Unisoft  
Viscom

### Machine-Vision Software

Adlink Technology  
Alacron  
Averna

www.visionresearch.com

When it's too fast to see, and too important not to.™



## Test tools that let you see where you can improve profits! Phantom Miro high-speed digital cameras



Miro 4

Qualifying products? Characterizing materials?  
The **Phantom Miro high-speed digital camera**  
belongs in your T & M toolkit.

The Miro is the high-speed camera that's  
astonishingly easy to use. Simply point and shoot.  
Miro's bright **touchscreen LCD** lets you immediately  
**see what no ordinary camera can show you.**

Capture transient motions persisting a few microseconds.  
**Measure. Analyze. Characterize.**

The **rugged lightweight** Phantom Miro comes with  
LCD control, compact flash, powerful software, &  
network capability. High-g certified models are also available.

Visit our web site today [www.visionresearch.com/go/tmw](http://www.visionresearch.com/go/tmw)



Watch a short movie about  
Phantom high-speed imaging solutions:  
[www.visionresearch.com/movie](http://www.visionresearch.com/movie)

**VISION  
RESEARCH**

100 Dey Road, Wayne, NJ 07470, USA  
P: 1.772.286.7000 TF: 1.866.450.PHANTOM  
E: [phantom@visionresearch.com](mailto:phantom@visionresearch.com)

### THIRD-PARTY SUPPLIERS

#### Distributors: Inspection Equipment

Aegis Electronic  
Group  
Creative Devices  
Firstsight Vision  
Image Labs  
International  
Instrumart  
Madell Technology  
Miller Industrial  
NET USA  
Silicon Imaging  
Stanley  
Stemmer Imaging  
SVS-Vistek  
Terra Universal  
Vision Research

#### Rental/Lease: Inspection Equipment

Advanced Test  
Equipment Rentals  
Agilent Technologies  
Industrial Resources  
Microlease  
TRS-RenTelco

#### Training: Inspection

A.T.E. Solutions  
Matrox Imaging  
phoenix x-ray Systems  
+ Services  
Sypris Test &  
Measurement

#### Used Equipment: Inspection Equipment

Agilent Technologies  
Creative Devices  
FLIR Systems  
Industrial Resources  
K & Us Equipment  
NEA  
phoenix x-ray Systems  
+ Services  
Teradyne  
TRS-RenTelco  
YXLON International

### SERVICES/LABS/TEST HOUSES

#### Inspection Services

Agilent Technologies  
Amkor Technology  
Averna  
Geller Microanalytical  
Lab  
Glenbrook  
Technologies  
GOEPEL Electronics  
Integra Technologies  
Nevada Automotive  
Test Center  
Oneida Research  
Services  
phoenix x-ray Systems  
+ Services  
Pikes Peak Test Labs  
Premier  
Semiconductor  
Services  
Product Safety  
Consulting  
QIOPTIQ Imaging  
Solutions

Sypris Test &  
Measurement  
TUV SUD America  
Vision Systems  
International  
VJ Electronix  
X-TEK Group  
YXLON International  
Zygo

T&MW

# Stumped on a big project? Don't SWEAT it!

Everything about **Standard Wafer-Level  
Electromigration Accelerated Test**  
and more can be found at **TMWorld.com**.



**TMWorld.com** now offers more SWEAT than ever.  
We've redesigned the website to provide:

- + **More News, More Often** – from TMWorld.com and around the web
- + **Blogs** – T&MW editors and industry leaders lend color to manufacturing's hot button issues
- + **TalkBack** – Sound off about the latest news and blogs
- + **Improved Search** – Dig through TMWorld.com archives and find relevant information from other news sources
- + **Online Glossary** – Learn about SWEAT, SPICE, shmoo plot and more

**Test &  
MEASUREMENT  
WORLD**

## TMWorld.com

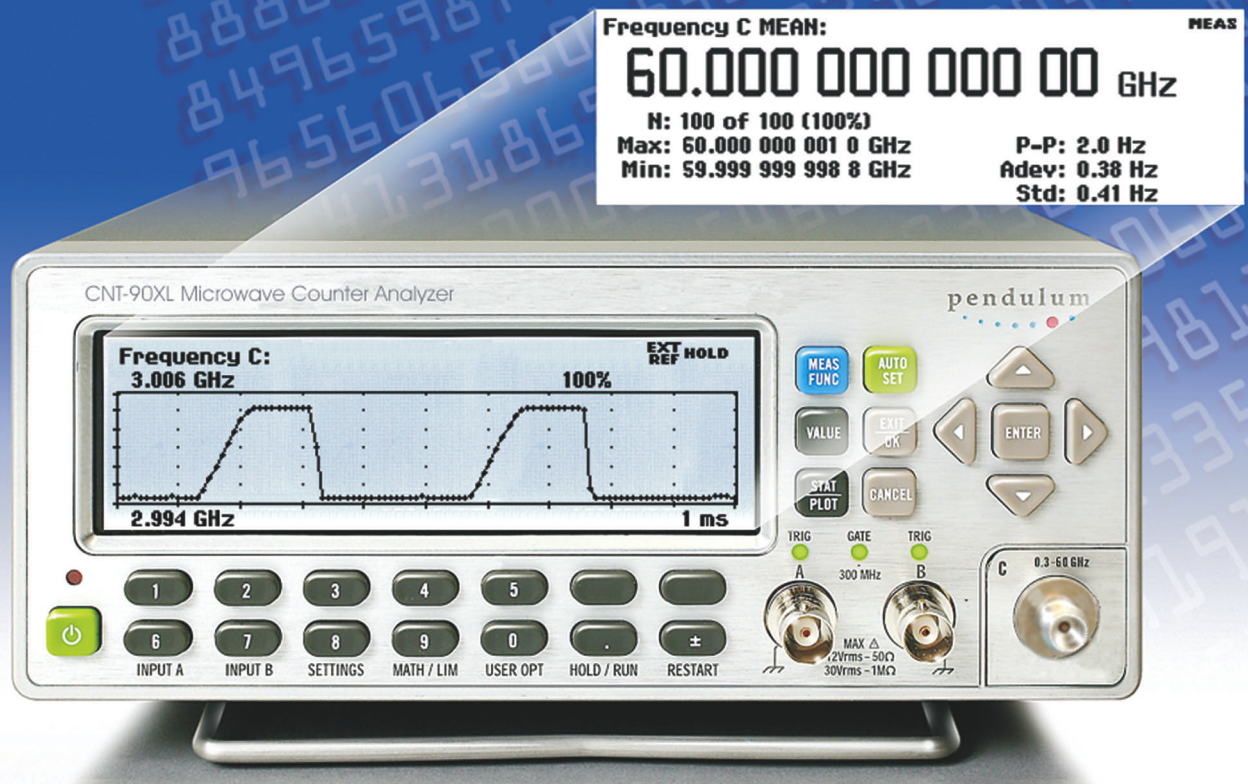
Visit the **new** TMWorld.com.

The industry's best source for test, measurement,  
and inspection information.



# CNT-90XL Microwave Counter/Analyzer

## SUMMER CAMPAIGN



**Buy a CNT-90XL Microwave Counter/Analyzer and get**  
**- Modulation Domain Analysis Software (TimeView™)**  
**- Five Years Warranty**  
**- Hard Carrying Case**  
**FOR FREE!\***

The CNT-90XL Microwave Counter/Analyzer is the Ultimate Tool for Measurement, Analysis and Calibration of Microwave Frequency and Power:

### Fast Analysis

Frequency or power stability, settling or drift  
Modulation domain analysis to 60 GHz  
View FM or AM on graphical display

### Versatility

Frequency or power, CW or burst to 60 GHz  
All timer/counter functions to 300 MHz

### Ultra High Range, Speed and Resolution

250k meas./sec. of frequency or power  
27, 40, 46 or 60 GHz frequency range  
mHz resolution on GHz signals

### For more information, please visit

[www.pendulum-instruments.com/eng/htm/90xl\\_campaign.php](http://www.pendulum-instruments.com/eng/htm/90xl_campaign.php)

\*The value of the offer is up to \$3000. The offer is valid for each CNT-90XL ordered up to, and including, September 30, 2008

### Pendulum Instruments

- Experts in Time & Frequency Calibration, Measurement and Analysis

Phone: +1 510-428-9488 (US/Canada), +46 8 598 510 57 (World-wide). [info@pendulum.se](mailto:info@pendulum.se)

[www.pendulum-instruments.com](http://www.pendulum-instruments.com)

pendulum

### In this section

- RF/Microwave and Wireless Communications Test Equipment, see below
- Telecom/Datacom Test Equipment, p. 82
- Fiber-Optic/Electro-Optic Test Equipment, p. 99
- Third-Party Suppliers, p. 100
- Services/Labs/Test Houses, p. 101

Vendor contact information begins on p. 106.

### RF/MICROWAVE AND WIRELESS COMMUNICATIONS TEST EQUIPMENT

#### Calibration Sets, Microwave

Boonton Electronics  
Cascade Microtech  
Colby Instruments  
Pendulum Instruments  
Rohde & Schwarz

#### Calibrators, Antenna

A.H. Systems  
Colby Instruments  
Schomandl

#### Channel Simulators

Anite Group  
Azimuth Systems  
Leader Instruments

#### Frequency Counters, RF/Microwave

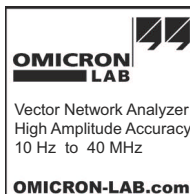
Advantest America  
Aeroflex  
Agilent Technologies  
Anritsu

B&K Precision  
EADS North America Test & Services  
Fluke

Instek America  
National Instruments  
Pendulum Instruments  
Phase Matrix  
Precision Test Systems  
Protek Test and Measurement  
Tabor Electronics

#### Network Analyzers, RF/Microwave

Advantest America  
Agilent Technologies  
Anritsu  
Cascade Microtech  
Giga-tronics  
JDSU  
National Instruments  
OMICRON Electronics



Rohde & Schwarz

#### Power Meters, RF/Microwave

Aeroflex  
Agilent Technologies  
Anritsu  
AR, RF/Microwave Instrumentation

Berkeley Varitronics Systems  
Bird Electronic  
Boonton Electronics  
EADS North America Test & Services  
ETS-Lindgren  
Focus Microwaves  
Giga-tronics  
Keithley Instruments  
National Instruments  
Pendulum Instruments  
Phase Matrix  
Praxsion  
Precision Test Systems  
Ramsey Electronics  
Rohde & Schwarz  
Schomandl  
Tegam  
Tektronix

#### RF Field Strength Meters

Berkeley Varitronics Systems  
Bird Electronic  
ETS-Lindgren

Lake Shore Cryotronics  
Leader Instruments  
Pendulum Instruments  
Precision Test Systems  
Schomandl  
Sencore  
Tektronix

#### Signal Analyzers, RF

Advantest America  
Aeroflex  
Agilent Technologies  
Anritsu  
Bird Electronic  
Boonton Electronics  
Keithley Instruments  
MI Technologies  
National Instruments  
Opticom  
Pendulum Instruments  
Precision Test Systems  
Rohde & Schwarz  
Sencore  
Tektronix

Continued >

This note might change your life!\*



[www.OMICRON-Lab.com](http://www.OMICRON-Lab.com)

\*at least it will provide inspiration for your daily measurement tasks.

Smart Measurement Solutions®



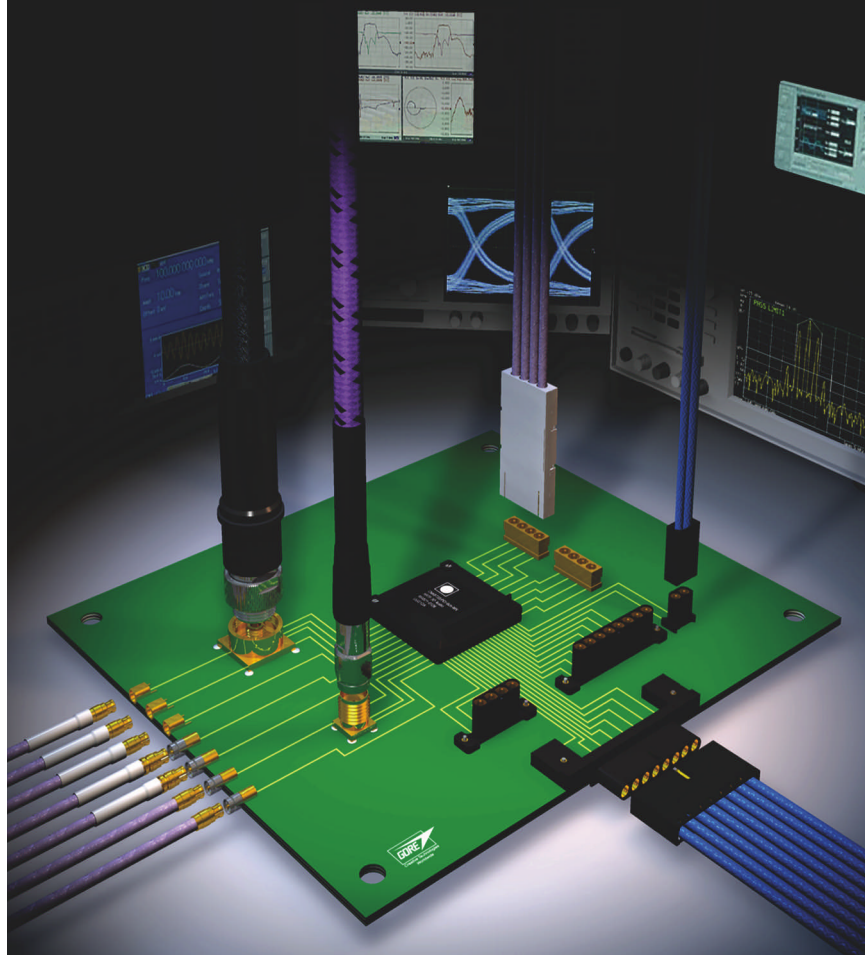


# Did you know?

Gore is celebrating 50 years of innovation in the electronic products market!

Experience the breadth of Gore microwave solutions:

- Frequency - up to 110 GHz
- Diameters as small as 50 AWG
- Cables with flat, round, or ganged form factors
- Blindmate push-on connectors
- EMI shielding
- Thermal interfaces
- Ruggedization for long service life
- Excellent stability and repeatability



W. L. Gore & Associates, Inc.

North America:

1 (800) 445 4673

International:

1 (302) 292 5100

Europe:

+49 91 44 6010

+44 1382 561511

[gore.com](http://gore.com)



## COMMUNICATIONS TEST .....

> RF/MICROWAVE AND WIRELESS TEST *Continued*

### Signal Sources, RF/Microwave

Advantest America  
Aeroflex  
Agilent Technologies  
Anritsu  
Chase Scientific  
EADS North America  
Test & Services  
Fluke  
Giga-tronics  
Instek America  
Keithley Instruments  
L-3 Communications  
Nova Engineering  
Leader Instruments  
MI Technologies  
Micro Lambda  
Wireless  
National Instruments  
Noise Com  
Novatech Instruments  
Pendulum Instruments  
Pentek  
Phase Matrix  
Picosecond Pulse  
Labs  
Praxsym  
Precision Test Systems  
Protek Test and  
Measurement  
Rohde & Schwarz  
Schomandl  
Tabor Electronics  
Tektronix

### Spectrum Analyzers, RF/Microwave

Advantest America  
Aeroflex  
Agilent Technologies  
Anritsu  
Bantam Instruments  
Berkeley Varitronics  
Systems  
Hameg Instruments  
Instek America  
JDSU  
National Instruments  
Pendulum Instruments  
Precision Test Systems  
Rohde & Schwarz  
Schomandl  
Sencore  
Tektronix  
Willtek  
Communications

### Switching Matrices, RF/Microwave

AR, RF/Microwave  
Instrumentation  
Colby Instruments  
Cytec  
Dow-Key Microwave  
EADS North America  
Test & Services  
Giga-tronics  
JDSU  
JFW Industries  
Keithley Instruments  
National Instruments  
Pickering Interfaces  
Rohde & Schwarz  
Teledyne Relays  
Universal Switching  
VXI Technology

### Wireless Communications Testers

Advantest America  
Aeroflex  
Agilent Technologies  
Anite Group  
Anritsu  
Azimuth Systems  
Berkeley Varitronics  
Systems  
Catapult  
Communications  
CIMTEK  
Colby Instruments  
Comarco Wireless  
Test Solutions  
EADS North America  
Test & Services  
Ixia  
Keithley Instruments  
MI Technologies  
Noise Com  
Pendulum Instruments  
Praxsym  
Precision Test Systems  
RADCOM  
Rohde & Schwarz  
Schomandl  
SeaSolve Software  
Spectracom  
Tabor Electronics  
Tektronix  
Willtek  
Communications  
ZTEC Instruments

*Continued >*

# TELEDYNE SWITCHING SOLUTIONS



## CCR-59 and CCR-33K Coaxial Switches

- DC to 33 GHz
- Excellent insertion loss repeatability
- Ultra low passive intermodulation (PIM)
- 5 million cycles characteristic life
- Failsafe and latching



**TELEDYNE**  
COAX SWITCHES

(800) 351-7368 • [www.teledynecoax.com](http://www.teledynecoax.com)

## GRF312 Surface-Mount Relays

- DC to 8GHz
- Signal Integrity measured to 12 Gbps
- Excellent pole-to-pole Isolation
- Pick-and-place surface mount solution
- Hermetically sealed - immune to cleaning solutions



**TELEDYNE**  
RELAYS

*A Teledyne Technologies Company*

(800) 596-3855 • [www.teledynereleys.com](http://www.teledynereleys.com)



## TELECOM/DATACOM TEST EQUIPMENT

### Bit-Error-Rate Testers

Aeroflex  
Agilent Technologies  
Anritsu  
Centellax  
Connecticut Technology Products  
EXFO  
Finisar  
GL Communications  
Ixia  
JDSU  
Megatel-CTC Group USA  
Noise Com  
Spirent Communications  
Sunrise Telecom  
SyntheSys Research  
Telinc  
Wavecrest

### Communication Cable Testers (Metal and Optical)

AEMC Instruments  
Anritsu  
EXFO  
JDSU  
Leader Instruments  
Sunrise Telecom

### Modem Testers, Cable/xDSL

Agilent Technologies  
EXFO  
Hermon Labs  
Ixia  
JDSU  
Megatel-CTC Group USA  
Noise Com  
RADCOM  
Spirent Communications

Sunrise Telecom  
Tracespan Communications

### Network Test Software, Third-Party

Catapult Communications  
EdenTree Technologies  
EXFO  
The Fanfare Group

### Packet Generators

Anritsu  
Catapult Communications  
EXFO  
GL Communications  
Ixia  
RADCOM  
Spirent Communications

### Protocol Analyzers, LAN and WAN

Agilent Technologies  
Anritsu  
Benedict Computer  
Connecticut Technology Products  
EXFO  
Finisar  
Frontline Test Equipment  
GL Communications  
Ixia  
JDSU  
Megatel-CTC Group USA  
Network Instruments  
QualityLogic  
RADCOM  
Spirent Communications  
Telinc  
Tracespan Communications

### Return-Loss Testers

Anritsu  
DiagnoSYS Systems  
EXFO  
GL Communications  
JDSU  
Microtronix Systems  
Spirent Communications  
Sunrise Telecom  
Terahertz Technologies

### SDH/PDH/SONET Testers

Agilent Technologies  
Anritsu  
EXFO  
GL Communications  
Ixia  
JDSU  
Pendulum Instruments  
RADCOM  
Spirent Communications  
Sunrise Telecom

### RADCOM

Spirent Communications  
Sunrise Telecom  
Telinc  
Teltone

### Transmission Testers

Agilent Technologies  
Anritsu  
B&K Precision  
Connecticut Technology Products  
DiagnoSYS Systems  
EXFO  
Hermon Labs  
JDSU  
Megatel-CTC Group USA  
Microtronix Systems  
Pendulum Instruments  
QualityLogic  
Spirent Communications  
Sunrise Telecom

## Half the Cost, Twice the Accuracy

**TEGAM**

Be certain.

### Model 1830A

- RF Power Meter for Metrology
- Calibrate 50 MHz reference outputs
- Compatible with most DC substitution thermistor sensors
- Directly reads calibrated RF power

\$6495



800-666-1010 • www.tegam.com • 10 TEGAM Way, Geneva, Ohio 44041

### Telecom Switch/Router Testers

Agilent Technologies  
Catapult Communications  
DiagnoSYS Systems  
EXFO  
GL Communications  
Gordon Kapes  
Ixia  
QualityLogic  
RADCOM  
Spirent Communications  
Teltone

### Telephone & DSL Line Simulators

Advent Instruments  
Catapult Communications  
DiagnoSYS Systems  
GL Communications  
Gordon Kapes  
Micro Seven  
Microtronix Systems

### VoIP & IPTV & MPEG Testers

Agilent Technologies  
Anritsu  
B&K Precision  
Chroma Systems Solutions  
EXFO  
GL Communications  
Ixia  
JDSU  
Leader Instruments  
Microtronix Systems  
Network Instruments  
Noise Com  
Opticom  
Prism Sound  
QualityLogic  
Quantum Data  
RADCOM  
Rohde & Schwarz  
Sencore  
Spirent Communications  
Sunrise Telecom  
Tektronix

Continued >

## FIBER-OPTIC/ELECTRO-OPTIC TEST EQUIPMENT

### Display/LED Testers

Instrument Systems  
Integral Vision  
Keithley Instruments  
Klein Instruments  
Microvision  
National Instruments  
Optomistic Products  
Radiant Imaging  
Sencore  
Test Coach  
Vektrex Electronic Systems

### Electro-Optics Testers

CIMTEK  
EADS North America Test & Services  
Gigahertz-Optik  
JDSU  
Keithley Instruments  
National Instruments  
Newport  
Terahertz Technologies  
Vektrex Electronic Systems

### Fault Locators

AEMC Instruments  
AFL Telecommunications  
Anritsu  
EXFO  
JDSU  
OZ Optics  
Sunrise Telecom  
Terahertz Technologies

### Fiber-Optic Attenuators

AFL Telecommunications  
EXFO  
JDSU  
OZ Optics

### Fiber-Optic Laser Sources

AFL Telecommunications  
Agilent Technologies  
Anritsu  
Berkeley Nucleonics  
Calmar Optcom  
dBm Optics  
EXFO  
ILX Lightwave  
JDSU

Luna Technologies  
MTI Instruments  
Newport  
OptoTest  
OZ Optics  
Princeton  
StockerYale  
Terahertz Technologies

### Fiber-Optic Power Meters

AFL Telecommunications  
Anritsu  
EXFO  
Gigahertz-Optik  
JDSU  
Megatel-CTC Group USA  
Newport  
OptoTest  
OZ Optics  
Sunrise Telecom  
Terahertz Technologies

### Fiber-Optics Testers

AFL Telecommunications  
Agilent Technologies  
Anritsu  
CableTest Systems  
dBm Optics  
DIT-MCO International  
EXFO  
Ixia  
JDSU  
Luna Technologies  
National Instruments  
Newport  
OptoTest  
Photon  
Sunrise Telecom  
Terahertz Technologies

### Light and Illumination Meters

Gigahertz-Optik  
Klein Instruments  
Newport  
Sencore

### Light/Laser Sources

AFL Telecommunications  
Anritsu

EXFO  
Moritex USA  
MTI Instruments  
OptoTest  
OZ Optics  
PerkinElmer  
Optoelectronics

Princeton  
QIOPTIQ Imaging Solutions  
StockerYale  
Terahertz Technologies  
Vektrex Electronic Systems

### Loss Test Sets

AFL Telecommunications  
Anritsu  
EXFO  
JDSU  
OptoTest

OZ Optics  
Sunrise Telecom  
Terahertz Technologies

*Continued >*

TEST+MEASUREMENT



# Be precise !

HUBER+SUHNER offers a truly comprehensive portfolio of microwave products for the measurement of RF and digital signals up to 50 GHz/30 Gbps.

- Performance Measurement
- PIM Measurement
- Power Measurement
- EMC Measurement
- TVAC Measurement
- Calibration
- Measurement Accessories

**You need HUBER+SUHNER . . . Precisely!**

**HUBER+SUHNER**

HUBER+SUHNER AG  
9100 Herisau, Switzerland  
Phone +41 (0)71 353 41 11  
Fax +41 (0)71 353 44 44  
[www.hubersuhner.com](http://www.hubersuhner.com)

Excellence in Connectivity Solutions



> FIBER-OPTIC/ELECTRO-OPTIC TEST *Continued*

## Optical Attenuators

AFL  
Telecommunications  
Agilent Technologies  
dBm Optics  
EADS North America  
Test & Services  
EXFO  
JDSU  
Megatel-CTC Group  
USA  
Newport  
OZ Optics  
Photon  
VXI Technology

## Optical Detectors

dBm Optics  
Edmund Optics  
EXFO  
Gigahertz-Optik  
International Light  
JDSU  
Keithley Instruments  
Newport  
PerkinElmer  
Optoelectronics  
Photon

## Optical Dispersion Testers

Agilent Technologies  
Anritsu  
dBm Optics  
EXFO  
JDSU  
Luna Technologies  
Sunrise Telecom

## Optical Power Meters

AFL  
Telecommunications  
Agilent Technologies  
Anritsu  
dBm Optics  
Edmund Optics  
EXFO  
Gigahertz-Optik  
ILX Lightwave  
JDSU  
Megatel-CTC Group  
USA  
Newport  
OptoTest  
OZ Optics  
Sunrise Telecom  
Terahertz  
Technologies

## Optical Spectrum Analyzers

Agilent Technologies  
Anritsu  
dBm Optics  
EXFO  
JDSU  
Newport

## Optical Switches

Cytec  
dBm Optics  
EADS North America  
Test & Services  
EXFO  
ILX Lightwave  
Ixia  
JDSU  
Keithley Instruments  
Luna Technologies  
MRV Communications  
Newport  
Pickering Interfaces  
Piezosystem Jena  
Universal Switching  
VXI Technology

## Optical Time Domain Reflectometers

AFL  
Telecommunications  
Agilent Technologies  
Anritsu  
EXFO  
JDSU  
Luna Technologies  
OZ Optics  
Sunrise Telecom

## Photometers & Radiometers

Agilent Technologies  
Gigahertz-Optik  
Instrument Systems  
International Light  
Klein Instruments  
Newport  
Photon  
Pyrometer Instrument  
Radiant Imaging  
Terahertz  
Technologies

## Wavelength Meters

Agilent Technologies  
EXFO  
Newport

## THIRD-PARTY SUPPLIERS

### Distributors: FO/EO Test Products

Fiber Instrument Sales  
GMW Associates  
MetricTest  
S.R.S. Market Solutions  
Stanley  
TestMart  
Transcat  
Tucker Electronics

### Distributors: RF/Microwave/Wireless Test Equipment

Advint  
Agilent Technologies  
Avalon Equipment  
Bell Electronics NW  
Digi-Key  
Direct Industry  
MetricTest



**METRICTEST**

- Oscilloscopes
- Spectrum Analyzers
- Multimeters
- Logic Analyzers
- Signal Generators
- More!

**New Refurbished Rent**

**Tel: 800-432-3424**  
**www.MetricTest.com**

PTL Test Equipment  
S.R.S. Market Solutions  
Stanley  
TestEquity  
Testforce  
TestMart  
Tucker Electronics

### Distributors: Telecom/Datacom Test Products

Agilent Technologies  
Avalon Equipment  
Averna  
Digi-Key  
Direct Industry  
Huntron  
Measurement  
Assurance Technology

MetricTest



**METRICTEST**

- Oscilloscopes
- Spectrum Analyzers
- Multimeters
- Logic Analyzers
- Signal Generators
- More!

**New Refurbished Rent**

**Tel: 800-432-3424**  
**www.MetricTest.com**

S.R.S. Market Solutions  
Saelig  
Stanley  
TestEquity  
Testforce  
TestMart  
Transcat  
Tucker Electronics

### Rental/Lease: FO/EO Test Products

Agilent Technologies  
Continental Resources  
Electro Rent  
Fiber Instrument Sales  
Industrial Resources  
Measurement  
Assurance Technology  
MetricTest  
Microlease  
PTL Test Equipment  
Test Equipment  
Connection  
Trek Equipment  
TRS-RenTelco  
Tucker Electronics

### Rental/Lease: RF/Microwave/Wireless Test Equipment

Advanced Test  
Equipment Rentals  
Agilent Technologies  
Avalon Equipment  
Bell Electronics NW  
Continental Resources  
Electro Rent  
Industrial Resources  
Measurement  
Assurance Technology

MetricTest



**METRICTEST**

- Oscilloscopes
- Spectrum Analyzers
- Multimeters
- Logic Analyzers
- Signal Generators
- More!

**New Refurbished Rent**

**Tel: 800-432-3424**  
**www.MetricTest.com**

Microlease  
Noise Com  
PTL Test Equipment  
Test Equipment  
Connection  
TestEdge  
TestEquity  
Trek Equipment  
TRS-RenTelco  
Tucker Electronics

### Rental/Lease: Telecom/Datacom Test Products

Advanced Test  
Equipment Rentals  
Agilent Technologies  
AssetRelay  
Avalon Equipment  
Bell Electronics NW  
Continental Resources  
Electro Rent  
GL Communications  
Industrial Resources  
MetricTest



**METRICTEST**

- Oscilloscopes
- Spectrum Analyzers
- Multimeters
- Logic Analyzers
- Signal Generators
- More!

**New Refurbished Rent**

**Tel: 800-432-3424**  
**www.MetricTest.com**

Microlease  
Test Equipment  
Connection  
TestEquity  
Trek Equipment

TRS-RenTelco  
Tucker Electronics

### Training: FO/EO Test

A.T.E. Solutions  
AFL  
Telecommunications  
EXFO  
Fiber Instrument Sales

### Training: RF/Microwave/Wireless Test

A.T.E. Solutions  
MI Technologies  
Rohde & Schwarz  
Test Site Services  
Willtek  
Communications

### Training: Telecom/Datacom Test

A.T.E. Solutions  
EXFO  
Opticom  
QualityLogic  
Spirent  
Communications  
Test Site Services

### Used Equipment: FO/EO Test

Avalon Equipment  
Bizi International  
Creative Devices  
Electro Rent  
EXFO  
Fiber Instrument Sales  
Industrial Resources  
LabX  
Measurement  
Assurance Technology  
MetricTest  
Microlease  
Naptech Test  
Equipment  
ORIX Rentec USA  
PTL Test Equipment  
SurplusEq.com  
TechRecovery  
Test & Measurement  
Global Exchange  
(Tamge)  
Test Equipment  
Connection  
TestMart  
Trek Equipment  
TRS-RenTelco

### Used Equipment: RF/Microwave/ Wireless Test

Avalon Equipment  
Bell Electronics NW  
Bizi International  
Continental Resources  
Electro Rent  
Industrial Resources  
LabX  
Measurement  
Assurance Technology  
MetricTest



#### METRICTEST

- Oscilloscopes
- Spectrum Analyzers
- Multimeters
- Logic Analyzers
- Signal Generators
- More!

#### New Refurbished Rent

Tel: 800-432-3424  
www.MetricTest.com

Microlease  
Naptech Test  
Equipment  
ORIX Rentec USA

PTL Test Equipment  
Rohde & Schwarz  
Sencore  
TechRecovery  
Test & Measurement  
Global Exchange  
(Tamge)  
Test Equipment  
Connection  
Test Equipment  
Solutions Today  
TestEquity  
TestMart  
Trek Equipment  
TRS-RenTelco  
Tucker Electronics  
Willtek  
Communications

### Used Equipment: Telecom/Datacom Test

AssetRelay  
Avalon Equipment  
Bell Electronics NW  
Continental Resources  
Electro Rent  
EXFO  
Industrial Resources  
LabX  
Measurement  
Assurance Technology

MetricTest



#### METRICTEST

- Oscilloscopes
- Spectrum Analyzers
- Multimeters
- Logic Analyzers
- Signal Generators
- More!

#### New Refurbished Rent

Tel: 800-432-3424  
www.MetricTest.com

Microlease  
Naptech Test  
Equipment  
ORIX Rentec USA  
PTL Test Equipment  
TechRecovery  
Test Equipment  
Connection  
Test Equipment  
Solutions Today  
TestEquity  
TestMart  
Trek Equipment  
TRS-RenTelco  
Tucker Electronics

### SERVICES/LABS/TEST HOUSES

#### Fiber-Optic Testing Services

Agilent Technologies  
Amkor Technology  
Averna  
Bloomy Controls  
Invisar  
MET Laboratories  
National Technical  
Systems

#### Telecom Testing Services

Agilent Technologies  
Amkor Technology  
Averna  
Bloomy Controls  
Communication  
Certification Lab  
D.L.S. Electronic  
Systems  
Elite Electronic  
Engineering

GL Communications



**GL**

**Communications Inc**  
Wireless, VoIP, TDM  
Testing Tools

Contact: gl-info@gl.com  
(301) 670-4784

Hermon Labs  
Invisar  
MET Laboratories  
National Technical  
Systems  
Oneida Research  
Services  
QualityLogic  
Test Site Services  
TestEdge  
TUV Rheinland of  
North America  
TUV SUD America  
VI Technology

#### Wireless Testing Services

Agilent Technologies  
Amkor Technology

Communication  
Certification Lab  
D.L.S. Electronic  
Systems

**DLS**  
EMC & Product Safety  
Testing • Consulting  
847-537-6400  
www.dlsemc.com

dBm Engineering  
Elite Electronic  
Engineering  
GL Communications  
In-Phase Technologies  
LTX  
MET Laboratories  
MI Technologies  
National Technical  
Systems  
QualityLogic  
Test Site Services  
TestEdge  
TUV SUD America  
VI Technology

T&MW

# ULTRA FINN™

## The Fastest, Smallest and Most Reliable LED Tester EVER!



**Detects 2000 different hues between  
Blue (380 nm) and Red (700 nm)**

**Accurate readings for most LEDs in  
less than 10 milliseconds**

**5.8 mm x 3.4 mm footprint**



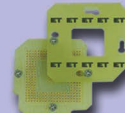
TEST COACH  
CORPORATION

**1-877-551-4129**  
www.testcoach.com

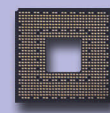
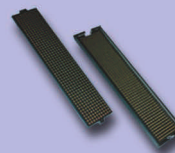
## Design & Development Engineers

**ASAP  
RUSH  
SERVICE**

## SUPERSTORE

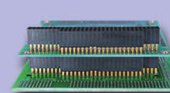


**Development  
Sockets**



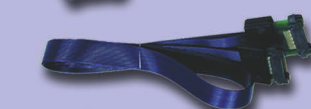
**Adapters**

**HiLo PGA/BGA  
Socketting System**



**PC104 & PC104+  
Connectors**

**Test accessories  
for every package**



**Mictor probing &  
cable accessories**

**FIND IT FAST  
GET IT FAST**

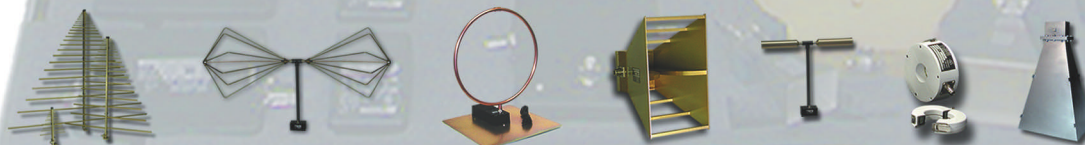
**ET Emulation Technology, Inc.**  
(800) 232-7837  
www.emulation.com



# All you need in one small package

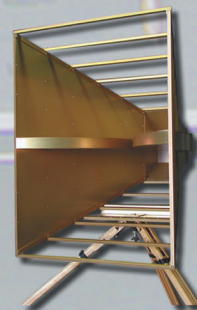


Antennas | Probes | Accessories | Preamplifiers | Low-Loss Cables | Recalibration Services



## Travel Made Easy

with Next-Day,  
On-Time  
Delivery



**Don't Leave home without it.** A.H. Systems provides many models of Portable Antenna Kits, each containing all the necessary Antennas, Current Probes, and Cables to satisfy numerous customer requirements. Excellent performance, portability (compact size and lightweight), along with ease of setup make all of the Antenna Kits your choice for indoor or field testing. Loss and breakage are virtually eliminated as each component has a specific storage compartment within the case. All Antenna Kits are accompanied with a Tripod and Azimuth & Elevation Head, both contained in a

**ANTENNAS...** Tripod Carrying Case...and don't forget your keys! **and KITS TOO...**



Innovation

Quality

Performance

Phone: (818)998-0223 • Fax (818)998-6892

[www.AHSystems.com](http://www.AHSystems.com)

**A.H. Systems**



**In this section**

- Environmental Test Equipment, below
- ESD Control/Protection, below
- EMC Test Equipment, below
- Services/Labs/Test Houses, p. 104
- Third-Party Suppliers, p. 104

Vendor contact information begins on p. 106.

**ENVIRONMENTAL TEST EQUIPMENT****Burn-In Trays/  
Sockets**

Antares Advanced  
Test Technologies  
Aries Electronics  
Armel Electronics  
Cascade Microtech  
Emulation Technology  
Ironwood Electronics  
Micro Control  
3M Electronics  
Plastronics  
Robson Technologies  
RS Tech  
Sharetree  
Test Tooling Solutions  
Group  
Yamaichi Electronics

**Burn-In/Screening  
Equipment**

Advint  
Aehr Test Systems  
Associated  
Environmental Systems  
Burnsco Technologies  
C&H Technologies  
Chart Industries  
CIMTEK  
Cincinnati Sub-Zero  
Despatch Industries  
Dynamic Solutions  
EADS North America  
Test & Services  
Environment  
Associates  
ESPEC  
GOEPEL Electronics  
HALT&HASS Systems



Integrated Technology  
Corp.  
LR Environmental  
m + p international  
M/RAD  
Micro Control  
Sharetree

Sigma Systems  
Sun Electronic Systems  
Telops  
Temptronic  
Thermonics  
Thermotron Industries  
TPS  
Trio-Tech International  
Vektrex Electronic  
Systems  
VXI Technology

**Humidity Test  
Equipment**

AEMC Instruments  
Associated  
Environmental Systems  
Cincinnati Sub-Zero  
Despatch Industries  
Environment  
Associates  
Environmental  
Specialties  
Envirotronics  
ESPEC  
Q-Lab  
Rotronic Instrument  
Sharetree  
Sigma Systems  
Telatemp  
Terra Universal  
Thermotron Industries  
TPS  
Trio-Tech International

**Pressure Test  
Equipment**

Cincinnati Sub-Zero  
Envirotronics  
ESPEC  
Neff Instrument  
Thermotron Industries  
TPS  
TUV SUD America

**Radiation Test  
Equipment**

Berkeley Nucleonics  
Q-Lab

**Temperature Test  
Equipment**

Aehr Test Systems  
AEMC Instruments

Associated  
Environmental Systems  
Burnsco Technologies  
Campbell Scientific  
Chart Industries  
Cincinnati Sub-Zero  
Despatch Industries  
Dewetron  
Dynamic Solutions  
Environment  
Associates  
Environmental  
Specialties  
Envirotronics  
ESPEC  
FTS Systems  
HALT&HASS Systems  
IOtech  
LR Environmental  
m + p international  
Materials  
Development  
Micromanipulator  
Neff Instrument  
Nevada Automotive  
Test Center  
Q-Lab  
QualiTau  
Rotronic Instrument  
Sharetree  
Sigma Systems  
Sovtest  
Sun Electronic Systems  
Telatemp  
Temptronic  
Terra Universal  
TestEquity  
Thermonics  
Thermotron Industries  
TPS  
Trio-Tech International  
TUV SUD America  
VXI Technology  
Xitron Technologies

**Vibration Test  
Equipment**

Agilent Technologies  
Associated  
Environmental Systems  
B&W Engineering  
Brüel & Kjær  
CableTest Systems  
Campbell Scientific

Chart Industries  
Data Physics  
Data Translation  
Despatch Industries  
Dewetron  
Dynamic Solutions  
Electronic Systems of  
Wisconsin  
Environment  
Associates  
Envirotronics  
GHI Systems  
HALT&HASS Systems  
IMV

Instron  
Instrumented Sensor  
Technology  
IOtech  
LDS Test and  
Measurement  
LMS North America  
m + p international  
M/RAD  
MTI Instruments  
National Instruments  
Neff Instrument  
OROS  
Photon

Polytec  
Qualmark  
Sciometric Instruments  
Signalys  
Sovtest  
TEAM  
Thermotron Industries  
TPS  
TUV SUD America  
Unholtz-Dickie  
Vibration Research  
VXI Technology

**ESD CONTROL/PROTECTION****Air Ionizers**

DESCO  
ESD Systems.com  
MKS Instruments  
3M Electronics  
Simco  
Terra Universal

**Bins/Boxes/  
Protective Bags**

Conductive Containers  
DESCO  
ESD Systems.com  
Lista International  
3M Electronics  
Terra Universal

**Electrostatic  
Measuring  
Equipment**

ACL Staticide  
DESCO  
Electro-Tech Systems  
ESD Systems.com  
MKS Instruments  
3M Electronics  
Monroe Electronics  
Noise Laboratory  
Prostat  
Static Solutions  
TREK

**ESD Control/  
Monitoring  
Equipment**

ACL Staticide  
DESCO  
Electro-Tech Systems  
ESD Systems.com  
MKS Instruments  
3M Electronics  
Monroe Electronics  
Prostat  
Static Solutions  
Terra Universal  
TREK

**Flooring/Finishes**

ACL Staticide  
DESCO  
ESD Systems.com  
Flexco  
3M Electronics  
Prostat  
Static Solutions  
Staticworx

**Gloves and  
Finger Cots**

DESCO  
ESD Systems.com  
QRP  
Terra Universal

**Protective  
Clothing and  
Wrist & Heel  
Straps**

DESCO  
ESD Systems.com  
3M Electronics  
Prostat  
Static Solutions  
Terra Universal

**Work Surfaces/  
Workstations**

ACL Staticide  
BioFit Engineered  
Products  
DESCO  
ESD Systems.com  
Lista International  
3M Electronics  
Prostat  
Staticworx  
Terra Universal

**EMC TEST EQUIPMENT****Anechoic  
Chambers/  
GTEM/TEM Cells**

AR, RF/Microwave  
Instrumentation  
Cumming Lehman  
Chambers  
EMCC DR. RAŠEK  
ETS-Lindgren  
TDK RF Solutions  
Teseq

**Antennas/Masts**

A.H. Systems  
AR, RF/Microwave  
Instrumentation  
Com-Power  
Electro-Metrics  
ETS-Lindgren  
Rohde & Schwarz

TDK RF Solutions  
Teseq

**EMI Receivers**

Agilent Technologies  
AR, RF/Microwave  
Instrumentation  
ETS-Lindgren  
Rohde & Schwarz  
Teseq

**EMI Susceptibility  
Testers**

Com-Power  
HV Technologies  
Noise Laboratory  
Noise Com  
TDK RF Solutions  
Teseq  
Thermo Scientific

**ESD Generators**

Electro-Tech Systems  
HV Technologies  
Kikusui America  
Noise Laboratory  
Ross Engineering  
Teseq  
Thermo Scientific

**Harmonics &  
Flicker Testers**

California Instruments  
Fluke  
Hioki USA  
HV Technologies  
Kikusui America

Continued >



> EMC TEST EQUIPMENT *Continued*

Programmable  
Division of Xantrex  
Technology  
Xitron Technologies  
Yokogawa Corp. of  
America

**Precompliance  
Test Kits**

A.H. Systems  
AR, RF/Microwave  
Instrumentation  
Com-Power  
Electro-Metrics  
ETS-Lindgren  
Hameg Instruments  
Noise Laboratory  
TDK RF Solutions

**Resistivity Test  
Systems**

Electronic Systems of  
Wisconsin  
Electro-Tech Systems  
ESD Systems.com  
Keithley Instruments  
Lake Shore Cryotronics  
Monroe Electronics  
QualiTau  
Static Solutions  
TREK

**RF Field Intensity  
Meters (EMC)**

Anritsu  
Bird Electronic  
Boonton Electronics

ETS-Lindgren  
Teseq

**RF Power  
Amplifiers**

AR, RF/Microwave  
Instrumentation  
Krohn-Hite  
Ophir RF  
Precision Test Systems

**Screen Rooms/  
Shielding  
Materials**

ETS-Lindgren  
Laird Technologies  
Magnetic Shield  
MuShield  
Saelig  
Swift Textile Metalizing  
TDK RF Solutions  
W.L. Gore

**Shielded-  
Enclosure Leak  
Detectors**

AR, RF/Microwave  
Instrumentation  
ETS-Lindgren

**Surge Testers**

Electronic Systems of  
Wisconsin  
HV Technologies  
Noise Laboratory  
Teseq  
Thermo Scientific

**SERVICES/LABS/TEST HOUSES****Compliance  
Testing Services**

Accolade Engineering  
Solutions  
Alion Science &  
Technology  
Associated Research  
CKC Laboratories  
Communication  
Certification Lab  
CSA International  
D.L.S. Conformity  
Assessment  
D.L.S. Electronic  
Systems



Elite Electronic  
Engineering  
EMCC DR. RAŠEK  
Environment  
Associates  
ETS-Lindgren  
Garwood Laboratories  
Hermon Labs  
Integra Technologies  
Intertek  
Invisar

MET Laboratories  
Motorola Product  
Testing Services  
National Technical  
Systems  
Nevada Automotive  
Test Center  
Noise Laboratory  
Northwest EMC  
PMG Technologies  
Product Safety  
Consulting  
Professional Testing  
Sensor and Antenna  
Systems, Lansdale  
Stephen Halperin &  
Associates  
Sypris Test &  
Measurement  
TDK RF Solutions  
Teseq  
Test Site Services  
Tracewell Systems  
TUV Rheinland of  
North America  
TUV SUD America  
Underwriters Labs

**Environmental  
Testing Services**

Accolade Engineering  
Solutions  
Alion Science &  
Technology  
Amkor Technology  
Averna  
B&W Engineering  
Cincinnati Sub-Zero  
D.L.S. Electronic  
Systems  
Dynamic Solutions  
Elite Electronic  
Engineering  
EMCC DR. RAŠEK  
Environment  
Associates  
ESSC  
Garwood Laboratories  
GOEPEL Electronics  
HALT&HASS Systems  
Hermon Labs  
Integra Technologies  
Intertek  
m + p international  
M/RAD  
MegaPhase  
MET Laboratories  
Micro Control  
Motorola Product  
Testing Services

National Technical  
Systems  
Nevada Automotive  
Test Center  
Pikes Peak Test Labs  
PMG Technologies  
Premier  
Semiconductor  
Services  
Professional Testing  
Sensor and Antenna  
Systems, Lansdale  
Sharetree  
Sypris Test &  
Measurement  
Telops  
Test Site Services  
Thermotron Industries  
Tracewell Systems  
Trio-Tech International  
TUV SUD America

**THIRD-PARTY SUPPLIERS****Distributors:  
EMC Test  
Equipment**

Avalon Equipment  
MetricTest  
3M, formerly Credence  
PTL Test Equipment  
Saelig  
Testforce  
TestMart  
Transcat

**Distributors:  
Environmental  
Test Equipment**

Data Physics  
Direct Industry  
Environment  
Associates  
m + p international  
Terra Universal  
Transcat  
Tucker Electronics

**Distributors: ESD  
Control Products**

Allied Electronics  
Miller Industrial  
3M, formerly Credence

S.R.S. Market Solutions  
Stanley  
Terra Universal  
TestMart

**Rental/Lease:  
EMC Test  
Equipment**

A.H. Systems  
Advanced Test  
Equipment Rentals  
AR, RF/Microwave  
Instrumentation  
Avalon Equipment  
Bell Electronics NW  
Electro Rent  
Industrial Resources  
MetricTest  
Microlease  
Trek Equipment  
TRS-RenTelco  
Tucker Electronics

**Rental/Lease:  
Environmental  
Test Equipment**

Burnsco Technologies  
Cincinnati Sub-Zero  
Dynamic Solutions

Environment  
Associates  
HALT&HASS Systems  
Industrial Resources  
LR Environmental  
Microlease  
PTL Test Equipment  
Sharetree  
Thermotron Industries  
TRS-RenTelco  
Tucker Electronics  
TUV SUD America

**Training:  
EMC Test**

A.T.E. Solutions  
D.L.S. Electronic  
Systems



Equipment Reliability  
Institute  
Garwood Laboratories

OptEM Engineering  
Rohde & Schwarz  
Test Site Services  
TUV SUD America

**Training:  
Environmental  
Test**

A.T.E. Solutions  
Data Physics  
Dynamic Solutions  
Environment  
Associates  
Equipment Reliability  
Institute  
HALT&HASS Systems  
Hobbs Engineering  
Nevada Automotive  
Test Center  
Technology Training

**Training:  
ESD Control**

D.L.S. Electronic  
Systems  
Electro-Tech Systems  
Equipment Reliability  
Institute  
Garwood Laboratories

Prostat  
Stephen Halperin &  
Associates  
TREK

**Used Equipment:  
EMC Test**

A.H. Systems  
AR, RF/Microwave  
Instrumentation  
Avalon Equipment  
Bell Electronics NW  
Electro Rent  
Industrial Resources  
MetricTest  
ORIX Rentec USA  
Rohde & Schwarz  
TechRecovery  
Test Equipment  
Connection  
TestMart  
Trek Equipment  
TRS-RenTelco  
Tucker Electronics

**Used Equipment:  
Environmental  
Test**

Burnsco Technologies  
Data Physics  
Dynamic Solutions  
Environment  
Associates  
Envirotronics  
HALT&HASS Systems  
Industrial Resources  
K & Us Equipment  
LabX  
LR Environmental  
m + p international  
NEA  
ORIX Rentec USA  
PTL Test Equipment  
Sharetree  
TestEquity  
Thermotron Industries  
TPS  
Trek Equipment  
TRS-RenTelco  
Tucker Electronics  
TUV SUD America  
Vibration Research

T&amp;MW

# Thermal Shock

## INTRODUCING...

### CSZ's NEW COMPACT THERMAL SHOCK CHAMBER

- Small footprint
- More capacity
- Easy to install - no special utilities required
- Includes more standard features
- CSZ's EZT-560i Touch Screen Controller
  - Data logging, data file access via memory stick,*
  - Ethernet control and monitoring, alarm notification via*
  - email or phone text message, data file backup system,*
  - full system security and more.*

Please visit  
[www.cszindustrial.com/thermals shock](http://www.cszindustrial.com/thermals shock)  
for more information

Cincinnati Sub-Zero Products, Inc.  
12011 Mosteller Road • Cincinnati, OH  
513.772.8810 • 800.989.7373



**CSZ**  
Cincinnati Sub-Zero

**BE CURIOUS:  
A NEW COMPANY IS BORN.  
BE AWARE:  
AN ESTABLISHED EMC  
LEADER IS GAINING  
STRENGTH.**

**Teseq for EMC Test Solutions: A new company  
combining tradition and experience with dynamic and  
innovative development.**

Teseq continues what Schaffner created, leading EMC solutions that are better by design! As an independent, management owned company, we focus with full commitment, profound know-how and continuous research on our core business: EMC test solutions and customized client support worldwide. Give us a challenge. Test us.

Teseq, Inc., USA E-mail: [usasales@teseq.com](mailto:usasales@teseq.com)  
Tel: (888) 417-0501 Fax: (732) 417-0511

[www.teseq.com](http://www.teseq.com)

**T E S E Q**

Advanced Test Solutions for EMC

formerly Schaffner Test Systems



# VENDOR CONTACT INFORMATION

## A

**A.H. Systems**, Chatsworth, CA. 818-998-0223. [www.AHSystems.com](http://www.AHSystems.com).  
**A.T.E. Solutions**, Los Angeles, CA. 310-641-8400. [www.besttest.com](http://www.besttest.com).  
**Absopulse Electronics**, Ottawa, ON, Canada. 613-836-3511. [www.absopulse.com](http://www.absopulse.com).  
**ACCES I/O Products**, San Diego, CA. 858-550-9559. [www.accessio.com](http://www.accessio.com).  
**Accolade Engineering Solutions**, Irvine, CA. 949-597-8378. [www.accoladeeng.com](http://www.accoladeeng.com).  
**Acculogic**, Markham, ON, Canada. 905-475-5907. [www.acculogic.com](http://www.acculogic.com).  
**Accuprobe**, Salem, MA. 978-745-7878. [www.accuprobe.com](http://www.accuprobe.com).  
**AccuSentry**, Marietta, GA. 770-850-1700. [www.accusentry.com](http://www.accusentry.com).  
**ACL Staticide**, Elk Grove Village, IL. 847-981-9212. [www.aclstaticide.com](http://www.aclstaticide.com).  
**A-Comm Electronics**, Centennial, CO. 303-770-4855. [www.a-comm.com](http://www.a-comm.com).  
**ACR Systems**, Surrey, BC, Canada. 800-663-7845. [www.acrsystems.com](http://www.acrsystems.com).  
**Acromag**, Wixom, MI. 248-295-0880. [www.acromag.com](http://www.acromag.com).  
**Active Silicon**, Chelmsford, MA. 978-244-0490. [www.activesilicon.com](http://www.activesilicon.com).  
**Acugen Software**, Nashua, NH. 603-673-8392. [www.acugen.com](http://www.acugen.com).  
**Adimec**, Stoneham, MA. 781-279-0770. [www.adimec.com](http://www.adimec.com).  
**Adlink Technology**, Irvine, CA. 866-423-5465. [www.adlinktech.com](http://www.adlinktech.com).  
**Advanced Illumination**, Rochester, VT. 802-767-3830. [www.advancedillumination.com](http://www.advancedillumination.com).  
**Advanced Interconnections**, W. Warwick, RI. 401-823-5200. [www.advanced.com](http://www.advanced.com).  
**Advanced Power Designs**, Irvine, CA. 949-600-6400. [VXilbus.com](http://VXilbus.com).  
**Advanced Test Equipment Rentals**, San Diego, CA. 888-404-2832. [www.atecorp.com](http://www.atecorp.com).  
**Advanced Testing Technologies**, Hauppauge, NY. 631-231-8777. [www.attinet.com](http://www.attinet.com).  
**Advanced Vehicle Technologies**, Davidsonville, MD. 410-798-4038. [www.AVT-HQ.com](http://www.AVT-HQ.com).  
**Advantech**, Industrial Automation Group, Cincinnati, Ohio. 513-742-8895. [www.advantech.com](http://www.advantech.com).  
**Advantest America**, Santa Clara, CA. 408-988-7700. [www.advantest.com](http://www.advantest.com).  
**Advent Instruments**, Port Coquitlam, BC, Canada. 604-944-4298. [www.adventinstruments.com](http://www.adventinstruments.com).  
**Advint**, Columbus, OH. 614-863-2433. [www.advint.com](http://www.advint.com).  
**Aegis Electronic Group**, Gilbert, AZ. 480-635-8400. [www.aegis-elec.com](http://www.aegis-elec.com).  
**Aehr Test Systems**, Fremont, CA. 510-623-9400. [www.aehr.com](http://www.aehr.com).  
**AEMC Instruments**, Foxborough, MA. 508-698-2115. [www.aemc.com](http://www.aemc.com).  
**Aeroflex**, Wichita, KS. 800-835-2352. [www.aeroflex.com](http://www.aeroflex.com).  
**Aerotech**, Pittsburgh, Pennsylvania. 412-963-7470. [www.aerotech.com](http://www.aerotech.com).  
**AFL Telecommunications**, Belmont, NH. 603-528-7780. [www.afttele.com](http://www.afttele.com).  
**Agilent Technologies**, Santa Clara, CA. 800-829-4444. [www.agilent.com](http://www.agilent.com).  
**AIM USA**, Valley, NE. 866-246-1553. [www.aim-online.com](http://www.aim-online.com).  
**Alacron**, Nashua, NH. 603-891-2750. [www.alacron.com](http://www.alacron.com).  
**Alion Science & Technology**, W. Conshohocken, PA. 610-825-1960. [rb.alionscience.com](http://rb.alionscience.com).  
**Allied Electronics**, Fort Worth, TX. 866-433-5722. [www.alliedelec.com](http://www.alliedelec.com).  
**Alligator Technologies**, Costa Mesa, CA. 949-515-1400. [www.alligatortech.com](http://www.alligatortech.com).  
**Altera**, San Jose, CA. 408-544-7000. [www.altera.com](http://www.altera.com).  
**Ambios Technology**, Santa Cruz, CA. 831-429-4200. [www.ambiostech.com](http://www.ambiostech.com).  
**American Sensor Technologies**, Mt. Olive, NJ. 973-448-1901. [www.astensors.com](http://www.astensors.com).  
**Amkor Technology**, Chandler, AZ. 480-821-5000. [www.amkor.com](http://www.amkor.com).  
**Amphenol Interconnect Products**, Endicott, NY. 607-754-4444. [www.amphenol-aipc.com](http://www.amphenol-aipc.com).  
**Amprobe Test Tools**, Everett, WA. 877-AMPROBE. [www.Amprobe.com](http://www.Amprobe.com).  
**AMREL**, Arcadia, CA. 626-303-6688. [www.amrel.com](http://www.amrel.com).  
**Analog Devices**, Norwood, MA. 800-ANALOGD. [www.analog.com](http://www.analog.com).  
**Anchor Optics**, Div. of Edmund Optics, Barrington, NJ. 856-573-6865. [www.anchoroptics.com](http://www.anchoroptics.com).  
**Anite Group**, Schaumburg, IL. 847-273-3800. [www.anite.com](http://www.anite.com).  
**Anritsu**, Richardson, TX. 800-267-4878. [www.us.anritsu.com](http://www.us.anritsu.com).  
**ANSOFT**, Pittsburgh, PA. 412-261-3200. [www.ansoft.com](http://www.ansoft.com).  
**Antares Advanced Test Technologies**, Vancouver, WA. 360-433-6230. [www.atares-att.com](http://www.atares-att.com).  
**Anthro**, Tualatin, OR. 800-325-3841. [www.anthro.com](http://www.anthro.com).  
**Applied Physics Systems**, Mt. View, CA. 650-965-0500. [www.appliedphysics.com](http://www.appliedphysics.com).  
**Aptech Systems**, Black Diamond, WA. 360-886-7100. [www.Aptech.com](http://www.Aptech.com).  
**AR**, RF/Microwave Instrumentation, Souderton, PA. 215-723-8181. [www.ar-worldwide.com](http://www.ar-worldwide.com).  
**Aries Electronics**, Bristol, PA. 215-781-8856. [www.arieselec.com](http://www.arieselec.com).  
**Armel Electronics**, North Bergen, NJ. 201-869-4300. [www.armel.us](http://www.armel.us).  
**ASSET Intertech**, Richardson, TX. 888-694-6250. [www.asset-intertech.com](http://www.asset-intertech.com).  
**AssetRelay**, Gatineau, QC, Canada. 819-770-7771. [www.assetrelay.com](http://www.assetrelay.com).  
**AssetSmart**, Santa Monica, CA. 800-755-3968. [www.assetsmart.com](http://www.assetsmart.com).

**Associated Environmental Systems**, Ayer, MA. 978-772-0022. [associatedenvironmental-bma.com](http://associatedenvironmental-bma.com).

**Associated Power Technologies**, Diamond Bar, CA. 909-860-1646. [www.aspowertechnologies.com](http://www.aspowertechnologies.com).

**Associated Research**, Lake Forest, IL. 800-858-8378. [www.asresearch.com](http://www.asresearch.com).

**Astro-Med**, W. Warwick, RI. 877-867-9783. [www.astro-med.com/tminindex.html](http://www.astro-med.com/tminindex.html).

**Atrenta**, San Jose, CA. 866-287-3672. [www.atrenta.com](http://www.atrenta.com).

**Audio Precision**, Beaverton, OR. 503-627-0832. [www.audioprecision.com](http://www.audioprecision.com).

**AudioControl Industrial**, Mountlake Terrace, WA. 425-775-8461. [www.audiocontrolindustrial.com](http://www.audiocontrolindustrial.com).

**Auktionshaus Dechow**, Hamburg, Germany. +49-4043-1300-70. [www.dechow.de](http://www.dechow.de).

**Autotest Co.**, San Antonio, TX. 210-661-8661. [www.autotest.com](http://www.autotest.com).

**Avalon Equipment**, Vista, CA. 760-536-0191. [www.avalontest.com](http://www.avalontest.com).

**Averna**, Montreal, QC, Canada. 514-842-7577. [www.averna.com](http://www.averna.com).

**Avtech Electrosystems**, Ogdensburg, NY. 888-670-8729. [www.avtechpulse.com](http://www.avtechpulse.com).

**Azimuth Systems**, Acton, MA. 978-263-6610. [www.azimuthsystems.com](http://www.azimuthsystems.com).

## B

**B & B Electronics**, Ottawa, IL. 815-433-5100. [www.bb-elec.com](http://www.bb-elec.com).

**B&K Precision**, Yorba Linda, CA. 714-921-9095. [www.bkprecision.com](http://www.bkprecision.com).

**B&W Engineering**, Costa Mesa, CA. 714-540-9975. [www.b-w-engineering.com](http://www.b-w-engineering.com).

**Ballard Technology**, Everett, WA. 425-339-0281. [www.ballardtech.com](http://www.ballardtech.com).

**Bantam Instruments**, Sunnyvale, CA. 408-736-3030. [www.bantaminstruments.com](http://www.bantaminstruments.com).

**Basler Vision Technologies**, Ahrensburg, Germany. +49-4102-463-500. [www.baslerweb.com](http://www.baslerweb.com).

**Beamex**, Marietta, GA. 800-888-9892. [www.beamex.com](http://www.beamex.com).

**Behlman Electronics**, Hauppauge, NY. 631-435-0410. [www.behlman.com](http://www.behlman.com).

**Bell Electronics NW**, Kent, WA. 800-366-5240. [www.bellnw.com](http://www.bellnw.com).

**Benedict Computer**, Menlo Park, CA. 650-323-0148. [www.benedictcommunication.com](http://www.benedictcommunication.com).

**Berkeley Nucleonics**, San Rafael, CA. 415-453-9955. [www.berkeleynucleonics.com](http://www.berkeleynucleonics.com).

**Berkeley Varitronics Systems**, Metuchen, NJ. 888-737-4287. [www.bvsystems.com](http://www.bvsystems.com).

**BetaTHERM Sensors**, Shrewsbury, MA. 508-842-0516. [www.betatherm.com](http://www.betatherm.com).

**BI Technologies**, Fullerton, CA. 714-447-2518. [www.bitechnologies.com](http://www.bitechnologies.com).

**BidItUp.com**, Studio City, CA. [www.biditup.com](http://www.biditup.com).

**BioFit Engineered Products**, Waterville, OH. 800-597-0246. [www.biofit.com](http://www.biofit.com).

**Bird Electronic**, Cleveland, OH. 400-248-1200. [www.bird-electronic.com](http://www.bird-electronic.com).

**BitFlow**, Woburn, MA. 781-932-2900. [www.bitflow.com](http://www.bitflow.com).

**Bizi International**, Tyngsboro, MA. 978-649-0931. [www.bizi.com](http://www.bizi.com).

**Bloomy Controls**, Windsor, CT. 860-298-9925. [www.bloomy.com](http://www.bloomy.com).

**Blue Mountain Quality Resources**, State College, PA. 814-234-2417. [www.coolblue.com](http://www.coolblue.com).

**Boonton Electronics**, Parsippany, NJ. 973-386-9696. [www.boonton.com](http://www.boonton.com).

**BPM Microsystems**, Houston, TX. 713-688-4600. [www.bpmicro.com](http://www.bpmicro.com).

**Bruehl & Kjaer**, North America, Norcross, GA. 770-209-6907. [www.bkhamer.com](http://www.bkhamer.com).

**Burnsco Technologies**, Kanata, ON, Canada. 613-591-0247. [www.burnsco.ca](http://www.burnsco.ca).

**Bustec**, Yucapca, CA. 909-797-0484. [www.bustec.com](http://www.bustec.com).

## C

**C&H Technologies**, Round Rock, TX. 512-733-2621. [www.chtech.com](http://www.chtech.com).

**Cables on Demand**, An Amphenol Co., Endicott, NY. 866-223-2860. [www.cablesondemand.com](http://www.cablesondemand.com).

**Cablescan**, Ontario, CA. 909-483-2436. [www.cablescan.com](http://www.cablescan.com).

**CableTest Systems**, Markham, ON, Canada. 905-475-2607. [www.CableTest.com](http://www.CableTest.com).

**Cadence**, San Jose, CA. 408-943-1234. [www.cadence.com](http://www.cadence.com).

**Cal Test Electronics**, Yorba Linda, CA. 714-221-9330. [www.caltestelectronics.com](http://www.caltestelectronics.com).

**California Instruments**, San Diego, CA. 858-677-9040. [www.california-instruments.com](http://www.california-instruments.com).

**Calmar Optcom**, Sunnyvale, CA. 408-733-7800. [www.calmaropt.com](http://www.calmaropt.com).

**CAMI Research**, Acton, MA. 800-776-0414. [www.camiresearch.com](http://www.camiresearch.com).

**Campbell Scientific**, Logan, UT. 435-753-2342. [www.campbellsci.com](http://www.campbellsci.com).

**Camtek USA**, Santa Clara, CA. 800-986-6540. [www.camtekusa.com](http://www.camtekusa.com).

**Caris Network Solutions**, Phoenix, NY. 315-695-3222. [www.carisnet.com](http://www.carisnet.com).

**Carl Zeiss MicroImaging**, Thornwood, NY. 800-233-2343. [www.zeiss.com/micro](http://www.zeiss.com/micro).

**CAS Data Loggers**, Chesterland, OH. 440-729-2570. [www.dataloggerinc.com](http://www.dataloggerinc.com).

**Cascade Microtech**, Beaverton, OR. 503-601-1000. [www.cascademicrotech.com](http://www.cascademicrotech.com).

Red indicates an advertiser in this issue (See Advertiser Index)

**Casella USA**, Amherst, NH. 800-366-2966. [www.CasellaUSA.com](http://www.CasellaUSA.com).  
**Catalyst Enterprises**, Sunnyvale, CA. 408-365-3846. [www.getcatalyst.com](http://www.getcatalyst.com).  
**Catapult Communications**, Mt. View, CA. 650-960-1025. [www.catapult.com](http://www.catapult.com).  
**Centellax**, Santa Rosa, CA. 707-568-5900. [www.centellax.com](http://www.centellax.com).  
**CGI**, Carson City, NV. 800-568-4327. [www.cgimotion.com](http://www.cgimotion.com).  
**Chart Industries**, New Prague, MN. 952-758-4400. [www.chartchambers.com](http://www.chartchambers.com).  
**Chase Scientific**, Langley, WA. 360-221-8455. [www.chase2000.com](http://www.chase2000.com).  
**Checksum**, Arlington, WA. 877-CHECKSUM. [www.checksum.com](http://www.checksum.com).  
**Chroma Systems Solutions**, Irvine, CA. 949-600-6400. [www.chromausa.com](http://www.chromausa.com).  
**CIMTEK**, Burlington, ON, Canada. 905-331-6338. [www.cimtek.com](http://www.cimtek.com).  
**Cincinnati Sub-Zero**, Cincinnati, OH. 513-772-8810. [www.csindustrial.com](http://www.csindustrial.com).  
**Circuit Check**, Maple Grove, MN. 763-694-4100. [www.circuitcheck.com](http://www.circuitcheck.com).  
**Circuit Specialists**, Mesa, AZ. 800-528-1417. [www.circuitspecialists.com](http://www.circuitspecialists.com).  
**Cirris Systems**, Salt Lake City, UT. 800-441-9910. [www.cirris.com](http://www.cirris.com).  
**CKC Laboratories**, Mariposa, CA. 800-500-4362. [www.ckc.com](http://www.ckc.com).  
**Clarke-Hess Communication Research**, Medford, NY. 631-698-3350. [www.clarke-hess.com](http://www.clarke-hess.com).  
**CMT Engineering**, Lappeenranta, Finland. +358-5-624-3140. [www.cmte.info](http://www.cmte.info).  
**Cognex**, Natick, MA. 508-650-3000. [www.cognex.com](http://www.cognex.com).  
**Colby Instruments**, Bellevue, WA. 425-452-8889. [www.colbyinstruments.com](http://www.colbyinstruments.com).  
**Comarco Wireless Test Solutions**, Lake Forest, CA. 949-599-7400. [www.comarco.com/wts](http://www.comarco.com/wts).  
**Communication Certification Laboratory**, Salt Lake City, UT. 801-972-6146. [www.cclab.com](http://www.cclab.com).  
**Compix**, Lake Oswego, OR. 503-639-8496. [www.compix.com](http://www.compix.com).  
**Components Corp.**, Denville, NJ. 973-627-0290. [www.componentscorp.com](http://www.componentscorp.com).  
**Com-Power**, Brea, CA. 714-528-8800. [www.com-power.com](http://www.com-power.com).  
**Comware Technical Services**, Irvine, CA. 949-851-9600. [www.comwaretech.com](http://www.comwaretech.com).  
**Conduant**, Longmont, CO. 303-485-2721. [www.conduant.com](http://www.conduant.com).  
**Conductive Containers**, New Hope, MN. 763-537-2090. [www.corstat.com](http://www.corstat.com).  
**Conec**, Brampton, ON, Canada. 905-790-2200. [www.conec.com](http://www.conec.com).  
**Connect2it**, Incline Village, NV. 800-540-4210. [www.connect2it.com](http://www.connect2it.com).  
**Connecticut Technology Products**, Ridgefield, CT. 203-648-4515. [www.c2p.com](http://www.c2p.com).  
**Continental Resources**, Bedford, MA. 800-937-4688. [www.conres.com](http://www.conres.com).  
**Corelis**, Cerritos, CA. 562-926-6727. [www.corelis.com](http://www.corelis.com).  
**Creative Devices**, Neshanic Station, NJ. 908-369-4333. [www.creativedevices.com](http://www.creativedevices.com).  
**Credence Systems**, Milpitas, CA. 408-635-4300. [www.credence.com](http://www.credence.com).  
**Crystal Instruments**, Santa Clara, CA. 408-986-8880. [www.go-ci.com](http://www.go-ci.com).  
**CSA International**, Toronto, ON, Canada. 416-747-4000. [www.csa-international.org](http://www.csa-international.org).  
**Cuming Lehman Chambers**, Chambersburg, PA. 717-263-4101. [www.cuminglehman.com](http://www.cuminglehman.com).  
**Curtiss-Wright**, Dayton, OH. 937-252-5601. [www.cwcmbedded.com](http://www.cwcmbedded.com).  
**Custom Systems Integration**, Endicott, NY. 607-757-0200. [www.customsi.com](http://www.customsi.com).  
**CVI Melles Griot**, Albuquerque, NM. 505-296-9541. [www.cvimellesgriot.com](http://www.cvimellesgriot.com).  
**CyberMetrics**, Scottsdale, AZ. 800-777-7020. [www.cybermetrics.com](http://www.cybermetrics.com).  
**Cytec**, Penfield, NY. 585-381-4740. [www.cytec-ate.com](http://www.cytec-ate.com).

## D

**D.L.S. Conformity Assessment**, Wheeling, IL. 847-537-6400. [www.dlsca.com](http://www.dlsca.com).  
**D.L.S. Electronic Systems**, Wheeling, IL. 847-537-6400. [www.dlsemc.com](http://www.dlsemc.com).  
**Dage Precision Industries**, Fremont, CA. 510-683-3930. [www.dage-group.com](http://www.dage-group.com).  
**Dalsa**, Waterloo, ON, Canada. 519-886-6000. [www.dalsa.com](http://www.dalsa.com).  
**DAQ Systems**, Bozeman, MT. 406-586-8028. [www.daqsystms.com](http://www.daqsystms.com).  
**DaqScribe Technology**, Centennial, CO. 303-220-7457. [www.daqscribe.com](http://www.daqscribe.com).  
**Data I/O**, Redmond, WA. 800-426-1045. [www.dataio.com](http://www.dataio.com).  
**Data Physics**, San Jose, CA. 408-437-0100. [www.dataphysics.com](http://www.dataphysics.com).  
**Data Translation**, Marlborough, MA. 800-525-8528. [www.datatranslation.com](http://www.datatranslation.com).  
**Dataforth**, Tucson, AZ. 520-741-1404. [www.dataforth.com](http://www.dataforth.com).  
**Dataq Instruments**, Akron, OH. 330-668-1444. [www.dataq.com](http://www.dataq.com).  
**Daytronic**, Dayton, OH. 937-293-2566. [www.daytronic.com](http://www.daytronic.com).  
**dBm Engineering**, Boulder, CO. 720-406-1200. [www.dbmengineering.com](http://www.dbmengineering.com).  
**dBm Optics**, Lafayette, CO. 303-464-1919. [www.dbmoptics.com](http://www.dbmoptics.com).  
**DCC Corp.**, Pennsauken, NJ. 856-662-7272. [www.DCCcorporation.com](http://www.DCCcorporation.com).  
**Denver Test Systems**, Phoenix, AZ. 888-641-8637. [www.denvertest.com](http://www.denvertest.com).  
**DESCO**, Chino, CA. 909-627-8178. [www.desco.com](http://www.desco.com).  
**Despatch Industries**, Minneapolis, MN. 952-469-5424. [www.despatch.com](http://www.despatch.com).  
**Dewetron**, Wakefield, RI. 877-431-5166. [www.dewetron.com/us](http://www.dewetron.com/us).  
**DFT Microsystems**, Burlington, MA. 514-878-8271. [www.dftmicrosystems.ca](http://www.dftmicrosystems.ca).  
**DGH**, Manchester, NH. 603-622-0452. [www.dghcorp.com](http://www.dghcorp.com).

**DiagnoSYS Systems**, Kissimmee, FL. 800-788-6219. [www.dianosys-usa.com](http://www.dianosys-usa.com).  
**Diamond Systems**, Mt. View, CA. 650-810-2500. [www.diamondsystems.com](http://www.diamondsystems.com).  
**Digalog Systems**, New Berlin, WI. 262-797-8000. [www.digalogsystems.com](http://www.digalogsystems.com).  
**Digi-Key**, Thief River Falls, MN. 800-344-4539. [www.digikey.com](http://www.digikey.com).  
**Digitaltest**, Concord, CA. 925-603-8650. [www.digitaltest.net](http://www.digitaltest.net).  
**Direct Industry**, Marseille, France. +33-491-038-090. [www.directindustry.com](http://www.directindustry.com).  
**Directed Energy**, Ft. Collins, CO. 970-493-1901. [www.directedenergy.com](http://www.directedenergy.com).  
**DIT-MCO International**, Kansas City, MO. 816-444-9700. [www.ditmco.com](http://www.ditmco.com).  
**Diversified Technical Systems**, Seal Beach, CA. 562-493-0158. [www.dtsweb.com](http://www.dtsweb.com).  
**DL Instruments**, Ithaca, NY. 607-277-8498. [www.dlinstruments.com](http://www.dlinstruments.com).  
**DoveBid**, Roseville, CA. 800-442-5835. [www.dovebid.com](http://www.dovebid.com).  
**Dow-Key Microwave**, Ventura, CA. 805-650-0260. [www.dowkey.com](http://www.dowkey.com).  
**DSP Development**, Newton, MA. 617-969-0185. [www.dadisp.com](http://www.dadisp.com).  
**DYNAFLOW**, Jessup, MD. 301-604-3688. [www.dynaflo-inc.com](http://www.dynaflo-inc.com).  
**Dynalab Test Systems**, Reynoldsburg, OH. 614-729-6550. [www.dynalabtesters.com](http://www.dynalabtesters.com).  
**Dynamic Signal**, S. Easton, MA. 508-238-2714. [www.dynamicsignal.com](http://www.dynamicsignal.com).  
**Dynamic Solutions**, Northridge, CA. 818-831-0832. [www.dynsolUSA.com](http://www.dynsolUSA.com).

## E

**EADS North America Test & Services**, Irvine, CA. 949-859-8999. [www.eads-nadefense.com](http://www.eads-nadefense.com).  
**Eagle Test Systems**, Buffalo Grove, IL. 847-367-8282. [www.eagletest.com](http://www.eagletest.com).  
**eBay**, San Jose, CA. [www.ebay.com](http://www.ebay.com).  
**EdenTree Technologies**, Newbury Park, CA. 805-499-4555. [www.edentreetech.com](http://www.edentreetech.com).  
**Edmund Optics**, Barrington, NJ. 800-363-1992. [www.edmundoptics.com](http://www.edmundoptics.com).  
**Elan Digital Systems**, Fareham, Hampshire, UK. +44-148-957-9799. [www.elandigitalsystems.com](http://www.elandigitalsystems.com).  
**Electro Rent**, Van Nuys, CA. 818-787-2100. [www.electrorent.com](http://www.electrorent.com).  
**Electroglas**, San Jose, CA. 408-528-3000. [www.electroglas.com](http://www.electroglas.com).  
**Electro-Metrics**, Johnstown, NY. 518-762-2600. [www.electro-metrics.com](http://www.electro-metrics.com).  
**Electronic Systems of Wisconsin**, Racine, WI. 262-554-1211. [www.eswtesters.com](http://www.eswtesters.com).  
**Electro-Tech Systems**, Glenside, PA. 215-887-2196. [www.electrotechsystems.com](http://www.electrotechsystems.com).  
**Elite Electronic Engineering**, Downers Grove, IL. 630-495-9770. [www.elitetest.com](http://www.elitetest.com).  
**ELMA Electronic**, Fremont, CA. 510-656-3400. [www.elma.com](http://www.elma.com).  
**EMCC DR. RAŠEK**, Ebermannstadt, Germany. +49-9194-9016. [www.emcc.de](http://www.emcc.de).  
**Emcor Enclosures**, Rochester, MN. 507-289-3371. [www.emcorenclosures.com](http://www.emcorenclosures.com).  
**Emulation Technology**, Camarillo, CA. 805-383-8480. [www.emulation.com](http://www.emulation.com).  
**Endevco**, San Juan Capistrano, CA. 949-493-8181. [www.endevco.com](http://www.endevco.com).  
**Environment Associates**, Chatsworth, CA. 818-709-0568. [www.eatest.com](http://www.eatest.com).  
**Environmental Specialties**, a Luwa Group Company, Raleigh, NC. 800-688-5859. [www.LuwaES.com](http://www.LuwaES.com).  
**Envirotronics**, Grand Rapids, MI. 616-554-5020. [www.envirotronics.com](http://www.envirotronics.com).  
**EPiX**, Buffalo Grove, IL. 847-465-1818. [www.epixinc.com](http://www.epixinc.com).  
**Equipment Reliability Institute**, Santa Barbara, CA. 805-564-1260. [www.equipment-reliability.com](http://www.equipment-reliability.com).  
**ESD Systems.com**, Marlboro, MA. 508-485-7390. [www.esdsystems.com](http://www.esdsystems.com).  
**ESPEC**, Hudsonville, MI. 616-896-6100. [www.espec.com](http://www.espec.com).  
**ESSC**, Cincinnati, OH. 513-793-7774. [www.esscinc.com](http://www.esscinc.com).  
**ETS-Lindgren**, Cedar Park, TX. 512-531-6400. [www.ets-lindgren.com](http://www.ets-lindgren.com).  
**Euresys**, Itasca, IL. 630-250-2300. [www.euresys.com](http://www.euresys.com).  
**Everest Interscience**, Tucson, AZ. 520-792-4545. [www.everestinterscience.com](http://www.everestinterscience.com).  
**Everett Charles Technologies**, Pomona, CA. 909-625-5551. [www.ectinfo.com](http://www.ectinfo.com).  
**Exacq Technologies**, Indianapolis, IN. 317-845-5710. [www.exacqdaq.com](http://www.exacqdaq.com).  
**EXFO**, Québec City, QC, Canada. 418-683-0211. [www.EXFO.com](http://www.EXFO.com).  
**Exttech Instruments**, Waltham, MA. 781-890-7440. [www.exttech.com](http://www.exttech.com).  
**E-Z-Hook**, Arcadia, CA. 626-446-6175. [www.e-z-hook.com](http://www.e-z-hook.com).

## F

**The Fanfare Group**, Mt. View, CA. 650-641-5101. [www.fanfaresoftware.com](http://www.fanfaresoftware.com).  
**Fast-Vision**, Nashua, NH. 603-891-4317. [www.fast-vision.com](http://www.fast-vision.com).  
**Faxitron X-Ray**, Wheeling, IL. 847-465-9729. [www.faxitron.com](http://www.faxitron.com).  
**FCI**, Etters, PA. 800-237-2374. [www.fciconnect.com](http://www.fciconnect.com).  
**FEI Co.**, Hillsboro, OR. 503-726-7500. [www.fei.com](http://www.fei.com).  
**FETtest**, Morgan Hill, CA. 408-778-0234. [www.fettest.com](http://www.fettest.com).  
**Fiber Instrument Sales**, Oriskany, NY. 315-736-2206. [www.fiberinstrumentsales.com](http://www.fiberinstrumentsales.com).  
**Fiberoptic Systems**, Simi Valley, CA. 805-583-2088. [www.fiberopticsystems.com](http://www.fiberopticsystems.com).  
**Fieldtex Products**, Rochester, NY. 585-427-2940. [www.fieldtexcases.com](http://www.fieldtexcases.com).



# VENDOR CONTACT INFORMATION

**Finisar**, Sunnyvale, CA. 4085481000. [www.finisar.com](http://www.finisar.com).  
**FirstSight Vision**, Tongham, Surrey, UK. +44-125-278-0000. [www.firstsightvision.co.uk](http://www.firstsightvision.co.uk).  
**Fischer Connectors**, Alpharetta, GA. 678-393-5400. [www.fischerconnectors.com](http://www.fischerconnectors.com).  
**Flexco**, Tuscumbia, AL. 800-633-3151. [www.flexcofloors.com](http://www.flexcofloors.com).  
**Flex-Core**, Columbus, OH. 614-889-6152. [www.flex-core.com](http://www.flex-core.com).  
**FLIR Systems**, N. Billerica, MA. 800-464-6372. [www.flirthermography.com](http://www.flirthermography.com).  
**Fluke**, Everett, WA. 425-446-6100. [www.fluke.com](http://www.fluke.com).  
**Flynn Systems**, Nashua, NH. 603-598-4444. [www.flynn.com](http://www.flynn.com).  
**Focus Microwaves**, Dollard-des-Ormeaux, QC, Canada. 514-684-4554. [www.focus-microwaves.com](http://www.focus-microwaves.com).  
**FocusTest**, Reading, MA. 781-944-3891. [www.focustestinc.com](http://www.focustestinc.com).  
**Foresight Imaging**, Lowell, MA. 978-458-4624. [www.fi-llc.com](http://www.fi-llc.com).  
**FormFactor**, Livermore, CA. 925-290-4169. [www.formfactor.com](http://www.formfactor.com).  
**Frequency Devices**, Ottawa, IL. 815-434-7800. [www.freqdev.com](http://www.freqdev.com).  
**Frontline Test Equipment**, Charlottesville, VA. 800-359-8570. [www.fte.com](http://www.fte.com).  
**FTS Systems**, Stone Ridge, NY. 800-824-0400. [www.ftssystems.com](http://www.ftssystems.com).  
**Futek Advanced Sensor Technology**, Irvine, CA. 949-465-0900. [www.futek.com](http://www.futek.com).  
**FuturePlus Systems**, Colorado Springs, CO. 719-278-3540. [www.futureplus.com](http://www.futureplus.com).

## G

**GaGe**, Lockport, IL. 514-633-7447. [www.gage-applied.com](http://www.gage-applied.com).  
**Garwood Laboratories**, Pico Rivera, CA. 562-949-2727. [www.garwoodtestlabs.com](http://www.garwoodtestlabs.com).  
**GE Energy**, Minden, NV. 775-782-3611. [www.ge-energy.com/adre](http://www.ge-energy.com/adre).  
**GEI International**, Syracuse, NY. 315-463-9261. [www.geionline.com](http://www.geionline.com).  
**Geller Microanalytical Lab**, Topsfield, MA. 978-887-7000. [www.gellermicro.com](http://www.gellermicro.com).  
**Geotest - Marvin Test Systems**, Irvine, CA. 888-837-8297. [www.geotestinc.com](http://www.geotestinc.com).  
**GHI Systems**, San Pedro, CA. 310-548-6544. [www.ghisys.com](http://www.ghisys.com).  
**Gigahertz-Optik**, Newburyport, MA. 978-462-1818. [www.gigahertz-optik.com](http://www.gigahertz-optik.com).  
**Giga-tronics**, San Ramon, CA. 925-328-4650. [www.gigatronics.com](http://www.gigatronics.com).  
**Givens Control Engineering**, Burlington, ON, Canada. 905-631-8293. [www.givenscontrol.com](http://www.givenscontrol.com).  
**GL Communications**, Gaithersburg, MD. 301-670-4784. [www.gl.com](http://www.gl.com).  
**Glassman High Voltage**, High Bridge, NJ. 908-638-3800. [www.glassmanhv.com](http://www.glassmanhv.com).  
**Glenbrook Technologies**, Randolph, NJ. 973-361-8866. [www.glenbrooktech.com](http://www.glenbrooktech.com).  
**GMC-I Gossen Metrawatt**, Nuernberg, Germany. +49-9118-6020. [www.gossenmetrawatt.com](http://www.gossenmetrawatt.com).  
**GMW Associates**, San Carlos, CA. 650-802-8292. [www.gmw.com](http://www.gmw.com).  
**GOEPEL Electronics**, Austin, TX. 512-502-3010. [www.goepelusa.com](http://www.goepelusa.com).  
**Golden Software**, Golden, CO. 303-279-1021. [www.goldensoftware.com](http://www.goldensoftware.com).  
**Gordon Kapes**, Skokie, IL. 847-676-1750. [www.gkinc.com](http://www.gkinc.com).  
**GraphPad Software**, San Diego, CA. 858-259-5770. [www.graphpad.com](http://www.graphpad.com).  
**Graphtec America**, Santa Ana, CA. 949-770-6010. [www.graphtecamerica.com](http://www.graphtecamerica.com).  
**GuideTech**, Sunnyvale, CA. 408-733-6555. [www.guidetech.com](http://www.guidetech.com).  
**Guideline Instruments**, Smiths Falls, ON, Canada. 613-283-3000. [www.Guideline.com](http://www.Guideline.com).

## H

**H+W Test Products**, Seekonk, MA. 508-336-3200. [www.hwtestproducts.com](http://www.hwtestproducts.com).  
**HALT&HASS Systems**, Westminster, CO. 303-466-1141. [www.haltandhass.com](http://www.haltandhass.com).  
**Hamamatsu**, Bridgewater, NJ. 908-231-0960. [systems.hamamatsu.com](http://systems.hamamatsu.com).  
**Hameg Instruments**, Mainhausen, Germany. +49-6182-8000. [www.hameg.com](http://www.hameg.com).  
**Hartman Associates**, Woodland Hills, CA. 818-887-4266. [hartmanassoc.com](http://hartmanassoc.com).  
**Heim Data Div.**, Zodiac Data Systems, Alpharetta, GA. 770-753-4017. [www.zds-us.com](http://www.zds-us.com).  
**Hermon Labs**, Binyamina, Israel. +972-4-628-8001. [www.hermonlabs.com](http://www.hermonlabs.com).  
**Highland Technology**, San Francisco, CA. 415-551-1700. [www.highlandtechnology.com](http://www.highlandtechnology.com).  
**Hioki USA**, Cranbury, NJ. 609-409-9109. [www.hiokiusa.com](http://www.hiokiusa.com).  
**Hipotronics**, Brewster, NY. 845-279-8091. [www.hipotronics.com](http://www.hipotronics.com).  
**Hi-Techniques**, Madison, WI. 608-221-7500. [www.hi-techniques.com](http://www.hi-techniques.com).  
**Hobbs Engineering**, Westminster, CO. 303-465-5988. [www.hobbsengr.com](http://www.hobbsengr.com).  
**Honeywell Sensing and Control**, Golden Valley, MN. 614-850-5000. [sensing.honeywell.com](http://sensing.honeywell.com).  
**Huber+Suhner**, Essex, VT. 630-250-0100. [www.hubersuhnerinc.com](http://www.hubersuhnerinc.com).  
**Huntron**, Mill Creek, WA. 800-426-9265. [www.huntron.com](http://www.huntron.com).  
**HV Technologies**, Manassas, VA. 703-365-2330. [www.hvtechnologies.com](http://www.hvtechnologies.com).  
**Hypertronics**, Hudson, MA. 978-568-0451. [www.hypertronics.com](http://www.hypertronics.com).

## I

**ic automation**, Mainz, Germany. +49-6131-6271-80. [www.ic-automation.de](http://www.ic-automation.de).  
**ICS Electronics**, Pleasanton, CA. 925-416-1000. [www.icselect.com](http://www.icselect.com).  
**IET Labs**, Westbury, NY. 516-334-5959. [www.ietlabs.com](http://www.ietlabs.com).  
**Illunis**, Minnetonka, MN. 952-975-9203. [www.illunis.com](http://www.illunis.com).  
**ILX Lightwave**, Bozeman, MT. 800-459-9459. [www.ilxlightwave.com](http://www.ilxlightwave.com).  
**Image Labs International**, Bozeman, MT. 406-585-7225. [www.imagelabs.com](http://www.imagelabs.com).  
**The Imaging Source**, Charlotte, NC. 704-370-0110. [www.TheImagingSource.com](http://www.TheImagingSource.com).  
**IMC DataWorks**, Madison, WI. 608-231-6123. [www.imcdatworks.com](http://www.imcdatworks.com).  
**Immersion**, San Jose, CA. 408-467-1900. [www.immersion.com/digitizer](http://www.immersion.com/digitizer).  
**Imperx**, Boca Raton, FL. 866-849-1662. [www.imperx.com](http://www.imperx.com).  
**IMV**, Chiyoda-ku, Tokyo, Japan. +81-03-3262-6335. [www.imv.co.jp/e](http://www.imv.co.jp/e).  
**Industrial Resources**, Orange, CA. 800-654-7368. [www.industrialresources.com](http://www.industrialresources.com).  
**ines**, Hannover, Germany. +49-5723-916-250. [www.inesinc.com](http://www.inesinc.com).  
**Infinity Photo-Optical**, Boulder, CO. 303-440-4544. [www.infinity-usa.com](http://www.infinity-usa.com).  
**Innovative Integration**, Simi Valley, CA. 805-578-4260. [www.innovative-dsp.com](http://www.innovative-dsp.com).  
**In-Phase Technologies**, Clarksburg, NJ. 609-259-8555. [www.in-phasetech.com](http://www.in-phasetech.com).  
**Instek America**, Chino, CA. 909-591-8358. [www.goodwill.com.tw](http://www.goodwill.com.tw).  
**Instron**, Norwood, MA. 800-564-8378. [www.instron.com](http://www.instron.com).  
**Instrumart**, Williston, VT. 802-863-0085. [www.instrumart.com](http://www.instrumart.com).  
**Instrument Systems**, Ottawa, ON, Canada. 613-729-0614. [www.instrumentsystems.com](http://www.instrumentsystems.com).  
**Instrumentation Engineering**, Oakland, NJ. 201-651-1111. [www.ietest.com](http://www.ietest.com).  
**Instrumented Sensor Technology**, Okemos, MI. 517-349-8487. [www.isthq.com](http://www.isthq.com).  
**Integra Technologies**, Wichita, KS. 800-622-2382. [www.integra-tech.com](http://www.integra-tech.com).  
**Integral Vision**, Wixom, MI. 248-668-9230. [www.iv-usa.com](http://www.iv-usa.com).  
**Integrated Design Tools**, Tallahassee, FL. 850-222-5939. [www.idtvision.com](http://www.idtvision.com).  
**Integrated Sciences Group**, Bakersfield, CA. 661-872-1683. [www.isgmax.com](http://www.isgmax.com).  
**Integrated Technology Corp.**, Tempe, AZ. 480-968-3459. [www.inttechcorp.com](http://www.inttechcorp.com).  
**Intelligent Instrumentation**, Tucson, AZ. 520-573-0887. [www.instrument.com](http://www.instrument.com).  
**Intellitech**, Durham, NH. 603-868-7116. [www.intellitech.com](http://www.intellitech.com).  
**Intercon 1**, Div. of Nortech Systems, Baxter, MN. 800-237-9576. [www.nortechsys.com/intercon](http://www.nortechsys.com/intercon).  
**Interconnect Devices**, Kansas City, KS. 913-342-5544. [www.idinet.com](http://www.idinet.com).

## A HIGH FREQUENCY OF INNOVATION

- SPRING CONTACT PROBES • CONNECTORS
- INTERFACES • SYNERGETIX® TEST SOCKETS

PHONE: 913.342.5544 WEB: [www.idinet.com](http://www.idinet.com)

**ID** INTERCONNECT DEVICES, INC.

**International Light**, Peabody, MA. 978-818-6180. [www.intl-lighttech.com](http://www.intl-lighttech.com).  
**Intertek**, Kentwood, MI. 800-888-3787. [www.intertek-etlsemko.com](http://www.intertek-etlsemko.com).  
**inTEST**, Cherry Hill, NJ. 856-424-6886. [www.intest.com](http://www.intest.com).  
**Intrinsic Quality**, Elk Grove Village, IL. 847-258-5598. [www.intrinsicquality.com](http://www.intrinsicquality.com).  
**Intusoft**, Carson, CA. 310-952-0657. [www.intusoft.com](http://www.intusoft.com).  
**Invisar**, Morrisville, NC. 919-991-1100. [www.invisar.com](http://www.invisar.com).  
**Ion Physics**, Fremont, NH. 603-895-5100. [www.ionphysics.com](http://www.ionphysics.com).  
**IOtech**, Cleveland, OH. 440-439-4091. [www.iotech.com](http://www.iotech.com).  
**Ironcon**, Niles, IL. 847-967-5151. [www.ironcon.com](http://www.ironcon.com).  
**Ironwood Electronics**, Burnsville, MN. 952-229-8200. [www.ironwoodelectronics.com](http://www.ironwoodelectronics.com).  
**ITT Electronic Components**, Santa Ana, CA. 714-557-4700. [www.ittcannon.com](http://www.ittcannon.com).  
**Ixia**, Calabasas, CA. 818-871-1800. [www.ixiacom.com](http://www.ixiacom.com).

Red indicates an advertiser in this issue (See Advertiser Index)

## J

**JAI**, San Jose, CA. 408-383-0300. [www.jai.com](http://www.jai.com).  
**JDSU**, Germantown, MD. 866-228-3762. [www.jdsu.com/test\\_and\\_measurement](http://www.jdsu.com/test_and_measurement).  
**JEOL USA**, Peabody, MA. 978-535-5900. [www.jeol.com](http://www.jeol.com).  
**JFW Industries**, Indianapolis, IN. 317-887-1340. [www.jfwindustries.com](http://www.jfwindustries.com).  
**JMC Worldwide**, Newfield, NJ. 856-697-4400. [www.jmcscv.com](http://www.jmcscv.com).  
**JMP**, Cary, NC. 877-594-6567. [www.jmp.com](http://www.jmp.com).  
**Johnstech International**, Minneapolis, MN. 612-378-2020. [www.johnstech.com](http://www.johnstech.com).  
**JTAG Technologies**, Stevensville, MD. 877-367-5824. [www.jtag.com](http://www.jtag.com).

## K

**K & Us Equipment**, Boulder Creek, CA. 831-338-7246. [www.KandUs.com](http://www.KandUs.com).  
**KAPPA opto-electronics**, Monrovia, CA. 626-256-4343. [www.kappa-vision.com](http://www.kappa-vision.com).  
**Keithley Instruments**, Cleveland, OH. 440-248-0400. [www.Keithley.com](http://www.Keithley.com).  
**Kemo**, Jacksonville, FL. 904-223-0662. [www.kemo.com](http://www.kemo.com).  
**Kepeco**, Flushing, NY. 718-461-7000. [www.kepecopower.com](http://www.kepecopower.com).  
**Keyence**, Woodcliff Lake, NJ. 201-930-0100. [www.keyence.com](http://www.keyence.com).  
**Kikusui America**, Burlingame, CA. 650-259-5900. [www.kikusui.us](http://www.kikusui.us).  
**KineticSystems**, Lockport, IL. 815-838-0005. [www.kscorp.com](http://www.kscorp.com).  
**Kistler Instrument**, Amherst, NY. 716-691-5100. [www.kistler.com](http://www.kistler.com).  
**Klein Instruments**, Portland, OR. 503-245-1012. [www.kleininstruments.com](http://www.kleininstruments.com).  
**Knight Electronics**, Dallas, TX. 214-340-0265. [www.knightonline.com](http://www.knightonline.com).  
**Krohn-Hite**, Brockton, MA. 508-580-1660. [www.krohn-hite.com](http://www.krohn-hite.com).

## L

**L-3 Communications Nova Engineering**, Cincinnati, OH. 513-642-3000. [www.nova-eng.com](http://www.nova-eng.com).  
**LabX**, Midland, ON, Canada. 888-781-0328. [www.labx.com](http://www.labx.com).  
**Laird Technologies**, Earth City, MO. 314-344-9300. [www.lairdtech.com](http://www.lairdtech.com).  
**Lake Shore Cryotronics**, Westerville, OH. 614-891-2244. [www.lakeshore.com](http://www.lakeshore.com).  
**Lambda Americas**, San Diego, CA. 619-575-4400. [www.lambdapower.com](http://www.lambdapower.com).  
**Landrex Technologies**, Santa Clara, CA. 408-567-9801. [www.landrex-us.com](http://www.landrex-us.com).  
**Lawson Labs**, Malvern, PA. 610-725-8800. [www.lawsonlabs.com](http://www.lawsonlabs.com).  
**LDS Test and Measurement**, Middleton, WI. 608-821-6600. [www.lds-group.com](http://www.lds-group.com).  
**Leader Instruments**, Cypress, CA. 714-527-9300. [www.leaderusa.com](http://www.leaderusa.com).  
**LeCroy**, Chestnut Ridge, NY. 800-553-2769. [www.lecroy.com](http://www.lecroy.com).  
**Lemo USA**, Rohnert Park, CA. 707-578-8811. [www.lemo.com](http://www.lemo.com).  
**Leutron Vision**, Burlington, MA. 888-442-2269. [www.leutron.com](http://www.leutron.com).  
**LINOS Photonics**, Milford, MA. 800-334-5678. [www.linos.com](http://www.linos.com).  
**Linseis**, Robbinsville, NJ. 609-799-6282. [www.linseis.net](http://www.linseis.net).  
**Lista International**, Holliston, MA. 800-722-3020. [www.listaintl.com](http://www.listaintl.com).  
**LMI Technologies**, Delta, BC, Canada. 604-636-1011. [www.lmitechnologies.com](http://www.lmitechnologies.com).  
**LMS North America**, Troy, MI. 248-952-5664. [www.lmsintl.com](http://www.lmsintl.com).  
**LogicVision**, San Jose, CA. 408-453-0146. [www.logicvision.com](http://www.logicvision.com).  
**Lord Ingenierie**, Corbreuse, France. +33-164-551-551. [www.lord-imaging.com](http://www.lord-imaging.com).  
**LPKF Laser and Electronics**, Tualatin, OR. 503-454-4200. [www.lpkfusa.com](http://www.lpkfusa.com).  
**LR Environmental Equipment**, Los Angeles, CA. 323-770-0634. [www.lre.com](http://www.lre.com).  
**LTX**, Westwood, MA. 781-461-1000. [www.ltx.com](http://www.ltx.com).  
**Lumenera**, Ottawa, ON, Canada. 613-736-4077. [www.lumenera.com](http://www.lumenera.com).  
**Luna Technologies**, Blacksburg, VA. 540-961-5190. [www.lunatechnologies.com](http://www.lunatechnologies.com).  
**Luther & Maelzer**, Hagenburger, Germany. +49-5031-1740. [www.luther-maelzer.com](http://www.luther-maelzer.com).

## M

**m + p international**, Verona, NJ. 973-239-3005. [www.mpihome.com](http://www.mpihome.com).  
**M/RAD**, Woburn, MA. 781-935-5940. [www.mradcorp.com](http://www.mradcorp.com).  
**M3 Electronics**, Apex, NC. 919-924-3525. [www.m3electronics.biz](http://www.m3electronics.biz).  
**MAC Panel**, High Point, NC. 336-861-3100. [www.macpanel.com](http://www.macpanel.com).  
**Machine Vision Products**, Carlsbad, CA. 760-438-1138. [www.machinevisionproducts.com](http://www.machinevisionproducts.com).  
**Macro Sensors**, Pennsauken, NJ. 856-662-8000. [www.macrosensors.com](http://www.macrosensors.com).  
**Macrotron Scientific Engineering**, Munich, Germany. +49-8945-1110. [www.m-se.com](http://www.m-se.com).

**Madell Technology**, Ontario, CA. 877-670-9023. [www.madelltech.com](http://www.madelltech.com).  
**Magnetic Shield**, Bensenville, IL. 630-766-7800. [www.magnetic-shield.com](http://www.magnetic-shield.com).  
**Magtrol**, Buffalo, NY. 716-668-5555. [www.magtrol.com](http://www.magtrol.com).  
**Manuals Plus**, Finksburg, MD. 800-345-4019. [www.manualsplus.com](http://www.manualsplus.com).  
**Marsh Bellofram**, ATC-Automatic Timing & Controls, Newell, WV. 800-727-5646. [www.automatictiming.com](http://www.automatictiming.com).  
**Materials Development**, Chatsworth, CA. 818-700-8290. [www.mdc4cv.com](http://www.mdc4cv.com).  
**The MathWorks**, Natick, MA. 508-647-7000. [www.mathworks.com](http://www.mathworks.com).  
**MatrIX Technologies**, Dachau, Germany. +49-8131-333-588-0. [www.m-xt.com](http://www.m-xt.com).  
**Matrox Imaging**, Dorval, QC, Canada. 800-804-6243. [www.matrox.com/imaging](http://www.matrox.com/imaging).  
**MCM Electronics**, Centerville, OH. 800-543-4330. [www.mcmelectronics.com](http://www.mcmelectronics.com).  
**Measurement Assurance Technology**, Carrollton, TX. 877-871-8378. [www.mattestusa.com](http://www.mattestusa.com).  
**Measurement Computing**, Norton, MA. 508-946-5100. [www.mccdaq.com](http://www.mccdaq.com).  
**MegaPhase**, Stroudsburg, PA. 877-634-2742. [www.MegaPhase.com](http://www.MegaPhase.com).  
**Megatel-CTC Group USA**, Norristown, PA. 610-239-8812. [www.megatelindustries.com](http://www.megatelindustries.com).  
**Meiji Techno America**, Santa Clara, CA. 800-832-0060. [www.meijitechno.com](http://www.meijitechno.com).  
**MEN Micro**, Ambler, PA. 215-542-9575. [www.menmicro.com](http://www.menmicro.com).  
**Mentor Graphics**, Design-for-Test, Wilsonville, OR. 503-685-7000. [www.mentor.com/dft](http://www.mentor.com/dft).  
**MET Laboratories**, Baltimore, MD. 410-354-3300. [www.metlabs.com](http://www.metlabs.com).  
**MetricTest**, Hayward, CA. 510-264-0887. [www.metrictest.com](http://www.metrictest.com).



# METRICTEST

**New • Refurbished • Rent**  
**3486 Investment Blvd. Hayward, CA 94545**  
**Tel: 800-432-3424 • [www.MetricTest.com](http://www.MetricTest.com)**

- Oscilloscopes
- Spectrum Analyzers
- Multimeters
- Logic Analyzers
- Signal Generators
- More!

**Metron Optics**, Solana Beach, CA. 858-755-4477. [www.metronusa.com](http://www.metronusa.com).  
**Meunier Electronic Supply**, Indianapolis, IN. 800-638-6437. [www.meunierusa.com](http://www.meunierusa.com).  
**MI Technologies**, Suwanee, GA. 678-475-8300. [www.mi-technologies.com](http://www.mi-technologies.com).  
**Micro Component Technology**, St. Paul, MN. 651-697-4000. [www.mct.com](http://www.mct.com).  
**Micro Control**, Minneapolis, MN. 763-786-8750. [www.microcontrol.com](http://www.microcontrol.com).  
**Micro Lambda Wireless**, Fremont, CA. 510-770-9221. [www.microlambdawireless.com](http://www.microlambdawireless.com).  
**Micro Seven**, Beaverton, OR. 503-693-6982. [www.microseveninc.com](http://www.microseveninc.com).  
**Micro-Coax**, Pottstown, PA. 610-495-0110. [www.micro-coax.com](http://www.micro-coax.com).  
**Microlmage Video Systems**, Boyertown, PA. 610-754-6800. [www.mivs.com](http://www.mivs.com).  
**Microlease**, Cary, NC. 866-520-0200. [www.microlease.com](http://www.microlease.com).  
**Micromanipulator**, Carson City, NV. 775-882-2400. [www.micromanipulator.com](http://www.micromanipulator.com).  
**Micro-Metric**, San Jose, CA. 408-452-8505. [www.micro-metric.com](http://www.micro-metric.com).  
**Microstar Laboratories**, Bellevue, WA. 425-453-2345. [www.mstarlabs.com](http://www.mstarlabs.com).  
**Microtronix Systems**, London, ON, Canada. 519-649-4900. [www.microtronix.ca](http://www.microtronix.ca).  
**Microvision**, Auburn, CA. 530-888-8344. [www.microvsn.com](http://www.microvsn.com).  
**Micro-Vu**, Windsor, CA. 707-838-6272. [www.microvu.com](http://www.microvu.com).  
**Miller Industrial**, Tucker, GA. 770-270-0076.  
**Mill-Max Mfg.**, Oyster Bay, NY. 516-922-6000. [www.mill-max.com](http://www.mill-max.com).  
**Mitutoyo America**, Aurora, IL. 630-820-9666. [www.mitutoyo.com](http://www.mitutoyo.com).  
**MKS Instruments**, Andover, MA. 800-227-8766. [www.mksinst.com](http://www.mksinst.com).  
**3M**, formerly Credence Technologies, Soquel, CA. 831-459-7488. [www.credencetech.com](http://www.credencetech.com).  
**3M Electronics**, Austin, TX. 800-328-1368. [www.3M.com/electronics](http://www.3M.com/electronics).  
**Monarch Instrument**, Amherst, NH. 800-999-3390. [www.monarchinstrument.com](http://www.monarchinstrument.com).  
**Monroe Electronics**, Lyndonville, NY. 585-765-2254. [www.monroe-electronics.com](http://www.monroe-electronics.com).  
**Moritex USA**, San Jose, CA. 408-363-2100. [www.moritex.com](http://www.moritex.com).  
**Motorola Product Testing Services**, Lawrenceville, GA. 770-338-3795. [www.motorola.com/producttesting](http://www.motorola.com/producttesting).  
**Moxa Americas**, Brea, CA. 714-528-6777. [www.moxa.com/usa](http://www.moxa.com/usa).  
**MRV Communications**, Chatsworth, CA. 818-773-0900. [www.mrv.com](http://www.mrv.com).  
**MTI Instruments**, Albany, NY. 518-218-2550. [www.mtiinstruments.com](http://www.mtiinstruments.com).  
**Multiprobe**, Santa Barbara, CA. 805-560-0404. [www.multiprobe.com](http://www.multiprobe.com).  
**Multitest Elektronische Systeme**, Rosenheim, Germany. +49-8031-4060. [www.multitest.com](http://www.multitest.com).  
**Murata Power Solutions**, Mansfield, MA. 508-339-3000. [www.murata-ps.com](http://www.murata-ps.com).  
**MuShield**, Londonderry, NH. 603-666-4433. [www.mushield.com](http://www.mushield.com).  
**MVtec Software**, Munich, Germany. +49-8945-7695-0. [www.mvtec.com](http://www.mvtec.com).  
**Myvu**, Westwood, MA. 781-326-8111. [www.myvu.com](http://www.myvu.com).



# VENDOR CONTACT INFORMATION

## N

**NAC Image Technology**, Simi Valley, CA. 800-969-2711. [www.nacinc.com](http://www.nacinc.com).  
**Nanotran**, Milford, MA.  
**Naptech Test Equipment**, Lower Lake, CA. 707-995-7145. [www.naptech.com](http://www.naptech.com).  
**National Instruments**, Austin, TX. 512-683-0100. [www.ni.com](http://www.ni.com).  
**National Quality Assurance—USA**, Acton, MA. 800-649-5289. [www.nqa-usa.com](http://www.nqa-usa.com).  
**National Semiconductor**, Santa Clara, CA. 800-272-9959. [www.national.com](http://www.national.com).  
**National Technical Systems**, Calabasas, CA. 800-270-2516. [www.nts-corp.com](http://www.nts-corp.com).  
**Navatek Engineering**, Rancho Santa Margarita, CA. 949-888-2222. [www.navatek.com](http://www.navatek.com).  
**Navitar**, Rochester, NY. 585-359-4000. [www.navitar.com](http://www.navitar.com).  
**NCI Logic Analyzers**, Huntsville, AL. 256-837-6667. [www.nci-usa.com](http://www.nci-usa.com).  
**NEA**, Londonderry, NH. 603-669-6080. [www.nea-inc.com](http://www.nea-inc.com).  
**Neff Instrument**, Monrovia, CA. 800-423-7151. [www.neff.com](http://www.neff.com).  
**NET USA**, Highland, IN. 219-934-9042. [www.net-usa-inc.com](http://www.net-usa-inc.com).  
**Network Instruments**, Minnetonka, MN. 800-526-7919. [www.networkinstruments.com](http://www.networkinstruments.com).  
**Nevada Automotive Test Center**, Carson City, NV. 775-629-2000. [www.natc-hi.com](http://www.natc-hi.com).  
**Newport**, Irvine, CA. 949-863-3144. [www.newport.com](http://www.newport.com).  
**Newport Electronics**, Santa Ana, CA. 714-540-4914. [www.newportus.com](http://www.newportus.com).  
**Nikon Instruments**, Melville, NY. 631-547-8500. [www.nikoninstruments.com](http://www.nikoninstruments.com).  
**Noise Laboratory**, Sagami-hara, Japan. +81-42-712-2051. [www.noiseken.co.jp](http://www.noiseken.co.jp).  
**Noise Com**, Parsippany, NJ. 973-386-9696. [www.noisecom.com](http://www.noisecom.com).  
**NorPix**, Montreal, QC, Canada. 514-846-0009. [www.norpix.com](http://www.norpix.com).  
**North Atlantic Industries**, Bohemia, NY. 631-567-1100. [www.naii.com](http://www.naii.com).  
**Northwest Analytical**, Portland, OR. 503-224-7727. [www.nwasoft.com](http://www.nwasoft.com).  
**Northwest EMC**, Hillsboro, OR. 503-844-4066. [www.nwemc.com](http://www.nwemc.com).  
**Novas Software**, San Jose, CA. 408-467-7888. [www.novas.com](http://www.novas.com).  
**Novatech Instruments**, Seattle, WA. 206-301-8986. [www.novatech-instr.com](http://www.novatech-instr.com).

## O

**Olympus**, Industrial Micro-Imaging, Orangeburg, NY. 800-233-0697. [www.olympusmicroimaging.com](http://www.olympusmicroimaging.com).  
**Omega Engineering**, Stamford, CT. 800-848-4286. [www.omega.com](http://www.omega.com).  
**OMICRON Electronics**, Houston, TX. 713-830-4660. [www.omicron-lab.com](http://www.omicron-lab.com).  
**Omron Electronics**, Schaumburg, IL. 847-843-7900. [www.omron.com/oei](http://www.omron.com/oei).  
**Onesida Research Services**, Whitesboro, NY. 315-736-5480. [www.ors-labs.com](http://www.ors-labs.com).  
**Onset Computer**, Bourne, MA. 508-759-9500. [www.onsetcomp.com](http://www.onsetcomp.com).  
**Ophir RF**, Los Angeles, CA. 310-306-5556. [www.ophirrf.com](http://www.ophirrf.com).  
**OptEM Engineering**, Calgary, AB, Canada. 403-289-0499. [www.optem.com](http://www.optem.com).  
**Optical Gaging Products**, Rochester, NY. 585-544-0400. [www.ogpnet.com](http://www.ogpnet.com).  
**Opticom**, Erlangen, Germany. +49-9131-53020-0. [www.opticom.de](http://www.opticom.de).  
**OptimalTest**, Nes-Ziona, Israel. +972-8-930-8800. [www.optimaltest.com](http://www.optimaltest.com).  
**OptoMetric**, Renton, WA. 425-251-6363. [www.optomet.com](http://www.optomet.com).  
**Optomistic Products**, So. Freeport, ME. 207-865-9181. [www.optomisticproducts.com](http://www.optomisticproducts.com).  
**OptoTest**, Newbury Park, CA. 805-498-2040. [www.optotest.com](http://www.optotest.com).  
**OriginLab**, Northampton, MA. 413-586-2013. [www.originlab.com](http://www.originlab.com).  
**ORIX Rentec USA**, Los Angeles, CA. 877-849-6749. [www.orixonline.com](http://www.orixonline.com).  
**OROS**, Dulles, VA. 888-200-6767. [www.orosinc.com](http://www.orosinc.com).  
**Owens Design**, Fremont, CA. 510-770-8479. [www.owensdesign.com](http://www.owensdesign.com).  
**OZ Optics**, Ottawa, ON, Canada. 613-831-0981. [www.ozoptics.com](http://www.ozoptics.com).

## P

**Pace Scientific**, Mooresville, NC. 704-799-0688. [www.pace-sci.com](http://www.pace-sci.com).  
**Pacific Instruments**, Concord, CA. 925-827-9010. [www.pacificinstruments.com](http://www.pacificinstruments.com).  
**Pacific Power Source**, Irvine, CA. 949-251-1800. [www.pacificpower.com](http://www.pacificpower.com).  
**Panasonic Factory Solutions Company of America**, Buffalo Grove, IL. 847-495-6100. [www.panasonicfa.com](http://www.panasonicfa.com).  
**Panasonic Vision Systems**, Secaucus, NJ. 888-880-8474. [www.panasonic.com/medical](http://www.panasonic.com/medical).  
**Paravirtual**, Santa Clara, CA. 408-907-1340. [www.paravirtual.com](http://www.paravirtual.com).  
**PCB Piezotronics**, Depew, NY. 716-684-0001. [www.pcb.com](http://www.pcb.com).  
**PCO**, Kelheim, Germany. +49-9441-2005-0. [www.pco.de](http://www.pco.de).  
**PDF Solutions**, San Jose, CA. 408-280-7900. [www.pdf.com](http://www.pdf.com).

**Pearson Electronics**, Palo Alto, CA. 650-494-6444. [www.pearsonelectronics.com](http://www.pearsonelectronics.com).  
**Pendulum Instruments**, Bromma, Sweden. Sweden. +46-8598-51000. [www.pendulum-instruments.com](http://www.pendulum-instruments.com).  
**Pentek**, Upper Saddle River, NJ. 201-818-5900. [www.pentek.com](http://www.pentek.com).  
**PerkinElmer Optoelectronics**, Fremont, CA. 510-979-6500. [optoelectronics.perkinelmer.com](http://optoelectronics.perkinelmer.com).  
**Phase Matrix**, San Jose, CA. 408-428-1000. [www.phasematrix.com](http://www.phasematrix.com).  
**Phlox**, Aix les Milles, cedex 3, France. +33-442-907-620. [www.phlox-gc.com](http://www.phlox-gc.com).  
**phoenix x-ray Systems + Services**, St. Petersburg, FL. 727-456-1465. [www.phoenix-xray.com](http://www.phoenix-xray.com).  
**Photon**, San Jose, CA. 408-226-1000. [www.photon-inc.com](http://www.photon-inc.com).  
**Photron**, San Diego, CA. 858-684-3555. [www.photron.com](http://www.photron.com).  
**Pickering Interfaces**, Grants Pass, OR. 541-471-0700. [www.pickeringtest.com](http://www.pickeringtest.com).  
**Pico Technology**, Garden City, KS. 800-591-2796. [www.picotech.com](http://www.picotech.com).  
**Picosecond Pulse Labs**, Boulder, CO. 303-443-1249. [www.picosecond.com](http://www.picosecond.com).  
**Piezosystem Jena**, Hopedale, MA. 508-634-6688. [www.piezojena.com](http://www.piezojena.com).  
**Pikes Peak Test Labs**, Colorado Springs, CO. 719-596-0802. [www.pptli.com](http://www.pptli.com).  
**Pintail Technologies**, Plano, TX. 972-208-2800. [www.pintail.com](http://www.pintail.com).  
**PixLink**, Ottawa, ON, Canada. 613-247-1211. [www.pixlink.com](http://www.pixlink.com).  
**Plastronics**, Irving, TX. 800-582-5822. [www.plastronicsusa.com](http://www.plastronicsusa.com).  
**PLDA**, San Jose, CA. 408-273-4528. [www.plda.com](http://www.plda.com).  
**Pleora Technologies**, Kanata, ON, Canada. 613-270-0625. [www.pleora.com](http://www.pleora.com).  
**PMG Technologies**, Blainville, QC, Canada. 888-764-8378. [www.pmgtest.com](http://www.pmgtest.com).  
**Point Grey Research**, Vancouver, BC, Canada. 604-730-9937. [www.ptgrey.com](http://www.ptgrey.com).  
**Polytec**, Tustin, CA. 714-850-1835. [www.polytec.com](http://www.polytec.com).  
**Pomona Electronics**, Everett, WA. 800-490-2361. [www.pomonaelectronics.com](http://www.pomonaelectronics.com).  
**PPT VISION**, Minneapolis, MN. 952-996-9500. [www.pptvision.com](http://www.pptvision.com).  
**Praxsym**, Fisher, IL. 217-897-1744. [www.praxsym.com](http://www.praxsym.com).  
**Precision Contacts**, El Dorado Hills, CA. 916-939-4147. [www.precisioncontacts.com](http://www.precisioncontacts.com).  
**Precision Filters**, Ithaca, NY. 607-277-3550. [www.pfinc.com](http://www.pfinc.com).  
**Precision Test Systems**, Chelmsford, Essex, UK. +44-845-052-0920. [www.ptsyst.com](http://www.ptsyst.com).  
**Premier Semiconductor Services**, Austin, TX. 512-912-3500. [www.premiers2.com](http://www.premiers2.com).  
**Pressure Systems**, Hampton, VA. 800-678-7226. [www.pressuresystems.com](http://www.pressuresystems.com).  
**Princeton**, Pennington, NJ. 609-895-9890. [www.princeton.com](http://www.princeton.com).  
**Princeton Instruments**, Trenton, NJ. 609-587-9797. [www.piaction.com](http://www.piaction.com).  
**Prior Scientific**, Rockland, MA. 781-878-8442. [www.prior.com](http://www.prior.com).  
**Prism Sound**, Rockaway, NJ. 973-983-9577. [www.prismsound.com](http://www.prismsound.com).  
**Probe Master**, El Cajon, CA. 800-772-1519. [www.probemaster.com](http://www.probemaster.com).  
**ProbeStar**, San Jose, CA. 408-435-8378. [www.probestar-usa.com](http://www.probestar-usa.com).  
**Product Safety Consulting**, Bensenville, IL. 630-238-0188. [www.productsafetyinc.com](http://www.productsafetyinc.com).  
**ProductionLine Testers**, Pleasanton, CA. 925-931-1255. [www.productionlinetesters.com](http://www.productionlinetesters.com).  
**Professional Testing**, Round Rock, TX. 512-244-3371. [www.ptitest.com](http://www.ptitest.com).  
**Programmable Division of Xantrex Technology**, San Diego, CA. 858-458-0223. [www.programmablepower.com](http://www.programmablepower.com).  
**Prologent**, Montreal, QC, Canada. 514-842-7577. [www.prologent.com](http://www.prologent.com).  
**Prostat**, Bensenville, IL. 630-238-8883. [www.prostatcorp.com](http://www.prostatcorp.com).  
**Protek Test and Measurement**, Englewood, NJ. 201-227-1161. [www.protektest.com](http://www.protektest.com).  
**PTL Test Equipment**, Jupiter, FL. 561-747-3647. [www.ptltest.com](http://www.ptltest.com).  
**Pulizzi Engineering**, Santa Ana, CA. 800-870-2248. [www.pulizzi.com](http://www.pulizzi.com).  
**Pyrometer Instrument**, Windsor, NJ. 609-443-5522. [www.pyrometer.com](http://www.pyrometer.com).

## Q

**QA Technology Co.**, Hampton, NH. 603-926-1193. [www.gatech.com](http://www.gatech.com).  
**QIOPTIQ Imaging Solutions**, Rochester, NY. 800-430-3041. [www.qioptiqimaging.com](http://www.qioptiqimaging.com).  
**Q-Lab**, Cleveland, OH. 440-835-8700. [www.q-lab.com](http://www.q-lab.com).  
**Qmax Test Equipments**, Tamilnadu, India. +91-44-2450-9627. [www.qmaxtest.com](http://www.qmaxtest.com).  
**QRP**, Tucson, AZ. 520-790-3533. [www.qrpgloves.com](http://www.qrpgloves.com).  
**QuadTech**, Maynard, MA. 800-253-1230. [www.quadtech.com](http://www.quadtech.com).  
**QualiTau**, Sunnyvale, CA. 408-522-9200. [www.qualitau.com](http://www.qualitau.com).  
**QualityLogic**, Moorpark, CA. 805-531-9030. [www.qualitylogic.com](http://www.qualitylogic.com).  
**Qualmark**, West Haven, CT. 203-933-8000. [www.qualmark.com](http://www.qualmark.com).  
**Quantum Data**, Elgin, IL. 847-888-0450. [www.quantumdata.com](http://www.quantumdata.com).

Red indicates an advertiser in this issue (See Advertiser Index)

## R

**R.C. Electronics**, Santa Barbara, CA. 805-685-7770. [www.rcelectronics.com](http://www.rcelectronics.com).  
**RADCOM**, Paramus, NJ. 201-518-0033. [www.radcom.com](http://www.radcom.com).  
**Radiant Imaging**, Duval, WA. 425-844-0152. [www.radiantimaging.com](http://www.radiantimaging.com).  
**Rad-icon Imaging**, Santa Clara, CA. 408-486-0886. [www.rad-icon.com](http://www.rad-icon.com).  
**RAM Optical Instrumentation**, Rochester, NY. 585-758-1300. [www.ramoptical.com](http://www.ramoptical.com).  
**Ramsey Electronics**, Victor, NY. 800-446-2295. [www.ramseytest.com](http://www.ramseytest.com).  
**Reinhardt System und Messelectronic**, Diessen, Germany. +49-8196-9341-00. [www.reinhardt-testsystem.de](http://www.reinhardt-testsystem.de).  
**Reliability Analysis Laboratory**, Raytheon, Tewksbury, MA. 800-725-4787. [www.reliabilityanalysislab.com](http://www.reliabilityanalysislab.com).  
**ReMaTek**, St. Laurent, QC, Canada. 514-333-0101. [www.rematek.com](http://www.rematek.com).  
**Ricreations**, Gainesville, GA. 678-455-7255. [www.universalscan.com](http://www.universalscan.com).  
**Rigol Technologies**, Monument, CO. 719-488-8306. [www.rigolna.com](http://www.rigolna.com).  
**Rika Denshi America**, Attleboro, MA. 508-226-2080. [www.testprobe.com](http://www.testprobe.com).  
**Robert A. Denton**, Rochester Hills, MI. 248-852-5100. [www.dentoninc.com](http://www.dentoninc.com).  
**Robson Technologies**, Morgan Hill, CA. 408-779-8008. [www.testfixtures.com](http://www.testfixtures.com).  
**Rocky Mountain Test Equipment**, Centennial, CO. 303-693-3322. [www.rmte.net](http://www.rmte.net).  
**Rohde & Schwarz**, Columbia, Maryland. 410-910-7800. [www.rohde-schwarz.com](http://www.rohde-schwarz.com).  
**Rolyn Optics**, Covina, CA. 626-915-5707. [www.rolyn.com](http://www.rolyn.com).  
**Ross Engineering**, Campbell, CA. 408-377-4621. [www.rossengineeringcorp.com](http://www.rossengineeringcorp.com).  
**Rotek Instrument**, Waltham, MA. 781-899-4611. [www.rotek.com](http://www.rotek.com).  
**Rotronic Instrument**, Huntington, NY. 631-427-3898. [www.rotrotron-usa.com](http://www.rotrotron-usa.com).  
**RS Tech**, Phoenix, AZ. 623-879-6690. [www.rstechinc.com](http://www.rstechinc.com).  
**Rudolph Technologies**, Flanders, NJ. 973-691-1300. [www.rudolphtech.com](http://www.rudolphtech.com).

## S

**S.R.S. Market Solutions**, Eagleville, PA. none. [www.metersuperstore.com](http://www.metersuperstore.com).  
**Saelig**, Pittsford, NY. 585-385-1750. [www.saelig.com](http://www.saelig.com).  
**ScanCAD International**, Morrison, CO. 303-697-8888. [www.scanCAD.com](http://www.scanCAD.com).  
**Schomandl**, Yucaipa, CA. 909-797-0484. [www.schomandl.com](http://www.schomandl.com).  
**Schott North America**, Auburn, NY. 315-255-2791. [www.us.schott.com/fiberoptics](http://www.us.schott.com/fiberoptics).  
**Schroff**, Warwick, RI. 888-550-9543. [www.schroff.us](http://www.schroff.us).  
**Sciometric Instruments**, Ottawa, ON, Canada. 613-254-7054. [www.sciometric.com](http://www.sciometric.com).  
**Scienscope International**, Chino, CA. 909-590-7273. [www.scienscope.com](http://www.scienscope.com).  
**Scientific Solutions**, Mentor, OH. 440-357-1400. [www.scientific-solutions.com](http://www.scientific-solutions.com).  
**Scientific Test**, Richardson, TX. 972-479-1300. [www.scitest.com](http://www.scitest.com).  
**Sealevel Systems**, Liberty, SC. 864-843-4343. [www.sealevel.com](http://www.sealevel.com).  
**SeaSolve Software**, San Jose, CA. 408-437-9306. [www.seasolve.com](http://www.seasolve.com).  
**Seaward Group**, Tampa, FL. 813-886-2775. [www.seaward-groupusa.com](http://www.seaward-groupusa.com).  
**Sefelec**, Yucaipa, CA. 909-797-0484. [www.sefelec.com](http://www.sefelec.com).  
**Seica**, Strambino, Italy. +39-0125-636-811. [www.seica.com](http://www.seica.com).  
**Semitek**, Richardson, TX. 972-783-8100. [www.semitex.com](http://www.semitex.com).  
**Sencore**, Sioux Falls, SD. 605-339-0100. [www.sencore.com](http://www.sencore.com).  
**SensArray**, Santa Clara, CA. 408-986-5600. [www.sensarray.com](http://www.sensarray.com).  
**Sensor and Antenna Systems**, Lansdale, Subsidiary of Cobham Corp., Lansdale, PA. 215-996-2343. [www.sas-lansdale.com](http://www.sas-lansdale.com).  
**Sensor Products**, Madison, NJ. 973-884-1755. [www.sensorprod.com](http://www.sensorprod.com).  
**Sensortronics**, Walpole, MA. 508-660-8823. [www.sensortronics.com](http://www.sensortronics.com).  
**Sens-Tech**, Ruislip, Middlesex, UK. +44-189-563-0771. [www.sens-tech.com](http://www.sens-tech.com).  
**Sentech America**, Carrollton, TX. 972-481-9223. [www.sentechamerica.com](http://www.sentechamerica.com).  
**Sharetree**, Stonehouse, Gloucestershire, UK. +44-145-382-8642. [www.sharetree.com](http://www.sharetree.com).  
**Siemens**, PLM Software, Plano, TX. 800-498-5351. [www.siemens.com/plm](http://www.siemens.com/plm).  
**Sigma Systems**, El Cajon, CA. 619-258-3700. [www.sigmasystems.com](http://www.sigmasystems.com).  
**SigmaQuest**, Sunnyvale, CA. 408-524-3180. [www.sigmaquest.com](http://www.sigmaquest.com).  
**Signal Recovery**, Oak Ridge, TN. 865-482-4411. [www.signalrecovery.com](http://www.signalrecovery.com).  
**Signalysis**, Cincinnati, OH. 513-528-6164. [www.signalysis.com](http://www.signalysis.com).  
**Signametrics**, Seattle, WA. 206-524-4074. [www.signametrics.com](http://www.signametrics.com).  
**Silicon Imaging**, Troy, NY. 908-202-3896. [www.siliconimaging.com](http://www.siliconimaging.com).  
**Simco**, Hatfield, PA. 215-997-0590. [www.simcoION.biz](http://www.simcoION.biz).  
**Slaughter**, Lake Forest, IL. 847-932-3662. [www.hipot.com](http://www.hipot.com).  
**Solaris Development**, Sunnyvale, CA. 408-541-0151. [www.solaris-inc.com](http://www.solaris-inc.com).  
**SOLTEC**, San Fernando, CA. 800-423-2344. [www.solteccorp.com](http://www.solteccorp.com).  
**Sony Electronics**, Park Ridge, NJ. 201-930-7000. [www.sony.com/video cameras](http://www.sony.com/video cameras).  
**Sony Manufacturing Systems America**, Lake Forest, CA. 949-770-8400. [www.sonysms.com](http://www.sonysms.com).  
**Sovtest**, Kursk, Russia. [www.sovtest.ru](http://www.sovtest.ru).

**SPEA**, Volpiano, Italy. +39-0119-825-400. [www.spea.com](http://www.spea.com).  
**Spectracom**, Rochester, NY. 585-321-5800. [www.spectracomcorp.com](http://www.spectracomcorp.com).  
**Spectratest**, Mt. View, CA. 800-716-2421. [www.spectratest.com](http://www.spectratest.com).  
**Spectrum**, Grosshansdorf, Germany. +49-4102-6956-0. [www.spec.de](http://www.spec.de).  
**Spellman High Voltage Electronics**, Hauppauge, NY. 631-630-3000. [www.spellmanhv.com](http://www.spellmanhv.com).  
**Sperry Instruments**, Milwaukee, WI. 414-352-4160. [www.sperryinstruments.com](http://www.sperryinstruments.com).  
**Spirent Communications**, Calabasas Hills, CA. 800-927-2660. [www.spirent.com](http://www.spirent.com).  
**Stag Programming Solutions**, Yucaipa, CA. 909-797-0484. [www.stag.co.uk](http://www.stag.co.uk).  
**Stanford Research Systems**, Sunnyvale, CA. 408-744-9040. [www.thinksrs.com](http://www.thinksrs.com).  
**Stanley, Supply & Services**, N. Andover, MA. 800-225-5370. [www.stanleysupplyservices.com](http://www.stanleysupplyservices.com).  
**StataCorp**, College Station, TX. 800-782-8272. [www.stata.com](http://www.stata.com).  
**Static Solutions**, Marlborough, MA. 508-480-0700. [www.staticsolutions.com](http://www.staticsolutions.com).  
**Staticworx**, Watertown, MA. 617-923-2000. [www.staticworx.com](http://www.staticworx.com).  
**Statit Software**, Corvallis, OR. 800-478-2892. [www.statit.com](http://www.statit.com).  
**StatSoft**, Tulsa, OK. 918-749-1119. [www.statsoft.com](http://www.statsoft.com).  
**Stemmer Imaging**, Puchheim, Germany. +49-8980-9020. [www.stemmer-imaging.de](http://www.stemmer-imaging.de).  
**Stephen Halperin & Associates**, Bensenville, IL. 630-238-8883. [www.halperinassoc.com](http://www.halperinassoc.com).  
**StingRay Optics**, Keene, NH. 603-358-5577. [www.stingrayoptics.com](http://www.stingrayoptics.com).  
**StockerYale**, Montreal, QC, Canada. 800-814-9552. [www.stockeryale.com](http://www.stockeryale.com).  
**Strategic Test**, Woburn, MA. 617-621-0080. [www.strategic-test.com](http://www.strategic-test.com).  
**Summit Instruments**, Akron, OH. 330-659-3312. [www.summitinstruments.com](http://www.summitinstruments.com).  
**Sun Electronic Systems**, Titusville, FL. 321-383-9400. [www.sunelectronics.com](http://www.sunelectronics.com).  
**Sunnex**, Natick, MA. 800-445-7869. [www.sunnexonline.com](http://www.sunnexonline.com).  
**Sunrise Telecom**, San Jose, CA. 408-363-8000. [www.sunrisetelecom.com](http://www.sunrisetelecom.com).  
**Sunstone Circuits**, Mulino, OR. 503-829-9108. [www.sunstone.com](http://www.sunstone.com).  
**Superior Electric**, Bristol, CT. 860-585-4500. [www.superiorelectric.com](http://www.superiorelectric.com).  
**SurplusEq.com**, Phoenix, AZ. 602-867-1904. [www.surpluseq.com](http://www.surpluseq.com).  
**Suss MicroTec**, Garching, Germany. +49-8932-0070. [www.suss.com](http://www.suss.com).  
**SV Probe**, Gilbert, AZ. 480-635-4700. [www.svprobe.com](http://www.svprobe.com).  
**SVS-Vistek**, Gold Canyon, AZ. 480-983-8399. [www.svs-vistek.com](http://www.svs-vistek.com).  
**Swift Textile Metalizing**, Bloomfield, CT. 860-243-1122. [www.swift-textile.com](http://www.swift-textile.com).  
**Symmetricom**, Timing, Test & Measurement Division, San Jose, CA. 978-232-1422. [www.symmtm.com](http://www.symmtm.com).  
**Symtx**, Austin, TX. 512-328-7799. [www.symtx.com](http://www.symtx.com).  
**Synergetix**, Kansas City, KS. 913-342-5544. [www.synergetix.com](http://www.synergetix.com).  
**Synergy Software**, Reading, PA. 610-779-0522. [www.synergy.com](http://www.synergy.com).  
**Synopsys**, Mt. View, CA. 650-584-5000. [www.synopsys.com](http://www.synopsys.com).  
**SynTest Technologies**, Sunnyvale, CA. 408-720-9956. [www.synctest.com](http://www.synctest.com).  
**SyntheSys Research**, Menlo Park, CA. 650-364-1853. [www.bertscope.com](http://www.bertscope.com).  
**Sypris Test & Measurement**, Orlando, FL. 407-678-6900. [www.sypris.com/stm](http://www.sypris.com/stm).  
**Systat Software**, San Jose, CA. 800-797-7401. [www.systat.com](http://www.systat.com).

## T

**Tabor Electronics**, Irvine, CA. 800-722-2528. [www.taborelec.com/us](http://www.taborelec.com/us).  
**TAL Technologies**, Philadelphia, PA. 215-496-0222. [www.TALtech.com](http://www.TALtech.com).  
**Tamar Technology**, Newbury Park, CA. 805-480-3358. [www.tamartechology.com](http://www.tamartechology.com).  
**Tamron USA**, Commack, NY. 631-858-8400. [www.tamron.com](http://www.tamron.com).  
**Tamura Corp. of America**, Temecula, CA. 800-472-6654. [www.tamuracorp.com](http://www.tamuracorp.com).  
**Tanisys Technology**, Austin, TX. 512-335-4440. [www.tanisys.com](http://www.tanisys.com).  
**TDI Power**, Hackettstown, NJ. 908-850-5088. [www.tdi-power.com](http://www.tdi-power.com).  
**TDK RF Solutions**, Cedar Park, TX. 512-258-9478. [www.tdkrfsolutions.com](http://www.tdkrfsolutions.com).  
**TEAM**, Burlington, WA. 360-757-8601. [www.teamcorporation.com](http://www.teamcorporation.com).  
**TEAM A.T.E.**, Denver, CO. 303-628-7722. [www.team-ate.com](http://www.team-ate.com).  
**Technology Training**, Santa Barbara, CA. 866-884-4338. [www.TTiedu.com](http://www.TTiedu.com).  
**TechRecovery**, Mendon, MA. 877-837-8872. [www.techrecovery.com](http://www.techrecovery.com).  
**Tecpel**, Sin Yi District, Taipei, Taiwan. +886-2-2737-5866. [www.tecpel.com](http://www.tecpel.com).  
**Tegam**, Geneva, OH. 440-466-6100. [www.tegam.com](http://www.tegam.com).  
**Tekscan**, South Boston, MA. 617-464-4500. [www.tekscan.com](http://www.tekscan.com).  
**Tektronix**, Beaverton, OR. 800-835-9433. [www.tektronix.com](http://www.tektronix.com).  
**Telatemp**, Fullerton, CA. 714-879-2901. [www.telatemp.com](http://www.telatemp.com).  
**Telco Testing Solutions**, Phoenix, AZ. 480-603-1828. [www.telcotesting.com](http://www.telcotesting.com).  
**Teledyne Relays**, Hawthorne, CA. 800-351-7368. [www.teledynecoax.com](http://www.teledynecoax.com).  
**Teledyne Scientific & Imaging**, Thousand Oaks, CA. 805-373-4545. [www.teledyne-si.com](http://www.teledyne-si.com).  
**Teledyne Storm Products—Microwave**, Woodridge, IL. 630-754-3300. [www.stormproducts.com](http://www.stormproducts.com).



# VENDOR CONTACT INFORMATION

**Telinc**, New Hope, PA. 800-257-5110. [www.telinc.com](http://www.telinc.com).  
**Telops**, Quebec, QC, Canada. 418-864-7808. [www.telops.com](http://www.telops.com).  
**Teltone**, Bothell, WA. 800-426-3926. [www.teltone.com](http://www.teltone.com).  
**Temptronic**, Sharon, MA. 781-688-2300. [www.temptronic.com](http://www.temptronic.com).  
**Tequipment.net**, Long Branch, NJ. 877-742-8378. [www.tequipment.net](http://www.tequipment.net).  
**Teradyne**, North Reading, MA. 978-370-2700. [www.teradyne.com](http://www.teradyne.com).  
**Terahertz Technologies**, Oriskany, NY. 315-736-3642. [www.terahertztechnologies.com](http://www.terahertztechnologies.com).  
**Terra Universal**, Fullerton, CA. 714-578-6000. [www.terrauniversal.com](http://www.terrauniversal.com).  
**Teseda**, Portland, OR. 503-223-3315. [www.teseda.com](http://www.teseda.com).  
**Teseq**, Edison, NJ. 732-225-9533. [www.teseq.com](http://www.teseq.com).  
**Test & Measurement Global Exchange (Tange)**, Franklin, MA. 508-520-9060. [www.tange.com](http://www.tange.com).  
**Test Advantage**, Tempe, AZ. 480-337-3377. [www.testadvantage.com](http://www.testadvantage.com).  
**Test Coach**, Hoffman Estates, IL. 847-885-4880. [www.testcoachcorp.com](http://www.testcoachcorp.com).  
**The Test Connection**, Owings Mills, MD. 410-526-2800. [www.ttc.com](http://www.ttc.com).  
**Test Equipment Connection**, Lake Mary, FL. 800-615-8378. [www.testequipmentconnection.com](http://www.testequipmentconnection.com).  
**Test Equipment Depot**, Melrose, MA. 800-996-3837. [www.testequipmentdepot.com](http://www.testequipmentdepot.com).  
**Test Equipment Solutions Today**, Foster City, CA. 888-889-8378. [www.testsolu.com](http://www.testsolu.com).  
**Test Research**, Taipei, Taiwan. +886-2-2832-8918. [www.tri.com.tw](http://www.tri.com.tw).  
**Test Site Services**, Milford, MA. 508-634-3444. [www.testsiteservices.com](http://www.testsiteservices.com).  
**Test Tooling Solutions Group**, Singapore. +65-677-96866. [www.tts-grp.com](http://www.tts-grp.com).  
**TestEdge**, San Diego, CA. 858-451-1012. [www.testedgeinc.com](http://www.testedgeinc.com).  
**TestEquity**, Thousand Oaks, CA. 800-950-3457. [www.testequity.com](http://www.testequity.com).  
**Testforce**, St. Laurent, QC, Canada. 514-856-0970. [www.testforce.com](http://www.testforce.com).  
**TestMart**, San Bruno, CA. 650-624-0525. [www.testmart.com](http://www.testmart.com).  
**Texas Instruments**, Dallas, TX. 800-336-5236. [www.ti.com](http://www.ti.com).  
**ThermaCal**, Solon, OH. 440-498-1005. [www.thermacal.com](http://www.thermacal.com).  
**Thermo Electric**, Saddle Brook, NJ. 201-843-5800. [www.thermo-electric-direct.com](http://www.thermo-electric-direct.com).  
**Thermo Fisher Scientific**, Liverpool, NY. 315-451-9410. [www.thermo.com/cidtec](http://www.thermo.com/cidtec).  
**Thermo Scientific**, Lowell, MA. 978-275-0800. [www.thermo.com/esd](http://www.thermo.com/esd).  
**Thermonics**, Sunnyvale, CA. 408-542-5900. [www.thermonics.com](http://www.thermonics.com).  
**Thermotron Industries**, Holland, MI. 616-393-4580. [www.thermotron.com](http://www.thermotron.com).  
**Thunder Scientific**, Albuquerque, NM. 505-265-8701. [www.ThunderScientific.com](http://www.ThunderScientific.com).  
**Thurlby-Thandar Instruments (TTI)**, Huntingdon, Cambs, UK. +44-148-041-2451. [www.tti-test.com](http://www.tti-test.com).  
**TPS, Thermal Product Solutions**, Williamsport, PA. 570-326-1770. [www.thermalproductsolutions.com](http://www.thermalproductsolutions.com).  
**Tracespan Communications**, Ann Arbor, MI. 734-846-0549. [www.tracespan.com](http://www.tracespan.com).  
**Tracewell Systems**, Westerville, OH. 800-848-4524. [www.tracewellsystems.com](http://www.tracewellsystems.com).  
**Transcat**, Rochester, NY. 800-828-1470. [www.transcat.com](http://www.transcat.com).  
**TREK**, Medina, NY. 585-798-3140. [www.trekin.com](http://www.trekin.com).  
**Trek Equipment**, Sausalito, CA. 415-332-1555. [www.trekequip.com](http://www.trekequip.com).  
**Trio-Tech International**, Van Nuys, CA. 818-787-7000. [www.triotech.com](http://www.triotech.com).  
**TRS-RenTelco**, DFW Airport, TX. 800-874-7123. [www.trs-rentelco.com](http://www.trs-rentelco.com).  
**Tucker Electronics**, Garland, TX. 800-527-4642. [www.tucker.com](http://www.tucker.com).  
**TUV Rheinland of North America**, Newtown, CT. 888-975-3943. [www.tuv.com](http://www.tuv.com).  
**TUV SUD America**, Peabody, MA. 800-888-0123. [www.tuvamerica.com](http://www.tuvamerica.com).  
**TYX**, Reston, VA. 703-264-1080. [www.tyx.com](http://www.tyx.com).

## U

**Ultrafast Sensors**, Thousand Oaks, CA. 866-205-0592. [www.ultrafastsensors.com](http://www.ultrafastsensors.com).  
**UltraTest International**, San Jose, CA. 408-433-2244. [www.ultratest.com](http://www.ultratest.com).  
**Underwriters Laboratories**, Northbrook, IL. 847-272-8800. [www.ul.com](http://www.ul.com).  
**Unholtz-Dickie**, Wallingford, CT. 203-265-3929. [www.udco.com](http://www.udco.com).  
**Unisoft**, Milford, CT. 888-486-4246. [www.unisoft-cim.com](http://www.unisoft-cim.com).  
**United Electronic Industries**, Canton, MA. 781-821-2890. [www.ueidaq.com](http://www.ueidaq.com).  
**Unitron**, Bohemia, NY. 631-589-6666. [www.unitronusa.com](http://www.unitronusa.com).  
**Universal Switching**, Burbank, CA. 818-381-5111. [www.uswi.com](http://www.uswi.com).

## V

**Valuetronics**, Elgin, IL. 800-552-8258. [www.valuetronics.com](http://www.valuetronics.com).  
**Vektrex Electronic Systems**, San Diego, CA. 858-558-8282. [www.vektrex.com](http://www.vektrex.com).  
**Verigy**, Cupertino, CA. 408-864-2900. [www.verigy.com](http://www.verigy.com).  
**VI Technology**, Austin, TX. 512-327-3348. [www.vi-tech.com](http://www.vi-tech.com).  
**Vibration Research**, Jenison, MI. 616-669-3028. [www.vibrationresearch.com](http://www.vibrationresearch.com).  
**Vicor**, Andover, MA. 978-470-2900. [www.vicorpower.com](http://www.vicorpower.com).  
**Videology Imaging Solutions**, Greenville, RI. 401-949-5332. [www.videologyinc.com](http://www.videologyinc.com).  
**View Engineering**, Simi Valley, CA. 805-578-5000. [www.viewengineering.com](http://www.viewengineering.com).  
**Viewpoint Data Management**, Rochester, NY. 585-475-9555. [www.myaperio.com](http://www.myaperio.com).  
**Viewpoint Systems**, Rochester, NY. 585-475-9555. [www.viewpointusa.com](http://www.viewpointusa.com).  
**Virginia Panel**, Waynesboro, VA. 540-932-3300. [www.vpc.com](http://www.vpc.com).  
**Viscom**, Duluth, GA. 678-966-9835. [www.viscom.com](http://www.viscom.com).  
**Vision Components**, Hudson, NH. 603-598-2588. [www.vision-components.com](http://www.vision-components.com).  
**Vision Engineering**, New Milford, CT. 860-355-3776. [www.visioneng.com](http://www.visioneng.com).  
**Vision Research**, Wayne, NJ. 866-450-7426. [www.visionresearch.com](http://www.visionresearch.com).  
**Vision Systems International**, Yardley, PA. 215-736-0994. [www.vision1.com/vsi](http://www.vision1.com/vsi).  
**Vistec Semiconductor Systems**, Fremont, CA. 510-623-3000. [www.vistec-semi.com/](http://www.vistec-semi.com/).  
**VJ Electronix**, Littleton, MA. 978-486-4777. [www.vjelectronix.com](http://www.vjelectronix.com).  
**VLSI Standards**, San Jose, CA. 408-428-1800. [www.vlsistandards.com](http://www.vlsistandards.com).  
**VMETRO**, Houston, TX. 281-584-0728. [www.vmetro.com](http://www.vmetro.com).  
**Volpi USA**, Auburn, NY. 315-255-1737. [www.volpiusa.com](http://www.volpiusa.com).  
**VXI Technology**, Irvine, CA. 949-955-1894. [www.vxitech.com](http://www.vxitech.com).

## W

**W.L. Gore & Associates**, Elkton, MD. 800-311-3060. [www.gore.com](http://www.gore.com).  
**W.M. Hague**, Pepperell, MA. 978-433-3777. [www.WMHague.com](http://www.WMHague.com).  
**Wavecrest**, Eden Prairie, MN. 952-831-0030. [www.wavecrest.com](http://www.wavecrest.com).  
**Wentworth Laboratories**, Brookfield, CT. 203-775-0449. [www.wentworthlabs.com](http://www.wentworthlabs.com).  
**WESCO**, Western Scientific, San Francisco, CA. 415-826-5732. [www.wescmicroscopes.com](http://www.wescmicroscopes.com).  
**Willtek Communications**, Parsippany, NJ. 973-386-9696. [www.willtek.com](http://www.willtek.com).  
**Winchester Electronics**, Wallingford, CT. 203-741-5400. [www.winchesterelectronics.com](http://www.winchesterelectronics.com).  
**Wintriss Engineering**, San Diego, CA. 800-550-7300. [www.weco.com](http://www.weco.com).  
**WITec Instruments**, Savoy, IL. 217-351-9705. [www.witec-instruments.com](http://www.witec-instruments.com).  
**World Cal**, Elk Horn, IA. 712-764-2197. [www.world-cal.com](http://www.world-cal.com).

## X

**Xantrex Technology**, San Diego, CA. 858-458-0223. [www.programmablepower.com](http://www.programmablepower.com).  
**Xilinx**, San Jose, CA. 408-559-7778. [www.xilinx.com](http://www.xilinx.com).  
**Xitron Technologies**, San Diego, CA. 858-530-8099. [www.xitrontech.com](http://www.xitrontech.com).  
**X-TEK Group**, Tyngsboro, MA. 978-649-6333. [www.xtekxray.com](http://www.xtekxray.com).

## Y

**Y.P. Unitesters**, Yucaipa, CA. 909-797-0484. [www.ypu.co.il](http://www.ypu.co.il).  
**Yamaichi Electronics USA**, San Jose, CA. 408-715-9100. [www.yeu.com](http://www.yeu.com).  
**YesTech**, San Clemente, CA. 949-361-2714. [www.yestechinc.com](http://www.yestechinc.com).  
**Yokogawa Corp. of America**, Newnan, GA. 770-254-0400. [www.yokogawa.com/us](http://www.yokogawa.com/us).  
**YXLON International**, Akron, OH. 330-798-4800. [www.yxlon.com](http://www.yxlon.com).

## Z

**Zmation**, Portland, OR. 503-253-8871. [www.zmation.com](http://www.zmation.com).  
**ZTEC Instruments**, Albuquerque, NM. 866-ZTEC-NOW. [www.ztecinstruments.com](http://www.ztecinstruments.com).  
**Zygo**, Middlefield, CT. 860-347-8506. [www.zygo.com](http://www.zygo.com).

T&MW

Red indicates an advertiser in this issue (See Advertiser Index)

# PROFESSIONAL SOCIETIES & TRADE ASSOCIATIONS

**3rd Generation Partnership Project (3GPP)**, [www.3gpp.org](http://www.3gpp.org). The 3GPP brings together a number of telecommunications standards bodies.

**Accellera**, [www.accellera.org](http://www.accellera.org). Accellera's mission is to drive development of standards that enhance a language-based design automation process.

**AeA**, [www.aeanet.org](http://www.aeanet.org). Formerly the American Electronics Association, AeA is a trade association representing all segments of the technology industry.

**Alliance for Telecommunications Industry Solutions (ATIS)**, [www.atis.org](http://www.atis.org). ATIS is a US-based body that is committed to developing technical and operations standards for the communications and information technologies industry worldwide.

**American Association for Laboratory Accreditation (A2LA)**, [www.a2la.org](http://www.a2la.org). The A2LA is dedicated to accreditation of competent testing and calibration laboratories, proficiency testing providers, and reference materials producers.

**American Council of Independent Laboratories (ACIL)**, [www.acil.org](http://www.acil.org). ACIL is a trade association representing independent, commercial scientific, and engineering firms.

**American National Standards Institute (ANSI)**, [www.ansi.org](http://www.ansi.org). ANSI is a private, nonprofit administrator and coordinator of the US voluntary standardization system.

**American Society for Nondestructive Testing (ASNT)**, [www.asnt.org](http://www.asnt.org). ASNT promotes nondestructive testing (NDT) as a profession and facilitates NDT research.

**American Society for Quality (ASQ)**, [www.asq.org](http://www.asq.org). The ASQ advances learning, quality improvement, and knowledge exchange to improve business results.

**American Society of Test Engineers (ASTE)**, [www.astetest.org](http://www.astetest.org). The ASTE, a nonprofit corporation, is dedicated to promoting test engineering as a profession.

**ASTM International**, [www.astm.org](http://www.astm.org). ASTM develops and distributes voluntary technical standards for materials, products, systems, and services.

**Audio Engineering Society (AES)**, [www.aes.org](http://www.aes.org). The AES is a professional society devoted exclusively to audio technology.

**Automated Imaging Association (AIA)**, [www.machinevisiononline.org](http://www.machinevisiononline.org). The AIA is a trade association for machine-vision imaging suppliers and users. AIA also maintains the Camera Link and GigE Vision standards.

**British Standards Institution (BSI)**, [www.bsi-global.com](http://www.bsi-global.com). BSI is the National Standards Body of the UK, responsible for publishing and marketing British Standards.

**Canadian Standards Association (CSA)**, [www.csa.ca](http://www.csa.ca). CSA works in Canada and around the world to develop standards that enhance public safety and facilitate trade.

**DSL Forum**, [www.dslforum.org](http://www.dslforum.org). DSL Forum is a consortium of telecom, equipment, networking, and service-provider companies that promotes the use of DSL technology.

**Electronic Industries Alliance (EIA)**, [www.eia.org](http://www.eia.org). EIA represents companies involved in the manufacture of electronic components, parts, systems, and equipment.

**ESD Association**, [www.esda.org](http://www.esda.org). The ESD Association is dedicated to advancing the theory and practice of electrostatic discharge avoidance.

**European Committee for Electrotechnical Standardization (CENELEC)**, [www.cenelec.org](http://www.cenelec.org). CENELEC creates electrotechnical standards, many of them following the mandates of the European Commission.

**European Committee for Standardization (CEN)**, [www.cen.eu](http://www.cen.eu). CEN works to implement voluntary technical harmonization in Europe.

**European Machine Vision Association (EMVA)**, [www.emva.org](http://www.emva.org). The EMVA works to strengthen the position of its members in worldwide markets, and it hosts the GenlCam standard group.

**European Telecommunications Standards Institute (ETSI)**, [www.etsi.org](http://www.etsi.org). ETSI's mission is to produce the telecom standards that will be used throughout Europe.

**Federal Communications Commission (FCC)**, [www.fcc.gov](http://www.fcc.gov). The FCC is charged with regulating interstate and international communications by radio, television, wire, satellite, and cable.

**Fibre Channel Industry Association (FCIA)**, [www.fibrechannel.org](http://www.fibrechannel.org). The FCIA aims to develop the market for fibre channel products.

**IEEE**, [www.ieee.org](http://www.ieee.org). The IEEE is a professional society that advances the theory and practice of electrical, electronics, computer engineering, and computer science.

**Institute of Environmental Sciences and Technology (IEST)**, [www.iest.org](http://www.iest.org). The IEST is concerned with the effects that natural, indoor, and extreme environments have on equipment and machinery.

**Institute for National Measurement Standards (INMS)**, [inms-ienm.nrc-cnrc.gc.ca](http://inms-ienm.nrc-cnrc.gc.ca). The INMS (Canada's national metrology institute) carries out a range of research and service activities.

**Institution of Engineering and Technology (IET)**, [www.theiet.org](http://www.theiet.org). The IET, a UK-based professional organization, aims to lead in the advancement of engineering and technology by facilitating the exchange of knowledge and ideas.

**International Committee for Information Technology Standards**, [www.incits.org](http://www.incits.org). The INCITS works to produce voluntary consensus standards for storage media, databases, programming languages, multimedia, and communication among computing devices and information systems.

**International Electrotechnical Commission (IEC)**, [www.iec.ch](http://www.iec.ch). The IEC creates international consensus standards and conformity assessment schemes in the fields of electricity, electronics, and associated technologies.

**International Microelectronics and Packaging Society (IMAPS)**, [www.imaps.org](http://www.imaps.org). IMAPS is a professional society dedicated to educating engineers in all phases of electronics packaging.

**International Organization for Standardization (ISO)**, [www.iso.org](http://www.iso.org). The ISO promotes the development of international standards.

**International Telecommunication Union (ITU)**, [www.itu.int](http://www.itu.int). Through the ITU, governments and industries establish and coordinate policies, standards, regulations, and treaties covering global telecommunication networks.

**IP/MPLS Forum (formerly MFA Forum)**, [www.ipmplsforum.org](http://www.ipmplsforum.org). The IP/MPLS Forum's mission is to drive the success of IP/MPLS-based technology, networks, and services while focusing on application and deployment solutions.

**IPC-Association Connecting Electronics Industries**, [www.ipc.org](http://www.ipc.org). IPC is a global trade association that represents all facets of the electronic interconnection industry, including design, printed wiring board manufacturing, and electronics assembly.

**ISA, The Instrumentation, Systems, and Automation Society**, [www.isa.org](http://www.isa.org). ISA is a society of professionals involved in instrumentation, measurement, and control.

**Japan Electric Measuring Instruments Manufacturer's Association (JEMIMA)**, [www.jemima.or.jp/english](http://www.jemima.or.jp/english). JEMIMA promotes research and standards to help develop Japan's electric measuring instrument industry.

**LXI Consortium**, [www.lxistandard.org](http://www.lxistandard.org). The LXI Consortium is working to develop the LAN eXtensions for Instrumentation (LXI) standard.

**Microelectronics Packaging and Test Engineering Council (MEPTEC)**, [www.meptec.org](http://www.meptec.org). MEPTEC is a trade association committed to enhancing the competitiveness of the back-end portion (assembly and testing) of the semiconductor business.

**National Cooperation for Laboratory Accreditation (NACLA)**, [www.nacla.net](http://www.nacla.net). NACLA's primary mission is to evaluate US laboratory accreditation bodies (ABs).

**National Institute of Standards and Technology (NIST)**, [www.nist.gov](http://www.nist.gov). NIST promotes US economic growth by working with industry to develop and apply technology, measurements, and standards.

**National Society of Professional Engineers (NSPE)**, [www.nspe.org](http://www.nspe.org). The NSPE is an interdisciplinary professional engineering society.

**National Voluntary Laboratory Accreditation Program (NVLAP)**, [www.nist.gov/nvlap](http://www.nist.gov/nvlap). Administered by NIST, NVLAP provides third-party laboratory accreditation services.

**NCSL International**, [www.ncsl.org](http://www.ncsl.org). The National Conference of Standards Laboratories, NCSL International, is an association of metrology organizations with a focus on education.

**Optical Society of America (OSA)**, [www.osa.org](http://www.osa.org). The OSA is a nonprofit professional society of engineers and scientists in the optics and photonics community.

**PC/104 Embedded Consortium**, [www.pc104.org](http://www.pc104.org). The PC/104 Embedded Consortium disseminates information about PC/104 and serves a liaison function between PC/104 and standards organizations.

**PCI Special Interest Group (PCI-SIG)**, [www.pcisig.com](http://www.pcisig.com). The PCI SIG is committed to the development and enhancement of the PCI standard.

**PCMCIA**, [www.pcmcia.org](http://www.pcmcia.org). PCMCIA is an international standards body and trade association that promotes the interoperability of PC Cards in a variety of products.

**PXI Systems Alliance**, [www.pxisa.org](http://www.pxisa.org). The PXI Systems Alliance maintains the PXI specification, promotes PXI technology, and ensures multivendor interoperability.

**SAE International**, [www.sae.org](http://www.sae.org). SAE International works to advance the engineering of mobility systems, whether for use on land or sea or in air or space.

**Semiconductor Equipment and Materials International (SEMI)**, [www.semi.org](http://www.semi.org). SEMI is an international trade association for equipment and materials suppliers to the semiconductor, MEMS, and flat-panel display industries.

**Semiconductor Industry Association (SIA)**, [www.sia-online.org](http://www.sia-online.org). The SIA is a trade organization that represents US-based semiconductor manufacturers.

**Semiconductor Test Consortium (STC)**, [www.semistest.org](http://www.semistest.org). The STC oversees the Openstar (Open Semiconductor Test Architecture) platform.

**Society for Information Display (SID)**, [www.sid.org](http://www.sid.org). The SID is devoted to the advancement of electronic display technology, manufacturing, and applications.

**Society of Flight Test Engineers (SfTE)**, [www.sfte.org](http://www.sfte.org). The SfTE is a fraternity of engineers whose principal professional interest is the flight testing of aircraft and missiles.

**SPIE (formerly International Society for Optical Engineering)**, [www.spie.org](http://www.spie.org). The SPIE is a technical society dedicated to advancing engineering and commercial applications of optical, photonic, imaging, electronic, and optoelectronic technologies.

**Standards Council of Canada**, [www.scc.ca](http://www.scc.ca). The Standards Council of Canada, charged with promoting efficient and effective standardization, oversees Canada's National Standards System.

**Surface Mount Technology Association (SMTA)**, [www.smta.org](http://www.smta.org). The SMTA seeks to advance the industry through education, training, and networking in regards to electronics assembly technologies and related business operations.

**Telecommunications Industry Association (TIA)**, [www.tiaonline.org](http://www.tiaonline.org). The TIA is a trade association serving the communications and information technology industries.

**Test and Diagnostics Consortium (TDC)**, [www.test-diagnostics.org](http://www.test-diagnostics.org). The TDC brings together users and suppliers from industries such as medical, automotive, satellite, railroad, trucking, and defense to optimize the test and diagnostic environment.

**Underwriters Laboratories (UL)**, [www.ul.com](http://www.ul.com). The UL is an independent, nonprofit certification organization that evaluates products in the interest of public safety.

**VMEbus International Trade Association (VITA)**, [www.vita.com](http://www.vita.com). VITA is a nonprofit trade association that promotes the use of open system architectures.

**VXibus Consortium**, [www.vxibus.org](http://www.vxibus.org). The VXibus Consortium develops and promotes the VXibus instrumentation standard.

**WiMAX Forum**, [www.wimaxforum.org](http://www.wimaxforum.org). The WiMAX Forum certifies and promotes the compatibility and interoperability of broadband wireless products based upon the harmonized IEEE 802.16/ETSI HiperMAN standard.

**ZigBee Alliance**, [www.zigbee.org](http://www.zigbee.org). The ZigBee Alliance works to enable low-power, wirelessly networked, monitoring and control products based on a global standard.

T&MW



# CATALOGS & PRODUCTS

The following write-ups were supplied by advertisers in this issue.

## RF test socket

The Multitest Econ is a new-generation plunge-to-board socket for RF and high-current applications for QFN, QFP, and SO packages with a lead pitch down to 0.3 mm. *Multitest Electronic Systems*, [www.multitest.com/sockets](http://www.multitest.com/sockets).

## JTAG products and support

Goepel electronics is a leading vendor of innovative JTAG and boundary-scan solutions, offering mature software tools in an integrated development environment, high-performance boundary-scan controllers and accessories, as well as comprehensive product support and value-added services. *Goepel electronics*, [www.goepelusa.com](http://www.goepelusa.com).

## 5-Mpixel cameras

The Basler pilot models are all equipped with highly sensitive Kodak and Sony CCD sensors from VGA to 5 Mpixels. With its extremely slim design and a footprint of 29x44 mm, the Basler pilot is the smallest camera in its class, according to the company. *Basler Vision Technologies*, [www.baslerweb.com](http://www.baslerweb.com).

## Firsthand technical knowledge



Rohde & Schwarz is now offering its own selection of books written by in-house experts who are able to bring you the latest in theory and practice. *Rohde & Schwarz*, [www.books.rohde-schwarz.com](http://www.books.rohde-schwarz.com).

## Ethernet analyzer

GL's T3/E3 T1/E1 Ethernet analyzer is a compact, portable, and powerful unit that complies with USB 2.0, provides recording and playback of entire T3/E3 streams, and performs protocol testing. It supports channelized (M13, E12, G.747) as well as unchannelized T3/E3 modes. *GL Communications*, [www.gl.com/laptop3e3.html](http://www.gl.com/laptop3e3.html).

## Pad and leaded contactors

Johnstech's ROL Technology contactors are now available for both Pad and Leaded packages. The ROL Technology provides excellent electrical and mechanical reliability on all types of RoHS-compliant devices. *Johnstech International*, [www.johnstech.com](http://www.johnstech.com).

## AC power sources

The Associated Power Technologies 5000 Series is an entry-level line of AC power sources that provide simple and cost-effective control of voltage and frequency. Models up to 4 kVA are available. *Associated Power Technologies*, [www.aspowertechnologies.com](http://www.aspowertechnologies.com).

## Extensive sensor selection

The 2008 T&M sensor catalog is now available from Honeywell. Accuracy, repeatability, and durability are built into all of the company's load cells, torque transducers, digital gages, accelerometers, pressure sensors, force sensors, and instrumentation. *Honeywell Sensing and Control*, [www.honeywell.com/sensing](http://www.honeywell.com/sensing).



## Free "virtual chapters"

Free access to "virtual chapters" from Keithley's popular line of six informative handbooks is available on the company's Website. To obtain a free copy of each handbook by mail, simply submit your request online. *Keithley Instruments*, [www.keithley.com/at/551](http://www.keithley.com/at/551).

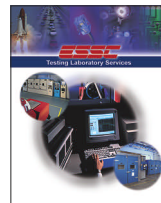
## Environmental products handbook

The 8th edition *Flow, Level and Environmental Handbook and Encyclopedia* contains 1400 pages of information on flow, level, and environmental products. This free handbook has a technical reference section, unit conversion tables, and a glossary. *Omega Engineering*, [www.omega.com](http://www.omega.com).

## ATE test tooling

Test Tooling Solutions Group specializes in providing integrated and turn-key solutions for burn-in boards and load boards. The company focuses on lowering the total cost of final test for customers. *Test Tooling Solutions Group*, [www.tts-grp.com](http://www.tts-grp.com).

## Test laboratory



ESSC Test Laboratories provides climatic testing services including temperature cycling, humidity, vibration, shock, thermal shock, altitude, salt spray, and cycling corrosion. Both laboratories in Ohio and Michigan are accredited by the A2LA. *ESSC Test Laboratories*, [www.esscinc.com](http://www.esscinc.com).

## Multifunction synchronous DAQ

Measurement Computing's USB-1600HS Series multifunction data-acquisition modules feature two, four, or eight simultaneous 16-bit analog inputs at rates to 2 Msamples/s, with 32 synchronous digital I/O lines, two 32-bit counters, and optional analog outputs. *Measurement Computing*, [www.mccdaq.com](http://www.mccdaq.com).

## LXI information

Pickering Interfaces has published the second edition of *LXImate*, a 130-page book that provides an overview of the LXI standard, discovering devices, and operation via a LAN/Web interface, as well as descriptions of LAN, IEEE 1588, and wired triggers. *Pickering Interfaces*, [www.pickeringtest.com](http://www.pickeringtest.com).

## Be precise

The Huber+Suhner Test & Measurement components catalog offers a comprehensive range of RF products meeting the specific requirements of special applications encountered in test and measurement laboratories. *Huber+Suhner*, [www.hubersuhner.com](http://www.hubersuhner.com).

## Data-acquisition catalog



IOtech's comprehensive *Data Acquisition & Instrumentation Catalog* offers solutions for vibration, temperature, strain, and more. The company's included Out-of-the-Box software

lets you acquire, save, analyze, and view data within minutes. *IOtech*, [www.iotech.com](http://www.iotech.com).

## Programmable power

The Programmable RKW Series of single-output DC power supplies is available in 300-, 600-, and 1500-W sizes. The instruments offer outputs of 0–3.3 to 0–48 VDC and operate from 85 to 265 VAC with active power factor correction (PFC). *Kepeco*, [www.kepecopower.com/rkwp.htm](http://www.kepecopower.com/rkwp.htm).

## 3.0-GHz spectrum analyzer

Instek's GSP-830 3.0-GHz spectrum analyzer offers autoset, a USB interface, and a brilliant TFT color display in one package at an affordable price. The battery-pack option and low noise floor make this unit ideal for the lab or the field. *Instek America*, [www.goodwill.com.tw](http://www.goodwill.com.tw).

## Express instruments

During the last 12 months, Strategic Test has released more than 80 new PCI Express instrument cards. These include digitizers/oscilloscopes, arbitrary waveform generators, high-speed digital I/O, and pattern generators. *Strategic Test*, [www.strategic-test.com](http://www.strategic-test.com).

## Complimentary white papers

TÜV SÜD America offers complimentary white papers written by industry professionals who are experts in their fields. The company's white papers offer clarification and insight on a variety of topics. *TÜV SÜD America*, [www.tuvamerica.com/tuvnews/whitepapers.cfm](http://www.tuvamerica.com/tuvnews/whitepapers.cfm).

# PRODUCT FOCUS

The following write-ups were supplied by advertisers in this issue.

## Benchmark for pick-and-place test

The MT2168 pick-and-place handler optimizes test cell efficiency. Its speed and high parallelism permit shorter



test times and multi-site testing. The MT2168 is scalable for different test

situations from engineering to high-volume production, it can be converted for various package styles, and it offers a flexible contact site, which is adaptable to all existing load boards.

*Multitest Electronic Systems*, [www.multitest.com/MT2168](http://www.multitest.com/MT2168).

## Vector-network analyzer

The Bode 100 combines a PC-controlled vector-network analyzer, a gain/phase meter, an impedance meter, and a sine-wave generator in a compact and lightweight



design. The wide frequency range of 10 Hz to 40 MHz is ideal for many RF and low-frequency applications, such as control circuit analysis.

*Omicron Lab*, [www.omicron-lab.com](http://www.omicron-lab.com).

## WiMAX tester simplifies setup

Rohde & Schwarz says that the measurement speed of its new R&S CMW270 WiMAX tester is up to 10 times higher than that of



other test options. This ensures maximum throughput in the production of WiMAX chipsets and mobile stations. In addition, the R&S CMW270 offers the capability to emulate a base station (signaling mode).

*Rohde & Schwarz*, [www.rohde-schwarz.com](http://www.rohde-schwarz.com).

## JTAG emulation tool

The VarioTAP tool from Goepel electronics is based on a flexibly configurable streaming technology of the TAP signals based on re-



spective microprocessor model libraries (VarioTAP Models). Thus, VarioTAP enables a complete fusion of JTAG emulation and boundary-scan test for real interlaced test operations and multivalent flash in-system programming.

*Goepel electronics*, [www.goepelusa.com](http://www.goepelusa.com).



## PRODUCT FOCUS

The following write-ups were supplied by advertisers in this issue.

### Mobile benches and carts

Anthro, a leader in lab furniture since 1984, provides mobile benches and equipment carts that can be con-



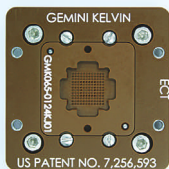
figured specifically for your application. Options include monitor arms, storage bins, additional shelves

(holding up to 500 lbs), and height-adjustable workstations so everyone can work in comfort. A lifetime warranty is included.

Anthro,  
[www.anthro.com/labs](http://www.anthro.com/labs).

### Kelvin probes for BGA

ECT has enhanced its popular Gemini Kelvin series to include contactors for BGA devices.



Entire arrays down to 0.65-mm pitch can now make

true Kelvin connections, as can partial arrays at 0.5 mm and 0.4 mm. All designs include a floating alignment plate for ideal alignment and probe protection.

Everett Charles Technologies, [www.ectinfo.com](http://www.ectinfo.com).

### Cameras offer 140-kHz line rates

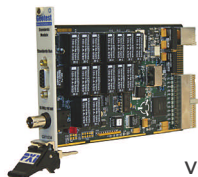
The sprint series cameras from Basler offer line rates up to 140 kHz at 2k or 4k resolution and 70 kHz at 8k resolution. With outstanding sensitivity and a high signal-to-noise ratio in low-light conditions, these cameras can increase the efficiency of imaging applications. All resolutions will be available in mono versions and in color versions that use a Bayer pattern concept.



Basler Vision Technologies,  
[www.baslerweb.com](http://www.baslerweb.com).

### Module simplifies maintenance

Featuring NIST-traceable voltage, frequency, and resistance standards, the GX1034 is a 3U, PXI module that can be incorporated



into a PXI system to support an in-system accuracy-verification

strategy for recertifying a system's source and measurement instrumentation. Such integration results in simplified support and maintenance logistics and improved system availability.

Geotest – Marvin Test Systems, [www.geotestinc.com](http://www.geotestinc.com).

### Antenna kits

A.H. Systems offers nine models of portable antenna kits from 2 GHz to 40 GHz. Each kit provides all the antennas, current probes, and accessories needed to satisfy a wide array of customer requirements. Additional pre-amplifiers and cables can be added. The company offers what you need for compliance testing with next-day delivery.



A.H. Systems,  
[www.ahsystems.com](http://www.ahsystems.com).

### SPDT terminated switch

Dow-Key has introduced a new line of SPDT terminated switches: the 521U series. The 521U series is a break-before-make SPDT switch noted for its 5-million actuation life cycle and for its various RF configuration options—an unterminated 2/3 (DP3T) switch, 2-W or 5-W internal terminations, and 2-W or 5-W external terminations.



Dow-Key Microwave,  
[www.dowkey.com](http://www.dowkey.com).

## Advanced AC power source

The Associated Power Technologies Model 6010 is a full-featured 1-kVA AC power source. The 6010 offers advanced features including a standard RS-232 interface with GPIB op-



tional. This programmable AC power source is well-suited for a variety of test and measurement, avionics, manufacturing, and military applications.

*Associated Power Technologies, [www.aspowertechnologies.com](http://www.aspowertechnologies.com).*

## Microwave spectrum analyzer

Featuring a frequency range of 9 kHz to 18 GHz, the R&S FSL18 can perform measurements on microwave systems, including



tests on radar and microwave link systems as well as production tests on microwave components such as mixers and amplifiers. The company says it is the only instrument in its class to support the WLAN, WiMAX, and WCDMA standards.

*Rohde & Schwarz, [www.rohde-schwarz.com](http://www.rohde-schwarz.com).*

## Sourcing and measurement resource guide

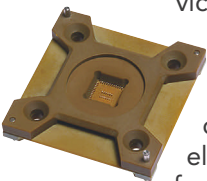
Keithley's newest CD guide contains more than a dozen application notes on topics such as measurements for BTI characterization, increasing production throughput of multipin devices, and making precision measurements. The CD also includes white papers on test-sequencing instruments and introducing pulsing into reliability tests for CMOS technologies.



*Keithley Instruments, [www.keithley.com/at/553](http://www.keithley.com/at/553).*

## Pad and leaded test contactors

Johnstech's patented ROL Technology is now available for both pad and leaded devices. ROL



Technology provides excellent electrical performance and

proven mechanical reliability on both matte-tin and nickel-palladium-gold devices. Two contact configurations, Eco-1 and Gold-Plated, allow for testing on a wide array of RoHS-compliant packages.

*Johnstech International, [www.johnstech.com](http://www.johnstech.com).*

## Surface probe calibrator

The CL1600 surface probe calibrator is designed to calibrate and verify surface probe readings from 25°C to 450°C (77°F to 842°F). This rugged, compact bench



device provides a large 120-mm (4.75-in.) diameter, high-grade aluminum surface. The calibrator is RoHS-compliant.

*Omega Engineering, [www.omega.com](http://www.omega.com).*

## Zoom lens

With a 4:1 zoom ratio, the VZM 100i maintains 1:1 maximum magnification at an extra long constant working distance of 175 mm. The



VZM 100i also has an adjustable locking iris to compensate for changing lighting conditions or to increase the depth of field during high-magnification inspection.

*Edmund Optics, [www.edmundoptics.com/US](http://www.edmundoptics.com/US).*



## PRODUCT FOCUS

The following write-ups were supplied by advertisers in this issue.

### Scalable, flexible data-acquisition

IOtech's DaqBook/2000 Series Ethernet-based, 16-bit, 200-kHz analog-to-digital data-acquisition systems



are supported by a variety of datalogging

and analysis software. More than 40 expansion options are available for customizing a system for a particular application. With the included Out-of-the-Box software, you can begin acquiring data within minutes.

IOtech,  
[www.iotech.com](http://www.iotech.com).

### Compact thermal-shock chamber

CSZ has introduced a new vertical thermal-shock chamber with a small footprint. The chamber offers 1 ft<sup>3</sup> of interior workspace volume and



incorporates many standard features, including CSZ's EZT-560i touch-screen controller. The product-transfer mechanism

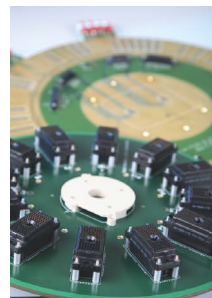
provides smooth transfer and requires only 208-V power to operate, so no special utilities such as air are required.

Cincinnati Sub-Zero,  
[www.cszindustrial.com](http://www.cszindustrial.com).

### ATE test and tooling

Test Tooling Solutions Group specializes in providing integrated and turnkey solution for burn-in

boards and load boards. The company focuses on improving yield and lowering the total



cost of final test through innovation, quality, reliability, and on-time delivery.

Test Tooling Solutions  
Group, [www.tts-grp.com](http://www.tts-grp.com).

### Test cables provide outdoor precision

The SucoTest 18 ruggedized, 18-GHz test cables can withstand bending and torsion while providing excellent



durability and stability.

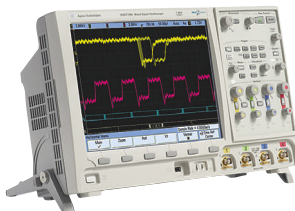
The cables

are ideal for outdoor tests of wireless communication systems, for locating and identifying cable and antenna system faults, for measuring isolation and gain, and for the design, deployment, and optimization of wireless devices and networks.

Huber+Suhner,  
[www.hubersuhner.com](http://www.hubersuhner.com).

### InfiniiVision 7000 now available

MetricTest has introduced the Agilent InfiniiVision 7000 series oscilloscopes to its



product offerings. The company says the InfiniiVision 7000 includes advanced technology that will allow you to see more subtle signal detail and more infrequent events than any other scope.

MetricTest,  
[www.metrictest.com](http://www.metrictest.com).

# Say What?

Read what our editors have to say about test and measurement, economics, globalization, the general engineering profession, and much more.

And then have YOUR say.

Go to  
**TMWorld.com**  
/blogs

### 3.0-GHz spectrum analyzer

Instek's new GSP-830 3.0-GHz spectrum analyzer offers many features such as autoset, a USB interface, and a brilliant TFT color display in one package at an affordable price. The battery-pack option and low noise floor make this unit ideal for the lab or the field.



play in one package at an affordable price. The battery-pack option and low noise floor make this unit ideal for the lab or the field.

*Instek America,  
www.goodwill.com.tw.*

### USB DAQ with instrument-class accuracy

The USB-2416 and the USB-2416-4AO synchronous, multifunction, measurement and control modules feature 32 single-ended and 16 differential analog inputs with



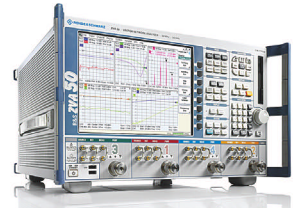
full 24-bit resolution, configurable for

either voltage or thermocouples. They also offer eight high-speed digital I/O lines, two 32-bit counters, and a 200-samples/s aggregate throughput.

*Measurement Computing,  
www.mccdaq.com.*

### Four-port network analyzer

Rohde & Schwarz is expanding its network-analyzer portfolio to higher frequencies. With two integrated



sources, the new R&S ZVA50 makes it possible to perform measurements on multiport and balanced components in the 50-GHz frequency range using a single instrument.

*Rohde & Schwarz,  
www.rohde-schwarz.com.*

### High-density LXI switching

Pickering Interfaces has announced two additions to its growing family of 1U LXI switching systems: The 60-

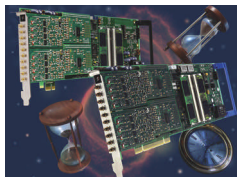


550/552 electromagnetic relay matrices feature 2-A switching and up to 4096 cross points. The 60-600 high-current matrix features 10-A switching and up to 256 cross points in the same 1U rack space.

*Pickering Interfaces,  
www.pickeringtest.com.*

### PCI digitizers get bigger memory

Strategic Test now equips all of its digitizer, arbitrary waveform generator, and high-speed digital I/O PCI and PCI Express cards with 256 Mbytes of onboard memory. This allows longer



recording and generation times and delivers

greater value for the money. Data sheets and prices are available on the company's Website.

*Strategic Test,  
www.strategic-test.com.*

### NRTL resource

The blue NRTL Mark from TÜV SÜD America, a Nationally Recognized Testing Laboratory, proves that a product meets US workplace requirements.

The company's NRTL information bank—NRTL Spotlight—provides information on OSHA, NRTLs, and standards. NRTL Spotlight also includes FAQs and lets you pose questions to experts, download white papers, and play trivia games.

*TÜV SÜD America,  
www.tuvamerica.com/nrtl.*





## TestLit Review®

### FREE IV/C-V LIBRARY CD FROM KEITHLEY

Keithley Instruments' new I-V and C-V Measurements Applications Library lets you discover how the Model 4200-SCS and the new 4200-CVU Integrated C-V Option can help you reduce your cost of test while simplifying the most challenging DC I-V, pulse, and C-V measurement applications. The CD includes a variety of invaluable tools for those responsible for configuring and using semiconductor parametric analyzers: Request a free copy of this CD by contacting Keithley. 800-588-9238

<http://www.keithley.com/at/522>

**Keithley Instruments, Inc.**

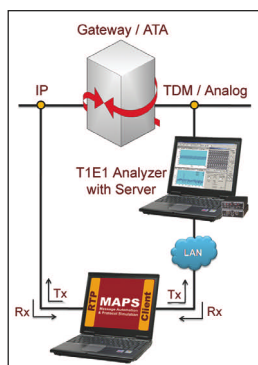


### GATEWAY TESTER – “MAPS SIP – MEGACO” CONFORMANCE TEST TOOL

MAPS-SIP MAPS-SIP and MEGACO Conformance test tool is an ideal tool to evaluate Gateway / ATA product features such as call connectivity, call signaling, traffic generation, voice quality testing, codec, and hundreds of other features. Other notable features include – Interfaces to T1E1, and VoIP; SIP and Megaco protocol conformance testing; Test echo canceller performance & compliance; and Multi-protocol call trace for TDM / VoIP

[www.gl.com/maps.html](http://www.gl.com/maps.html)

**GL Communications Inc.**



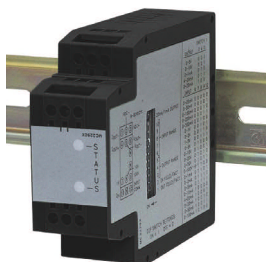
### UNIVERSAL SIGNAL CONDITIONING MODULE

The DR900 is a customizable universal signal conditioning module that has over 100 input and output analog conversion combinations and features 3-way signal isolation. Available as a linear or square root extraction model. Both models come factory precalibrated for all input and output ranges and factory or custom field scaling is available by an easy mode switch change. DIN rail mounting saves time and space.

This product is CE compliant. Price starts at \$189

**Omega Engineering, Inc.**

203-359-1660, <http://www.omega.com/pptst/DR900.html>



## ADVERTISER INDEX

ADVERTISER	PAGE
Advanced Test Equipment Rentals	54
Aerotech	65
Agilent Technologies	2, 22, 39, 49, 53
AH Systems	102
Anthro	51
Aries Electronics	62
AR Worldwide	9
Associated Power Technologies	38
Autotestcon	57
Avtech Electrosystems	50
BuyerZone	72
B&K Precision	42
Basler AG	73
BPM Microsystems	63
Checksum	20
Cincinnati Sub Zero Products	105
Circuit Specialists	121
Crystal Instruments	121
Cytec	12
Digi-Key	5, 69
DIT-MCO International	60
Dow-Key Microwave	18
EADS North America Defense	71
Edmund Industrial Optics	30
Emulation Technology	101
EPIX	74
Everett Charles Technologies	58
GaGe	48
Geotest	C-2
GL Communications	120, 121
Goepel Electronic	65
Hioki USA	41
Honeywell	4
Huber+Suhner	99
Instek America	32
Interconnect Devices	17
IOtech	33, 34
Johnstech International	67
Keithley Instruments	6, 120
Kepco	36
Kikusui America	43, 45, 47
KineticSystems	48
LeCroy	14
Matrox Electronic Systems	24, 75
MetricTest	52
MRV Communications	C-3
Multitest Elektronische	68
National Instruments	16, C-4
Navatek Engineering	59
Noise-Com	21
Omega Engineering	1, 120
OMICRON	79
Pearson Electronics	36
Pendulum Instruments	78
Pickering Interfaces	44
Pico Technology	29, 46
Rohde & Schwarz	10, 11, 83-98
Saelig	55
Scientific Test	62
Signametrics	56
Strategic Test	31
Tegam	82
Teledyne Relays	81
Teseq	105
Test Coach	101
Test Tooling Solutions Group	66
TUV America	26
Universal Switching	8
Verigy US	61
Virginia Panel	64
Vision Research	76
W.L. Gore & Associates	80
Xantrex	37
ZTEC Instruments	50

# Test & MEASUREMENT WORLD

225 Wyman St., Waltham, MA 02451  
781-734-8423 Fax: 781-734-8070

Sales e-mail: [trmwsales@reedbusiness.com](mailto:trmwsales@reedbusiness.com)

Editorial e-mail: [trmw@reedbusiness.com](mailto:trmw@reedbusiness.com)

Web: [www.trmworld.com](http://www.trmworld.com)

## BUSINESS STAFF

**Publisher:** Russell E. Pratt  
[rpratt@reedbusiness.com](mailto:rpratt@reedbusiness.com)

**Assistant to the Publisher:** Darlene Fisher

**Online Client Services Manager:** Lyndsay A. Richmond

**Market Research Director:** Rhonda McGee

**Group Production Director:** Dorothy Buchholz

**Production Manager:** Joshua Levin-Epstein

**Customer Contracts Coordinator:** Maureen Lesko

## ADVERTISING SALES

**CT, NJ, New York City, Long Island:**

Mike Moore, Chatham, NJ. 973-701-9340  
[1.mikemoore@gmail.com](mailto:1.mikemoore@gmail.com)

**Midwest, Southeast, NY (except NYC & LI), PA, MD, DE, and Canada:**

James Leahey, Kenosha, WI. 262-656-1064  
[james.leahey@reedbusiness.com](mailto:james.leahey@reedbusiness.com)

**CA, CO, TX, and Northwest:**

Mary Lu Buse, Calabasas, CA. 818-880-4024  
[marylu.buse@reedbusiness.com](mailto:marylu.buse@reedbusiness.com)

**New England, South Central, Classified, Test Marts, TestLits, and Account Development Nationwide:**

Kathy McNamara, Waltham, MA. 781-734-8421  
[kathy.mcnamara@reedbusiness.com](mailto:kathy.mcnamara@reedbusiness.com)

**France, Spain, United Kingdom, Ireland, Benelux, Scandinavia:** John Waddell, London, England.  
44-20-8312-4696

**Germany, Austria, Switzerland:** Adela Ploner, Dachau, Germany. 49-8131-366992-0

**Italy:** Roberto Laureri, Milan, Italy. 39-02-236-2500

**Israel:** Asa Talbar, Tel Aviv, Israel. Fax: 972-3-562-9565

**Asia:**

**Japan:** Shintaro Koyama, Tokyo, Japan.  
81-3-3402-0028

**Korea:** Belle Jung, Seoul, Korea. 822-511-0660

**Taiwan:** Laura Chen, Taiwan, ROC. 886-2-2314-7206

**Singapore, Malaysia, Hong Kong:** Wai Chun Chen, Singapore. 65-6544-1151

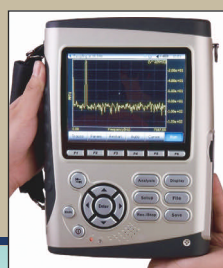
VOL. 28, NO. 6

## Subscription Policy

*Test & Measurement World*® (ISSN 0744-1657) (GST Reg.# 123397457) is published monthly except January by Reed Business Information, 8878 S. Barrons Blvd., Highlands Ranch, CO 80129-2345. Reed Business Information, a division of Reed Elsevier, is located at 360 Park Avenue, New York, NY 10010. Tad Smith, CEO. Periodicals postage paid at Littleton, CO 80126, and additional mailing offices. Circulation records are maintained at Reed Business Information, 8878 S. Barrons Blvd., Highlands Ranch, CO 80129-2345. Telephone: 800-446-6551. **POSTMASTER:** Send address changes to *Test & Measurement World*®, P.O. Box 7500, Highlands Ranch, CO 80163-7500. **For Canada:** Publications Mail Agreement No. 40685520. Return undeliverable Canadian addresses to: RCS International, Box 697 STN A, Windsor Ontario N9A 6N4. Email: [Subsmail@ReedBusiness.com](mailto:Subsmail@ReedBusiness.com). *Test & Measurement World*® copyright 2008 by Reed Elsevier Inc. Rates for non-qualified one-year subscriptions, including all issues: US, \$103; Canada, \$152 (includes 7% GST, GST# 123397457); Mexico, \$150; International (Priority), \$215. Except for special issues where price changes are indicated, single copies are available for \$10 (US orders) and \$15 (foreign orders). Buyer's Guide Issue (July) is available for \$35 (US orders) and \$40 (foreign orders). **Please address all subscription mail to *Test & Measurement World*®, 8878 S. Barrons Blvd., Highlands Ranch, CO 80129-2345. *Test & Measurement World*® is a registered trademark of Reed Properties Inc., used under license. (Printed in U.S.A.)**



Reed Business Information.



## Dynamic Signal Analyzer

- 2/4/8/16 inputs and one signal source
- Sample all input simultaneously up to 102.4 kHz
- 130 dB dynamic range
- Continuous recording at full speed for 8chs
- FFT sizes up to 64K
- FRF, Tri-Spectra, Octave, Order Tracking
- 1.7 kg. Battery life: >6 hours
- 5.7" color LCD. Ethernet, USB, SD card and wireless



**CRYSTAL instruments**

Santa Clara • 408-986-8880  
[www.go-ci.com](http://www.go-ci.com)



## Portable USB T1 E1 Analyzer

- ✓ T1/E1 - Voice, Digits, Tones, Fax, Modem,...
- ✓ Protocol Analysis & Simulation
- ✓ Voice Quality Testing
- ✓ Visual Analysis, Real-time Listening & Recording



**GL Communications Inc.**

Comprehensive Telecom Test Solutions

301-670-4784 \* [info@gl.com](mailto:info@gl.com) \* [www.gl.com](http://www.gl.com)

## TO ADVERTISE

# Test & MEASUREMENT WORLD

For more information about advertising in the *Test & Measurement World's* Classified or TestMart section, please contact:



**Kathy McNamara**

Phone: (800) 438-6597

E-mail: [kathy.mcnamara@reedbusiness.com](mailto:kathy.mcnamara@reedbusiness.com)

# TestMART

## Great Deals @ CircuitSpecialists.com

### Fluke TRMS Electronic Logging DMM w/TrendCapture

True-rms Electronics Logging Multimeter with TrendCapture quickly documents design performance and graphically displays what happened. Its' unique logging and graphing capabilities mean you no longer need to download logged readings to a PC.



Limited Offer!

**SAVE \$140.95 SPECIAL PURCHASE**

**Item # FLUKE 287: \$369.00**

### Programmable DC Loads

The 3710A is a programmable electronic DC load, capable of supporting up to 150W of power & the Model 3711A, 300W of power. These devices can be used with supplies up to 360VDC and 30A. They feature a rotary selection switch and a numeric keypad used to input the maximum voltage, current and power settings. Optional RS-232, USB & RS-485 adaptors are available.



**Item # CSI3710A: \$349.00**  
**Item # CSI3711A: \$499.00**

### Programmable DC Power Supplies

- Up to 10 settings stored in memory
- Optional RS-232, USB, RS-485 adaptors
- May be used in series or parallel modes with additional supplies.
- Low output ripple & noise
- LCD display with backlight
- High resolution at 1mV



Model	CSI3644A	CSI3645A	CSI3646A
DC Voltage	0-18V	0-36V	0-72V
DC Current	5A	3A	1.5A
Power (max)	90W	108W	108W
Price	<b>\$199.00</b>	<b>\$199.00</b>	<b>\$199.00</b>

**[www.CircuitSpecialists.com](http://www.CircuitSpecialists.com)**

### PROTEK PC Based 40/60/100MHz DSO's

- Bandwidth: 40, 60 or 100MHz
- Real Time
- Sampling Rate: 100MS/s
- Measurements via USB interface
- Includes Windows XP & Vista compatible software, Oscilloscope Probe Kit, USB cable and User Manual



Item #:	Freq.	Price
<b>PROTEK DSO-2090</b>	<b>40MHz</b>	<b>\$279.00</b>
<b>PROTEK DSO-2150</b>	<b>60MHz</b>	<b>\$359.00</b>
<b>PROTEK DSO-2250</b>	<b>100MHz</b>	<b>\$549.00</b>

**Circuit Specialists, Inc.**  
**[www.CircuitSpecialists.com](http://www.CircuitSpecialists.com)**  
800-528-1417 / Fax: 480-464-5824



[An exclusive interview with a technical leader]



**DR. JAMES TRUCHARD**

President and CEO  
National Instruments  
Austin, TX

Dr. James Truchard co-founded National Instruments in 1976 while working for the Applied Research Laboratories at the University of Texas. In 1986, together with Jeff Kodosky, he invented LabView, the graphical development software that is the cornerstone of the company's virtual instrumentation technology. NI has since grown into a global organization with more than 4000 employees. Among his extensive career honors, Truchard was elected to membership in the National Academy of Engineering in 2007. He holds a doctorate in electrical engineering, as well as an MS and a BS in physics, all from The University of Texas at Austin.

Contributing editor Larry Maloney conducted an e-mail interview with Dr. Truchard on important trends in the test field.

## Harnessing the power of multicore

**Q: NI has been focusing increasingly on multicore technology. What are the potential productivity gains from multicore in test?**

**A:** Multicore chips hold great promise for test because they can handle the concurrency requirements of most I/O-based systems. The real challenge is software. Up until now, traditional programming languages have provided performance increases with each new processor generation. With multicore architectures, however, traditional programming languages won't continue to provide automatic performance benefits. As Herb Sutter of Microsoft has said, "The free lunch is over."

Graphical languages, such as NI LabView, can represent the concurrency of a multicore system naturally. Two parallel loops can literally be drawn in parallel and will execute on separate cores. LabView automatically executes the program on the cores available to it and scales to execute on as many cores as are present in the system.

**Q: Do you see continued interest in PXI-based testing?**

**A:** PXI is growing rapidly and expanding into new applications. In 2007, PXI vendors shipped over 15,000 systems, and the market overall is growing at over 25% annually. With continued miniaturization of semiconductor technology, vendors can fit more and more performance into PXI modules. Modules are available for high-performance RF, optical measurement, high-speed digitizers, precision digital multimeters (DMMs), and many other instruments. With the introduction of PXI Express products, which increases the backplane performance by 45X, we see growth of PXI in new applications that can benefit from very high data throughput.

**Q: What is driving the growing popularity of field-programmable-gate-array-enabled instruments?**

**A:** FPGAs are powerful because they are inherently parallel, deterministic, and reliable. They also can be defined in software.

With software-reconfigurable FPGAs on modular instruments, test engineers can embed a custom algorithm into the device to perform in-line processing or emulate part of the system that requires real-time response.

Most test engineers lack the expertise to program FPGAs with traditional hardware description languages like Verilog or VHDL. LabView can target onboard FPGAs and synthesize the necessary hardware directly from a LabView program. This dramatically reduces the complexity of code development.

**Q: What new automated test equipment (ATE) approaches are needed for complex semiconductors?**

**A:** As semiconductors get more complex, testing each part completely with a traditional vector-based test methodology is increasingly difficult and expensive. Complex systems-on-a-chip (SOCs) and systems-in-a-package (SIPs) require testing at the functional level. A higher-level test methodology is called for to both reduce tester complexity and provide a tighter link back to system-level design tools.

The idea is to create a test system that can perform functional testing of a device by emulating the device in its intended surroundings. This requires the capability to model other components of the system and to interact with the device in real time.

This emulation-based ATE, also termed "Protocol-Aware ATE" during last year's International Test Conference, combines FPGA-based hardware to emulate the rest of the system in real time with the pin electronics found in traditional ATE. This both lowers the total cost of test and improves the user's ability to debug failures. **T&MW**



Dr. Truchard gives more insights on changing needs in the test field and the role of virtual instruments in the online version of this interview: [www.tmworld.com/2008\\_07](http://www.tmworld.com/2008_07).

# You can either Re-Wire or **Wire-Once** Your Choice



Lab **before** the MRV Media Cross-Connect



Lab **after** the MRV Media Cross-Connect



288 port Media Cross-Connect

## **Are you buried under the inefficiencies of your current cable management system?**

This manual method not only increases meantime between tests, it also increases the chances of configuration errors and inaccurate test results.

MRV's Media Cross Connect system takes the manual configuration process and turns it into simple software commands that can be stored and recalled at the click of a mouse. Scripting these commands can increase test velocity even more! Contact MRV Sales today to arrange a demonstration of MRV's lab solutions.

Find out why network equipment manufacturers around the world have chosen MRV's Test Automation Solutions.



Connectivity Unlimited™

Learn more about our **test automation products** at [mrv.com/tap](http://mrv.com/tap)



# Green Engineering

## Powered by National Instruments

### MEASURE IT



**Acquire** environmental data from thousands of sensors



**Analyze** power quality and consumption



**Present** measured data to adhere to regulations

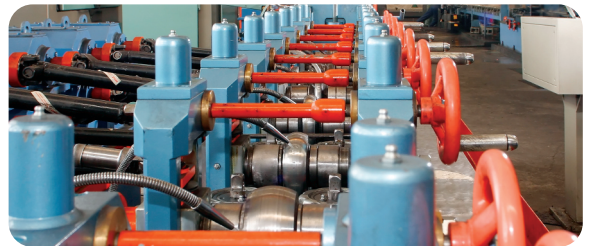
### FIX IT



**Design** and model more energy efficient machines



**Prototype** next-generation energy technologies



**Deploy** advanced controllers to optimize existing equipment

For more than 30 years, National Instruments has empowered engineers and scientists to measure, diagnose, and solve some of the world's most complex challenges. Now, through the NI graphical system design platform, engineers and scientists are using modular hardware and flexible software to not only test and measure but also fix inefficient products and processes by rapidly designing, prototyping, and deploying new machines, technologies, and methods. Today, a number of the world's most pressing issues are being addressed through green engineering applications powered by NI products.

>> Download green engineering resources at [ni.com/greenengineering](http://ni.com/greenengineering)

800 890 1345

