

Interfaces

From the Editor's Bench

Shlomo Engelberg

A Thing of Beauty Is a Joy Forever

I am writing this in mid-August during my annual summer visit to my parents in New York. In an attempt to absorb some culture and to expose my children to some culture, my family and I have been visiting some of the museums on the eastern seaboard. Yesterday, we went to the Metropolitan Museum of Art in Manhattan. It was the first time my daughters, ages six and ten, had been there. They got a real kick out of some of the exhibits (though they wanted to go home long before their mom did).

While looking at the exhibits, and in particular the four thousand year old exhibits from ancient Egypt, I started thinking about the work that we do as engineers and educators. What of all that we do will still be standing in several thousand year's time?

This column's title is the opening line of the well known poem by Keats, and the line came forcibly to mind when I saw the beautiful ancient artifacts. They seemed to be the best example of beautiful artifacts that have existed "forever". Nowadays, when we build something we work under many constraints—and one of those constraints is almost always cost. In order to cut costs, we use the least expensive materials that are consistent with meeting the rest of the constraints. This leads to the development of products that are very, very unlikely to survive into the next millennium.

How can we do work that will be a joy forever? As engineers, we can do work that is fundamentally interesting, and we can write up the work in a way that is accessible to our fellow engineers and the world at large. I do not know where Archimedes' bathtub is, but the explanation of Archimedes' principle remains, in my mind, a thing of beauty that has been bringing joy to the world for many years and that has been bringing me joy for twenty five years. If you do something interesting, even if the physical end-product will not last a thousand years, the ideas that made the product interesting can last.

As teachers, we present material that we can find "a thing of beauty". We can produce something that will last forever by organizing the material in an interesting way. Others can then appreciate it as a thing of beauty. Euclid organized much of the mathematics that was known in his time. The *Elements* has already weathered a couple of millennia. Everyone has a favorite textbook; some of them may be sufficiently beautiful to bring joy to students for thousands of years.

In this month's issue, we have a nice set of interesting articles. This issue contains articles about communication protocols, cellular modems and the first part of a flow-sensor tutorial. In addition to our regular columns, we have the first of two columns that present the results of a sensor survey that was carried out during the summer of 2008. We try to see to it that each of our columns, articles, and tutorials is a thing of beauty to be enjoyed by you, our readers. Enjoy!

Shlomo

President's Perspectives

Alessandro Ferrero

Πάντα ρεῖ

“Everything is in a State of Flux” – Heraclitus, ~500 BC

A New Year has started and with it we have another opportunity to look at it with the eager hope that it will bring us good news. It may also reveal the secret fear that it won't, or we won't be smart and quick enough to grab the opportunities it will offer us. For sure, it will bring changes. Let's consider our Society, starting with our Magazine.

With this issue, *The IEEE Instrumentation and Measurement Magazine* is entering its twelfth year. The first issue was published in March 1998. We have offered our members interesting survey papers on current topics in the I&M community, tutorials on instrumentation and measurement, and many columns on special interests. This New Year is also seeing a change: after 10 years of excellent service as Editor-in-Chief of this Magazine, Kim Fowler has left the staff-of-command to Shlomo Engelberg. Shlomo has been the Associate Editor-in-Chief for the last year. On behalf of the I&M Society and all our readers, I wish to warmly thank Kim for the great work he did and his invaluable dedication to this journal, and I wish Shlomo a warm welcome to his new position.

Our publications are of utmost importance to our Society. Our primary product is knowledge through the dissemination of new ideas and results to all of our members and those in the global I&M community through the major libraries. I opened this column talking about hopes and fears, and I feel both of them when I think of our publications. I hope that our two publications, this Magazine and the TRANSACTIONS ON INSTRUMENTATION AND MEASUREMENT, will always increase in the quality of the published articles. On the other hand I fear that, despite our best efforts, we might not meet the expectations of our Members and readers and miss our primary goal of advancing knowledge in the I&M field.

This year I feel rather optimistic, because several data – mainly the impact factor and the immediacy index – show that we are on the right path. Let me say that I do not belong to those who firmly believe that a paper is *ipso facto* a good paper because it has been published in a journal with a high impact factor. The indices are not necessarily a direct and reliable measure of the quality of a scientific journal. This is a clear example of the damage that the wrong use of a misleading measurement result can produce. On the other hand, these indices can be related to the degree of appreciation that a journal receives from a scientific community. Let's consider the impact factor. It is defined as the ratio between the number of cites in the current year of articles published in the previous two years, and the number of articles published in the current year. It is clear that a low impact factor means that few authors find the published articles interesting enough to be cited. But a low impact factor can be also related to a long publication process: if

an article is published more than one year after it has been submitted, it will barely cite recent articles. In both cases, the impact factor reflects low quality.

Let's now consider the immediacy index. It is the ratio between the cites in the current year, of articles published in the current year and the total number of articles published in the current year. It is once again clear that this index can be high only if the publication process is very timely, and the published articles are interesting enough to be cited. Therefore a high immediacy index is related to the overall journal quality, and not only to the timeliness of the publication process. Actually, only good papers are supposed to pass the review process quickly, and, after being published, will be cited by other good papers.

Well, I'm really pleased to say that the impact factor of our TRANSACTIONS on INSTRUMENTATION AND MEASUREMENT climbed from 0.572 in 2006 to 0.832 in 2007, an increase of 45.5%, and the immediacy index climbed from 0.074 in 2006 to 0.131 in 2007, an increase of 77% in a single year!

The data of 2008 are not yet available while I am writing this column, but I am confident that the indices will continue to recognize the high quality of TRANSACTIONS. This achievement is the result of the hard work that Reza Zoughi, the Editor-in-Chief, and his team of Associate Editors have done and gives a further proof that to achieve good results, good teams and good leaders are required.

I'm working with a terrific team! Thank you all for these excellent achievements. This New Year has gotten off to a very good start!

Alessandro

Article Summaries

An Introduction to I²C and SPI Protocols

(Summary)

Frederic Leens

The market for low-end communication protocols has two popular contenders – the I²C by Phillips and the SPI by Motorola. Both are inexpensive and relatively straightforward among other similarities, but have different qualifications depending on the task at hand. In this article, the origins and purposes of both products are discussed as well as specification qualities including topology, speed and of course, elegance. Their specs are analyzed and concluded by the author to be either helpful or harmful to suggested situations, providing a prospective user with insight as to which protocol would be best for their system.

This summary was written by Caitlin Woody

The Cellular Modem: More than Getting Rid of All the Cables

(Summary)

Shimon Mizrahi

“Most of us would like to get rid of as many cords and cables as possible. Some have said that a goal for this decade is to replace them with wireless connections. We normally distinguish between three types of cords: power cords, cords that connect our equipment to sensors, and cables used to connect us to communication networks.

These cords can be replaced by a near infinite number of protocols and methods for wireless systems that allow us to make our measurements from a distance and then send the data to a collector or host. Many companies manufacture chips and chipsets that simplify the process of developing systems that use wireless techniques. In this article, I discuss one of the ways of making a wireless communication link—the cellular modem. In what follows, I give an overview of some ways and means of performing measurements with cellular-modem enabled measurement systems and I describe an off-the-shelf solution to connectivity over the cellular network: the cellular engine terminal.”

This summary is the first two paragraphs of the article.

Tutorial 18: Flow Meters: Part 1

(Summary)

Miguel Pereira

This is Part 1 of a two-part tutorial on flow meters that explains working principles of volumetric and mass flow meters and provides a mathematical background to understand many current and legacy instrumentation systems currently used in industrial processes. Engineers are given information to help them decide what flow meter to use in applications. Drawings and diagrams illustrate the concepts and there is a full page of a detailed table of flow meter information that is presented and you will want to bookmark this tutorial for easy reference.

Summary written by June Sudduth

Columns

By the Numbers

(Summary)

Justin S. Dyer and Stephen A. Dyer

Generating Gaussian Random Variates

Often in science and engineering applications there is a need to generate Gaussian random variates. This is needed particularly in the analysis of various systems via Monte Carlo simulation. This column presents several ways to generate pseudorandom variates that follow the

Gaussian distribution. Find out about the variates that are generated using the inverse-transform method, the Box-Muller Transform, and the closure property of the Gaussian distribution. Six algorithms are noted in the text for easy reference.

Summary written by June Sudduth

Tried and True

(Summary)

Kim Fowler

The Reality: Academic Research to Commercial Product, Part 1

Contrary to popular belief, commercializing products requires more than just effort and a great product – it takes exactly the right funding, personnel, equipment, timing, support, resources, and manufacturing to name a few. As Kim Fowler explains, unexpected bumps such as proper certifications before moving on to the next stage of commercializing can, and mostly likely will, make for a product's downfall. In this column, Fowler provides an overview of what typically goes wrong when trying to put a product on the market. It is the first column on the topic, the second of which will focus on two case studies that exemplify product commercialization.

This summary was written by Caitlin Woody

Instrumentation Notes

(Summary)

Shlomo Engelberg, Haim Yossef Frenkel, and Avraham Haimov

Using Noise to Make Measurements and to Encrypt Data

In this column, we describe what may be the ultimate in do-it-yourself noise measurement tools. In principle, we show how you can use noise to make detailed measurements of the properties of a passive filter and how noise can be used to provide perfect encryption. We demonstrate how to inexpensively build a noise measurement system that works at the μV level by acting as an output characteristic of its filter, and how it can then be used to securely encrypt data. Source, encryption, and storage are analyzed in this article.

This summary was written by Caitlin Woody

A Look Back and Now

(Summary)

Bernie Gollomp

Remember the Basics of Non-Harmonic Disorder

During the engineering of a product, most specifications are highly scrutinized before the product is moved from the testing room to the market. Unfortunately, the pressure to provide a finished product forces some engineers to overlook a few mistakes or glitches that will show themselves later by reducing the product's lifetime. In this article, Bernie Gollomp reiterates the importance of the laws of thermodynamics and how disregarding them can lead to this outcome despite how well the product may seem to function. This column also provides an overview of non-harmonic disorder and is the introduction to Bernie's second column on insidious, slowly increasing non-harmonic disorder.

This summary was written by Caitlin Woody

Sensor Survey Results: Part 1

(Summary)
Kim Fowler

This column presents the first part of the results of a survey. These results help to better understand how sensors are used by a broad number of respondents from many backgrounds and fields. Characteristics of the most commonly used sensors are organized in graphs and charts and each question's results are discussed. The column describes the current state of sensors and sensor networks from responses that were sent in the late summer of 2008.

Summary written by June Sudduth

Membership Notes

Jorge Fernández Daher

In this issue we are going to comment on our Student Ambassadors and how our Society was promoted in Serbia.

Student Ambassadors

In our main sponsored conferences (I2MTC, SAS and AUTOTESTCON) we organize a student paper contest. From all student papers presented in such conferences, a technical committee selects the best ones and two different types of award are given to the winners, the Best Paper Award and the Travel Award. In this way we want to thank our students for their participation and contributions to the program of the conferences. Instrumentation & Measurement Society conferences are a good opportunity to learn about the work of other presenters, become acquainted with other professionals in our discipline and why not, also having fun and enjoying the conference.

As a result of the selection the Society is conveying on these students the title of Instrumentation and Measurement Society Student Ambassador. They help us provide an increased exposure to the Society by participating in at least two of the following activities during the months following the conference:

1. Give their paper at a local IEEE student branch meeting.
2. Give their paper at a local IEEE professional chapter meeting.

3. Give a talk about engineering at a local elementary, middle school or high school.
4. Share information about the Instrumentation and Measurement Society with their IEEE student branch by distributing copies of the Instrumentation & Measurement Magazine, flyers, or other literature about the Society.
5. Organize a trip for students to go to a local IEEE section meeting.

We also ask them to provide a brief report on the activities selected which will help us learn how we can continue to enhance their involvement with IMS.

I am attaching a list of the quantity of all student awards during the last years.

Conference	Best Paper Award	Travel Award
AUTOTESTCON 2005	4	8
AUTOTESTCON 2006	2	4
SAS 2006	1	2
IMTC 2006	5	6
AUTOTESTCON 2007	2	1
SAS 2007	4	0
SAS 2008	3	5
I2MTC 2008	4	15

Promoting I&M Society in Serbia

From June 2nd to June 5th, 2008, the Association for computing, informatics, telecommunications, automation and management of Serbia, together with the Ministry of Science of the Republic of Serbia, National Bank of Serbia, Serbian Chamber of Commerce and the most important foreign and domestic companies and IT users, organized the traditional scientific/ professional conference INFOTECH 2008. This event was technically sponsored by the IEEE Serbia and Montenegro Section. Many Societies helped the local organizers with publications and promotion materials which were exhibited at a booth. This was a good opportunity to conduct interpersonal discussions with conference participants and other visitors, about their eventual new memberships. More than 400 people attended the meeting and they received IEEE brochures and magazines. During the last day, Professor Miroslav Skoric from the University of Novi Sad, Serbia, gave a tutorial lecture with a quiz section with technical questions. Those participants who were capable to return the proper answers were awarded with two half-year student membership to the Instrumentation and Measurement Society.

This was an interesting initiative from Professor Miroslav Skoric, our Society supported it and we are very grateful to him for his effort as a volunteer. We are looking for similar proposals from other Sections or Chapters or even those countries where no I&M Chapter is present. Remember you can always contact me at j.daher@ieee.org or our Chapter liaison John Schmalzel at j.schmalzel@ieee.org

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New Products

Robert Goldberg

Innovative Handheld Digital Multimeter Equipped with OLED Display

Agilent Technologies has introduced the U1253A handheld digital multimeter (DMM), the first DMM to use an organic light-emitting diode (OLED) display. For on-the-go and benchtop applications, the OLED readout provides a 2000:1 contrast ratio, a 160-degree viewing angle, smoothed fonts and a "large display" mode to ensure crystal-clear indoor viewing.

The U1253A expands Agilent's U1250 Series of handheld DMMs. Designed to simplify electronic troubleshooting and validation, these high-performance instruments enable engineers and technicians to complete their day-to-day tasks without being confined to the bench. All three U1250 Series DMMs provide useful benefits that help simplify analysis, accelerate glitch detection and simplify probing of hard-to-reach points. Key specifications include 4.5-digit resolution with 50,000-count full-scale dual display and basic accuracy of up to 0.025 percent. All offer simultaneous measurements and provide the flexibility to quickly perform validation tests, tolerance checks and marginal-failure troubleshooting.

Beyond basic DMM functions, the models include capabilities such as temperature measurements, automated data-logging (with the optional PC-interface cable) and, in the U1252A, a 20-MHz frequency counter and a programmable square-wave generator.

Agilent's line of handheld DMMs also includes the U1240 Series, which allow users to check more with wide measurement ranges, true RMS readings and a 10,000-count display. The U1240 DMMs also simplify maintenance tasks with harmonic-ratio, dual-temperature and differential-temperature capabilities as well as a built-in switch counter.

Find more information at www.agilent.com

Troubleshoot Ground Loops with New Tool

Circuit Insights LLC announces the Loop Slooth™, a unique new diagnostic instrument that enables rapid troubleshooting of ground loops. The Loop Slooth not only makes troubleshooting messy cable arrangements a breeze, but does so without having to disconnect or even physically contact any cables or power cords. Circuit Insights claims what used to take hours or even days of frustration now takes only minutes.

The Loop Slooth™ consists of a hand-held Exciter and a hand-held Detector. The Exciter induces a 100 kHz test current in a ground loop if the ground loop exists. The inductively-coupled, tuned Detector uses a LED to provide a quick visual indication of the presence of the injected test ground loop current in a signal cable or power cord under test. The Detector has in addition a digital meter that indicates quantitatively whether all or only some of the ground loop current in the power cord is flowing in a signal cable; this feature enables easy diagnosis of complex situations where the ground loop current splits into two or more parallel paths.

Find more information at www.LoopSlooth.com.

Sensor Film Measures and Maps Very Low Contact Pressures

Sensor Products Inc. announces Pressurex Zero®, the newest addition to its tactile pressure-indicating sensor films. Pressurex Zero® characterizes contact surface pressure down to an extremely low 7.2 PSI (0.5 kg/cm²). It is an easy-to-use flexible film that is placed between contacting or mating surfaces to instantly and accurately measure and map pressure magnitude and distribution. Variations in contact surface pressure are immediately visible by the impression made on the film. The range for Pressurex Zero® is 7.2 – 28 PSI (0.5 – 1.97 kg/cm²).

Pressurex® comes in the form of a thin clear plastic sheet (4 or 8 mil), physically similar in appearance to paper, and is available in eight different pressure ranges. When placed between contacting surfaces, it instantaneously and permanently changes color directly proportional to the actual pressure applied. The precise pressure magnitude (PSI or kg/cm²) is easily determined by comparing color variation results to a color correlation chart (conceptually similar to interpreting Litmus paper.) Pressurex® can also be scanned through one of Sensor Product's optical imaging systems.

Pressurex®, which is available in eight different pressure ranges, is used in the design, manufacture, calibration and quality control of many products. Variations in contact surface pressure, that Pressurex® reveals, often result in manufacturing flaws and product defects. It is very flexible, which enables it to conform to curved spaces. It is ideal for invasive, intolerant environments and tight spaces not accessible to conventional electronic transducers.

Pressurex® measures pressures as high as 43,200 PSI (1,300 - 3,000 kg/cm²). To request a free sample of Pressurex®, contact Sensor Products Inc. at +1.973.884.1755 (USA), or info@sensorprod.com. Visit their website to view their entire line of products at www.sensorprod.com.

Industrial High Speed Fiber Optic Infrared Transmitter

Omega introduces its new OS4000 series of industrial high speed fiber optic infrared transmitters with the capability to measure temperature from 200 up to 1600 degrees Celsius (392 to 2912 degrees Fahrenheit) using three standard optical fields of view and three standard fiber optic cable lengths. This CE compliant product has a very fast response time of one millisecond and adjustable Emissivity from .05 to .99.

Other standard features include built in laser sighting for lens probe positioning, linear analog output (1 mV/ Deg, 0/5 VDC, 0/10 VDC, or 4-20 mA), high and low alarm outputs, fiber optic gain adjust, maximum & minimum temperature measurement, RS232 interface, and a Windows based PC interface software to allow changing response time, high & low alarm set points, and data logging. Transmitter mounting bracket & mounting nuts are included. Water cool jacket, vacuum bushing, air purge collar & mounting bracket for the fiber optic lens probe are all optional accessories. Optional two relays with contact closure outputs and custom optical field of views and temperature ranges are available. Recommended applications are induction heating, vacuum chamber, metal processing and power generation.

For more information, go to the OMEGA Engineering Inc. web site at www.omega.com/toc_esp/frameset.html?book=Temperature&file=OS4000_SERIES.

Flexible High performance 50 MHz Arbitrary Waveform Generator

Keithley Instruments introduces the Model 3390 50MHz Arbitrary Waveform/Function Generator, featuring high waveform resolution and price-to-performance value. The Model 3390 is a flexible, easy-to-use programmable signal generator with advanced function, pulse, and arbitrary waveform capabilities. Superior signal integrity, faster rise and fall times, lower noise, and greater waveform memory combine to provide high quality output signals. High resolution waveforms are supported by four times the waveform memory of any competitive waveform generator on the market.

The Model 3390 features:

- 50MHz maximum sine wave frequency
- 25MHz pulse frequency with 10ns minimum width
- Arbitrary waveform generator with 256k-point, 14-bit resolution
- Built-in function generator capability including sine, square, triangle, noise, DC, etc.
- Precision pulses and square waves with fast (<10ns) rise/fall times
- Built-in 10MHz external time base for multiple unit synchronization
- Built-in AM, FM, PM, FSK, PWM modulation
- Frequency sweep and burst capability
- LXI Class C compliant Ethernet, TMC compliant USB and standard GPIB interfaces
- Digital pattern output port and control capabilities

For more information on the Model 3390, visit <http://keithley.acrobat.com/model3390>.

New Wireless Condition Monitoring Solution

GE Energy announces the launch of its new Bently Nevada™ wireless condition monitoring solution, called Essential Insight™ .mesh. Designed to improve overall reliability, productivity and efficiency for remote and inaccessible plant equipment, the Essential Insight .mesh wireless condition monitoring system is a new way of delivering the current Bently Nevada monitoring capability. Previously, plant assets either had to be monitored via hardwired systems or through a walk around program using portable data collectors. Essential Insight .mesh enables temperature and vibration data to be transmitted wirelessly from the asset to the System 1® software platform. This enables plant operators to monitor assets that previously were not monitored due to remote locations, inaccessibility or hazardous areas and provides plant information.

The new solution's wireless sensors enhance work safety for maintenance personnel by improving their ability to monitor equipment in hazardous areas. It also improves productivity

and speeds up data analysis that can be accurately transmitted back to the System 1 software platform.

The Essential Insight .mesh solution consists of the following components:

- wSIM™ sensor—a wireless mesh network node that supports up to four sensor inputs; initially supporting vibration (dynamic waveform and static data) and temperature.
- Essential Insight .mesh repeater—a mesh-only node without I/O ports. This node extends the mesh network coverage for broader communications, but does not directly support physically connected I/O.
- Essential Insight .mesh manager gateway—a gateway node that enables communication with other networks and protocols; it also serves as the Essential Insight .mesh network manager.
- Transducers—rugged and reliable vibration (accelerometer) and thermocouple probes.

Visit the company's web site at <http://www.ge.com> for more information.

Multi-Handset Test Mobile

Aeroflex announces the launch of an LTE (Long Term Evolution) version of its TM500 multi-handset (multi-UE) test mobile designed to enable infrastructure equipment vendors accelerate the pace of their LTE development projects.

LTE lies on the 3GPP GSM evolutionary path beyond 3G HSDPA/HSUPA and is designed to provide increased data speeds at a lower cost per data bit compared to 3G. LTE technology will also ensure high performance for speeds up to 120 km/h and mobility support across the cellular network for speeds up to 350 km/h. as well as higher data rates. Wide-area coverage is also being targeted.

Up to 32 LTE handset UEs are provided in one multi-UE test mobile, which simplifies complex tasks such as functional network testing with multiple UEs and performance measurement of resource scheduling algorithms. An LTE cell can be loaded with multiple UEs using a repeatable time profile in a controlled test environment. All 3GPP UE categories will be supported with maximum aggregate data rates of up to 75 Mbps on the uplink and 300 Mbps on the downlink.

Handset configuration and measurement capabilities are also included to provide infrastructure engineers with the low-level UE access and internal UE visibility they require to properly test and debug the eNode-B (LTE basestation) and network. The performance measurement capabilities of the TM500 LTE Multi-UE can be used to measure, optimize and demonstrate functionality such as the resource scheduler performance of the eNode-B.

In addition to its use for functional and performance testing, TM500 Multi-UE Test Mobile can also be upgraded to support hundreds of UEs for load and stress testing in conjunction with third-party capacity test products.

More information can be found on the company's website: www.aeroflex.com.

Baseband Signal Generator for UWB Applications

The new R&S AFQ100B from Rohde & Schwarz is an ideal signal source for developing and producing ultra-wideband (UWB) components. Using the R&S AFQ-K264 software option, the instrument's intuitive interface makes it easy to generate all the test signals required for a WiMedia UWB band. Its large bandwidth, which is needed for UWB applications, also makes the R&S AFQ100B an excellent solution for the aerospace & defense market.

With a bandwidth of 528 MHz, the R&S AFQ100B is a powerful tool for manufacturers of UWB baseband components such as receivers or I/Q modulators. The R&S AFQ-K264 option ensures that the WiMedia UWB signals output by the generator are configured to comply with the standard. The intuitive graphical display of the packet setup or hopping sequence, for example, supports the user in this task.

Multiple standards, e.g. UWB plus WiMAX and 3GPP, are increasingly being integrated into communications terminals. The R&S AFQ100B is able to generate a wide variety of digital communications standards in addition to WiMedia UWB. Rohde & Schwarz offers options for WCDMA, HSPA+, WiMAX, WLAN, LTE or other standards, which makes the new R&S AFQ100B an extremely versatile signal source.

The performance features of the R&S AFQ100B enable manufacturers such as those in the aerospace & defense market sector to generate complex signals with short pulses and short rise and fall times. This could be very useful for RADAR applications. Pulse sequencer software from Rohde & Schwarz and the R&S AFQ-K6 option permit easy configuration of pulsed signals, including any type of analog or digital modulation. Plug-ins for inserting classified contents into the pulses are also available.

For more information please visit www.rohde-schwarz.com

EMI Filtered Barrier Strip Terminal Block Rated to 30 Amps

Spectrum Control expands its line of standard Barrier Strip Terminal Blocks with a new model featuring a higher 30 Amp current rating. Spectrum's new terminal block delivers the higher rating without incurring the expense of a true "higher current" block and provides high insertion loss for EMI/RFI filtering of AC and DC power lines and control lines. These terminal blocks are available with 2 to 6 terminals and a capacitance range of 2,500 to 5,200 pF.

The 30 Amp terminal blocks have an operating temperature range of -55° C to 105° C and a 100VDC working voltage. These barrier strip terminal blocks are UL recognized and CSA approved for DC voltages and are available in RoHS compliant versions.

The barrier strip terminal block is offered in various sizes with terminals for soldering or spade lugs. The block's rugged construction protects the filter elements during installation and field service. Typical applications include filtering power supplies in telecommunications equipment, metering, industrial controls, instrumentation and EDP equipment.

For more information please visit www.specemc.com.

Rapidly Design Machine Vision Solutions with Maestro™

LMI Technologies releases their new maestro™ product. Maestro™ lets you rapidly design, install, and start-up any machine vision solution while reducing time, materials, and costs using only two universal maestro™ modules for all installations.

Maestro™ is comprised of two modules. The P800 module is the master controller that interfaces with the encoders and the I/O, but also delivers microsecond synchronization, power, and safety on CAT5E cables for up to 8 or more cameras and light sources, all from a single power supply. All timing, triggering, synchronization, sorting, and reject activations are completed by the

maestro P800 module. As a result, all devices are slaves to the P800 controller, including the host computer that performs the image processing.

The connecting piece to the maestro™ P800 is the C12 module. This component is a camera and light controller that is connected to the P800 with a maximum 100-meter CAT5e cable. The C12 module powers and triggers any camera while providing synchronized configurable high current pulses for LEDs or lasers.

The combination of the P800 and C12 modules is compatible with all cameras, light sources, I/O, and machine vision software libraries to provide rapid design and installation of virtually any type of machine vision application from single cameras to multi-camera web inspection systems. Additionally, maestro™ enables the integration of LMI Technologies' FireSync™, Sensors that See™, and HexSight™ components with standard camera and lighting components.

For more information on maestro™, please visit WWW.LMItechnologies.com/maestro/pro11.

Wireless Test System Introduces Compact and Efficient R&D Testing For Wireless Devices

As wireless services and applications explode worldwide using an ever-increasing range of wireless standards, device developers are desperate to keep up with new and complex testing requirements.

Setcom Wireless has announced the S-CAT 6010 wireless protocol test system. Setcom claims this to be a revolutionary design approach for wireless device protocol testing. It replaces a bench full of equipment with a cost-sensitive, compact test platform that tests the full device signaling protocol stack, from the radio layer all the way up to the network services, multi-media, and applications layer. In the past, these tests required a combination of computers, RF testers, and network test equipment. The innovative S-CAT 6010 replaces all that with a compact, 19-inch unit. The S-CAT 6010 reduces test costs for pre- and post-launch testing; it allows testing of features and capture of issues early in R&D. The S-CAT 6010 can perform tests in true-to-life network conditions, such as poor or disruptive radio connectivity, and high or fluctuating network latency—all within a lab environment. Scenarios are highly repeatable and diagnostic information is clear.

The S-CAT 6010 wireless protocol test system performs combined testing of multiple feature sets from the radio layer through the applications layer. It can test two devices connected to each other (mobile to mobile) through one S-CAT system. The S-CAT 6010 supports GSM, GPRS, EDGE, W-CDMA, and UMA/GAN.

For more information please visit the Setcom web site at www.setcom.eu.

Logging Digital Multi-Meter

Yokogawa Corporation of America has released the new TY700 series logging digital multi-meter. These accurate true RMS meters have a dual 5 digit, 50k count, and 51-segment bar graph LCD displays. Basic accuracy is 0.02% and it measures AC/DC current, voltage, resistance, frequency, duty cycle, temperature & capacitance. Two models are available; TY720 & TY710 having a logging memory of 10k or 1k data points respectively with optional software & USB communication cable. Units are rated at CAT 111 1000V & CAT IV600V. Included are Yokogawa's unique terminal socket shutters to prevent accidental insertion of the leads into the current terminals.

For more information about Yokogawa visit www.yokogawa.com/us/.

Open LED Protector

Littelfuse, Inc. has introduced the PLED 6 Series, an open LED protector that provides a switching electronic shunt path when a single LED in an LED array fails as an open circuit. This ensures that the entire array of LEDs will continue to function even if a single LED in the array does not. The Littelfuse PLED 6 Series open LED protector helps LED lighting manufacturers design for critical-reliability, hostile-environment applications such as automotive headlights, traffic lights, bridge lighting, and aircraft runway lighting. In these applications, light replacement is costly; open LED protection preserves the advantages of long-life LED technology and helps end users avoid high maintenance costs.

The new LED open circuit protector features a current range of 300mA to 1.0A, the highest current range on the market. It also features a low on-state voltage of 1.5V and low off-state current which lowers power dissipation and reduces the impact of heating on LEDs, which are delicate solid-state devices and can be easily damaged by current surges and transients.

The PLED 6 Series open LED protector uses a 4-layered thyristor structure that automatically resets if the LED heals itself or is replaced and also features built-in surge immunity. Its environmentally friendly package is RoHS compliant and halogen free as well. The PLED 6 Series open LED protector is available in two surface mount packages, the DO-214 and the Quad Flat Pak No-lead (QFN). The QFN's low profile, chip scale package (CSP) is ideal for dense board applications as well as strings of LED lighting.

For additional information about the Littelfuse PLED 6 Series, please visit www.littelfuse.com/series/PLED6.html.
