ep&t

Publications Mail Agreement No. 40065710

electronic products and technology - OCTOBER 2017

ept&
electronic products and technology
Volume 39 Number 7 October 2017

Stephen Law
Editor
416.510.5208
slaw@ept.ca

Sohail Kamal
West Coast Correspondent
sohail@nextgear.ca

Scott Atkinson
Associate Publisher
416.510.5207
satkinson@ept.ca

Joanna Malivoire
Account Manager
Direct: 866.868.7089
jmalivoire@ept.ca

Tracy Lelyk
Art Director
416.510.5120
tlelyk@ept.ca

Anita Madden
Circulation Manager
416.442.5600 ext 3596
amadden@annexnewcom.ca

Bona Lao
Subscription Inquiries
416.442.5600 ext 3552
blao@annexnewcom.ca

Tracey Hanson
Account Coordinator
416.510.6762
thanson@annexnewcom.ca

Tim Dimopoulos
Executive Publisher

Ted Markle
COO
tmarkle@annexweb.com

Mike Fredericks
President & CEO

EP&T (Electronic Products & Technology) is published nine times per year: Monthly in February, May, August, September, October, Bi-Monthly January/February, March/April, June/July, November/December by:

Annex Business Media
80 Valleybrook Drive, Toronto ON M3B 2S9
info@ept.ca Website: www.ept.ca
Tel: 416.442.5600 Fax: 416.510.5134

Sales: 416.510.5207 • Editorial 416.510.5208

ISSN 0708-4366 (Print) • ISSN 1923-3701 (Online)

Subscription Rates: Canada: $56.00 per year, US: $98.00 per year, International: USD$134.00 per year, Single copy: $15 (Canada); $20 (all others)

Editorial Purpose: Electronic Products & Technology provides timely, comprehensive coverage of the latest worldwide developments and trends in electronic products, equipment and systems, and interprets their significance to manufacturers and end-users in the Canadian marketplace.

Publications Mail Agreement No. 40065710
Canada Post: Return undeliverable Canadian addresses to:
EP&T Circulation Dept.,
80 Valleybrook Drive, Toronto, ON M3B 2S9,
Subscription Inquiries: 416.442.5600 x3548 • circulation@ept.ca
EP&T (Electronic Products & Technology) assumes no responsibility for the validity of claims in items reported.

Printed in Canada

We acknowledge the [financial] support of the Government of Canada.

Canada

Collaboration raises all boats in Canadian tech circles

Never before in the history of tech has there been such a prominent display of collaboration amongst tech leaders, innovators, engineers and enthusiasts. With artificial intelligence (AI), IoT, quantum technology, machine learning, big data and cybersecurity weighing so heavily on today's tech ecosystem, everyone seems keen to learn more about when and how to harness these disruptive technologies.

On the global map, innovation and collaboration is vital to Canadian competitiveness and for domestic businesses to grow into globally successful brands. Some pundits believe that the current willingness to partner in Canada is unparalleled elsewhere in the world, including Silicon Valley. There seems to be a unique appetite here to find common ground, share strengths and move forward without feeling that your business is somehow at a disadvantage if you partner with a competitor.

Examples of collaboration are all around at present. Consider the efforts demonstrated when hundreds of business, government and academic leaders from around the world recently descended on one of Canada's leading technology ecosystems in Waterloo Ontario. The fifth annual Waterloo Innovation Summit —Hacking the Future— was hosted by the University of Waterloo and attended by those seeking to explore the trends that are driving global innovation.

"With technology driving change at a rapid pace, it's becoming increasingly important for business, government and academic leaders to work together to prepare for what is coming and capitalize on our many strengths," says Feridun Hamdullahpur, president & vice-chancellor, University of Waterloo, which hosted the event last month.

In an effort to collectively advance a city or region's individual booming tech scene, some tech clusters have taken to hosting 'meet-ups', with the aim to provide a fun, friendly & relaxed environment to gather over food & drinks. Ultimately, attendees to these type of functions are drawn by the opportunity to witness demos and showcases, while also having the opportunity to listen to highly curated leaders and innovators – serving as guest speakers, sharing their expertise and experiences through 'TED style' presentations. The key here - knowledge is being shared.

Tech hubs and incubators contribute to building a high-tech, startup community where founders come together, learn from each other, grow their companies and build global markets. Ultimately, this tendency to co-operate provides Canada with a distinct competitive advantage – and, in the midst of a tech resurgence, that's not a bad thing.

Stephen Law, Editor
slaw@ept.ca @EPTmagazine

NEWSWATCH

Altium acquires Toronto-based Upverter

Upverter CEO Zak Homuth

Toronto-based electronic design innovator Upverter Inc. has been acquired by Altium, a leading global provider of design software for the electronics industry. In a blog post on his firm's website, Upverter CEO Zak Homuth outlined the motivations behind the deal.

"Altium shares our vision for a powerful, collaborative new style of product design software. Free, but powerful enough to design a real product, accessible-to-all, cloud-based and collaborative, and maybe, most importantly, incredibly intuitive, helpful even, and easy-to-use," says Homuth.

Upverter' mission from the outset has been to make hardware and product design approachable for everyone, and to make hardware less hard, according to Homuth.

"To empower engineers, makers, hobbyists and students by equipping them with world-class technology through an intuitive user experience," says Homuth. "We believe the best design tools fade into the background, freeing designers to be truly creative."

Over the past seven years Homuth and his team have built a very sophisticated cloud-based, collaborative hardware design tool, responsible for assisting more than 45,000 people design more than 80 thousand devices.

"It will always be free to use, for everyone, from anywhere. Regardless of whether you're a professional electrical engineer, a maker, a student, a hobbyist or anyone else, you can now design your product, your hardware, your IOT device, your pcb - completely for free using Upverter," Homuth enthuses.

24-7 Intouch invests in AI tech jobs in Manitoba

24-7 Intouch, a global leader in contact center solutions, announced its investment in Artificial Intelligence (AI) and the creation of new technology jobs in Manitoba.

The Company plans to leverage AI, bots, robotic process automation and machine learning technology to drive a better customer experience for the clients they serve.

"Not only will this industry-leading technology be built here in Winnipeg and used by thousands of employees at our company, it will also be seen and used by Fortune 500 tech, retail and CPG brands that we partner with around the world," said Jeff Fettes, founder, global president and COO of 24-7 Intouch. "There is an incredible developer community here, and we are looking for forward-thinking, talented people to grow their careers and help change the future of customer service with us."

24-7 Intouch has grown significantly over the last two years, hiring more than 6,000 people across their its global locations. The firm currently has three campuses in Winnipeg, including its downtown headquarters.

"We like to win and set the bar high for performance and innovation," said Greg Fettes, founder and CEO of 24-7 Intouch. "We obsess about our people, which is reflected in the phenomenal experiences and career development opportunities we create for them."

CPEIA rebrands as intelliFLEX Innovation Alliance

The intelliFLEX Innovation Alliance is the new name and new brand identity of the Canadian Printable Electronics Industry Association (CPEIA).

The name change was made to expand the technology scope and membership of the association to include flexible, hybrid and wearable electronics, as well as rebrand the association, according to Peter Kallai, president and CEO of intelliFLEX. The new name reflects the diverse but interconnected nature of the technology and applications for printable, flexible, wearable and hybrid electronics.

"This new brand identity provides a better reflection of the diverse nature of flexible technologies that are at play both from a development and an applications perspective," says Kallai. "Many of our members were already involved in these tech domains, going well beyond our original mandate in printable electronics. This new brand and positioning helps us build a more inclusive and effective ecosystem to address the needs of the end-user verticals that best stand to benefit from the application of printable, flexible and hybrid technologies in North America and globally."

Averna to open a ThingWorx center of excellence

Montreal-based test and quality solutions provider Averna reached an agreement with global technology provider PTC, to become a ThingWorx IoT Partner. Averna will open a ThingWorx Center of Excellence to help clients with IT/OT (operational technology) alignment as part of their industry 4.0 transformation.

Averna will help customers leverage the power of an IoT platform to give them complete product quality visibility across the entire lifecycle, as well as insight on manufacturing and assembly processes and real-time monitoring of machines and systems' status and health.

As an integrator and solution provider of ThingWorx, Averna will develop intelligent operational technology (OT) systems, combining both hardware and software, to help clients monitor events, processes and devices and make adjustments in enterprise and industrial operations.

"As more companies work toward IT/OT alignment, the CIO and the IT organization will be at the forefront of fostering relationships and changing the culture of the organization," says Kristian Steenstrup, distinguished analyst and Gartner Fellow. "This will require a hybrid of traditional IT and OT skills and development of new intellectual property, while experience external to the company will be tapped into to assist with cross-topic education."

"Our partnership with PTC, will bring a disruptive offering of technologies, knowledge, methods, processes, services and workforce to business needs in the digital manufacturing era," says Andrè Gareau, CEO of Averna. "By leveraging the power of PTC's ThingWorx IoT platform together with our assembly automation and machine vision expertise."

Canadian creates next gen breakthrough in haptics

Nanoport's magnetically balanced haptics add new sensation to devices

Tim Szeto, CEO and founder of Nanoport

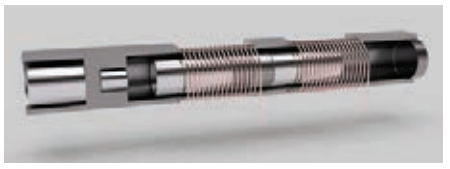
Nanoport Technology Inc., a Silicon Valley-based R&D lab creating next-generation breakthroughs in mobile, has revealed a first-of-its-kind haptic technology that adds new tactile feel to mobile devices at a fraction of the power.

Originally formed in Waterloo ON by a group of Canadian-based engineers, Nanoport rolled-out its first-ever public look at its technology during the Mobile World Congress Americas conference this week.

With a patented magnetically balanced design, Nanoport's haptics solution provides the first 3-mode tactile feedback actuator on the market. While most conventional haptics rely on bursts of controlled vibrations, the TacHammer is also able to generate individual pulses, taps, clicks and even sharp jolts.

"Imagine a mobile video game that lets you feel the tremor of rolling thunder, the rattling kickback of gunshots, or the soft pulsations of a beating heart. The TacHammer opens up opportunities for new form factors and creative use cases," says Tim Szeto, CEO and founder of Nanoport. "Software developers can now use haptics to make their software UI feel like it has physical buttons. Maybe one day we won't need any real mechanical buttons at all."

TacHammer Features:



Power Efficiency

- Up to 5 x more power efficient than leading haptic technologies
- Springless design reduces actuation resistance allowing the TacHammer to produce greater force with less power

Range of Haptics Effects

- Sharp Impulses - efficient production of sharp haptics such as snaps, jolts, and clicks that mimic the sensation of a physical button press.
- Soft Impulses - magnetically dampened production of soft haptics such as pulses, taps, and bumps
- Vibrations - produces sustained vibration haptics ranging from a light wobble to intense vibrations
- Flexibly programmable - customizable speed, intensity and duration

Suitable for mobile, wearable, console gaming and automotive applications, Nanoport's patented technology is scalable for custom applications that require stronger haptics and unique form factors. The company is currently working with leading OEMs to bring haptics to next generation devices.

Leaders in disruptive technology convene at Waterloo Innovation Summit

Hundreds of business, government and academic leaders from around the world descended on one of Canada's leading technology ecosystems last month to explore the trends that are driving global innovation. The fifth annual Waterloo Innovation Summit —Hacking the Future— hosted by the University of Waterloo.

"With technology driving change at a rapid pace, it's becoming increasingly important for business, government and academic leaders to work together to prepare for what is coming and capitalize on our many strengths," says Feridun Hamdullahpur, president and vice-chancellor at the University of Waterloo. "Whether it is AI, quantum technology or cybersecurity, summit attendees will engage with other leaders on when and how to harness these disruptive technologies."

With more than 300 people registered from across Canada and the around the world, attendees heard from representatives from some of the world's most forward-thinking companies, including Tesla, Dyson, Microsoft, Jigsaw, Kik and Whitespace at lululemon athletica.

"Innovation is vital to Canadian competitiveness," adds Cam Vidler, vice president of industry and innovation at the Business Council of Canada and summit attendee. "This signature innovation event in Canada's start-up centre is a great way to keep track of the latest developments and meet key players."

"The spark of innovation only happens when we open our minds to new ways of thinking—and this is often the result of coming together to share and explore new ideas," added Rob Barton, principal systems engineer at Cisco Canada and fellow summit attendee. "The Waterloo Innovation Summit is one of the best opportunities I know of to meet with fellow thought leaders and explore the ideas shaping the future of technology and digital transformation."

Facebook announces major AI commitment to CIFAR

Facebook announced a major investment with CIFAR, a result of the Institute's leadership in the field of artificial intelligence (AI). The US$2.625 million investment over five years will continue Facebook's support of CIFAR's Learning in Machines & Brains program and will also fund a Facebook-CIFAR Chair in Artificial Intelligence at the Montreal Institute for Learning Algorithms (MILA).

Facebook made the announcement last week at a ceremony at McGill University in Montreal, attended by Prime Minister Justin Trudeau and CIFAR president & CEO Alan Bernstein. Facebook also announced funding for a Facebook AI Research (FAIR) Lab to be headed by Joelle Pineau, a CIFAR Senior Fellow in the Learning in Machines & Brains program and an artificial intelligence researcher at McGill.

"Facebook's investment in CIFAR and in the Canadian AI community recognizes the strength of Canadian research in artificial intelligence," said Alan Bernstein, President & CEO of CIFAR.

Earlier this year CIFAR was selected by the Government of Canada to develop and implement the $125 million Pan-Canadian Artificial Intelligence Strategy, designed to cement Canada's status as a leader in AI research.

MyndTec garners investment towards medical device

Award-winning medical technology OEM MyndTec, Mississauga ON, has received $510(k) clearance to market its landmark product MyndMove. MyndTec is a pioneer in the treatment of arm and hand paralysis caused by stroke or spinal cord injury.

"This is a major milestone in the evolution of our company," says MyndTec founder Dr. Milos R. Popovic. "We are delighted that we can now offer this life-changing therapy to patients in the U.S. with upper extremity paralysis."

MyndMove Therapy is a functional electric stimulation (FES) based intervention that provides therapists the ability to assist individuals with upper limb paralysis to improve voluntary control of their arms and hands. The MyndMove system provides more than 30 FES protocols that therapists use to enable meaningful controlled movements via proprietary stimulation technology.

MyndTec was founded in 2008 as Simple Systems Inc., to commercialize technology developed by Dr. Milos R. Popovic and his colleagues at the Toronto Rehabilitation Institute-University Health Network and the Institute of Biomaterials and Biomedical Engineering at the University of Toronto.

Modular power supplies deliver BF ready isolation

QM5 modular power supplies are rated at 700 to 1200W and come with up to 12 outputs. Units have BF ready isolation and low acoustic noise, along with medical and industrial safety certifications. Accepting a wide range 90 to 264Vac, 47-440Hz input, product delivers 700W at low line and 1200W with a 150-264Vac input. With its modular construction, the series can be configured using a simple on-line configurator to provide 1 to 12 independently regulated outputs and include individual output good signal and remote on/off functions. Module output voltages range from 2.8V to 52.8V and output powers from 300W to 1200W.

TDK-LAMBDA AMERICAS

http://ept.hotims.com/65991-22

PoC biosensors to become $33B market

Point-of-care (PoC) biosensors will become a $33 billion market by 2027, with molecular diagnostic devices the main driver for this growth, according to a report from IDTechEx Research, Cambridge UK.

The report gives a complete analysis of the important trends in the field of medical biosensors and lists the new technologies and devices which are likely to be highly disruptive to the in-vitro diagnostics market.

Biosensors are used to detect and quantify biological material associated with a disease state or health condition (biomarkers). Biosensors are therefore powerful tools for diagnosis and monitoring. As technological advances allow for such tests to be conducted faster and on smaller devices, these tests are moving out of specialized laboratories and closer to the patient at the point-of-care.

Elastomeric primer/ adhesive system meets ISO 10993-5 specs

X21Med is a single component elastomeric compound passes ISO 10993-5 tests for cytotoxicity and is developed for priming and bonding polyolefinic substrates. Product is easy to use, either as an adhesive or a primer. It has a low viscosity of less than 250 cps and cures at ambient temperatures or more rapidly with heat. As a primer, product is simply applied in a thin layer to the surface and the solvent is allowed to evaporate. When used as an adhesive, product should be applied to both substrates and then mated. The maximum area of bonding effectiveness is about 1 square inch. Once cured, this clear to light amber colored product is tough and not rigid.

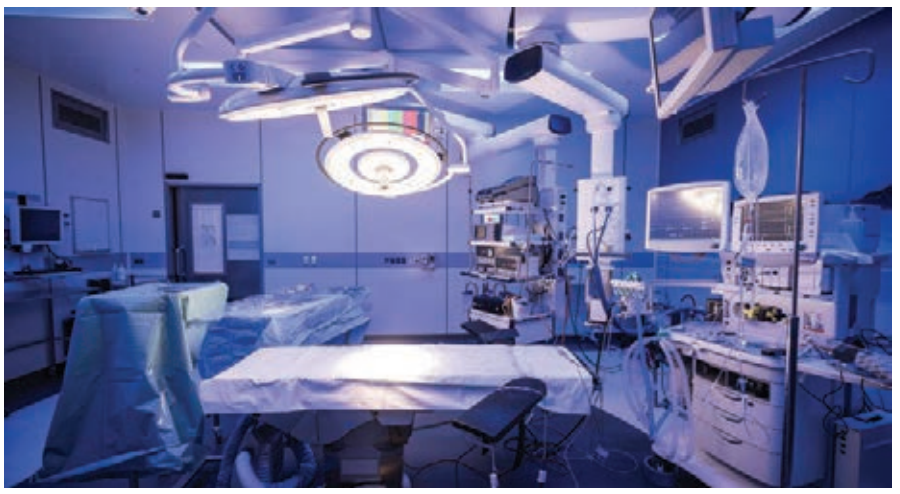
MASTER BOND

http://ept.hotims.com/65991-21

Power supplies and cords for medical equipment

Helpful steps on meeting IEC Standards

By MEGA Electronics Inc.



Whether you' re traveling for business or pleasure, it' s important to know the rules and customs of the places you're visiting. The same holds true when it comes to power cords and power supplies: Many countries have hospital-grade or medical applications standards for these supplies, and the safety of patients and equipment is at risk when these standards are not met.

This includes meeting IEC medical equipment standards, including IEC 60601-1 approval. In this article, we'll look at some of the criteria for selecting power cord supplies to adhere to these standards.

Safety standards

Medical-grade power supplies are required to meet IEC 60601-1 safety standards as set forth in regional versions such as EN60601-1 and UL60601-1. These standards levy additional safety regulations on issues such as creepage and clearing space, leakage current and isolation voltage. UL60601-1 limits leakage to 0.3 mA of leakage current from input to output on Class 1 equipment.

Patient vicinity and patient connect

'Patient vicinity' – as defined by UL60601-1 standards – refers to electrical equipment based within six feet of a patient. When equipment comes in direct contact with a patient, this is what is known as "patient connect," requiring another level of isolation. Medical grade power supplies typically carry patient vicinity certification, as they do not come in direct contact with patients.

Leakage current

Also known as touch current, these are the leakage paths from an enclosure that may come in contact with a patient or operator. As patients under medical care are often in a weakened state, a tiny amount of leakage current can be harmful to their health. The standard mandates a maximum level of 100µA for normal operation and 500µA for a single fault condition.

Output voltage, current and power rating

To meet the application requirement for supply voltage, medical power supplies offer single or multiple output voltage, ranging from 3.3 to 48 Vdc. When establishing the supply-voltage level your application needs, look to the current levels required at each voltage.

When only one supply voltage is needed, the power rating is the supply voltage multiplied by the maximum current required. When multiple outputs are required, add the voltage-times-current products for all supply voltages to find the power rating.

Thermal management

This refers to the type of cooling required, and is determined by looking at the ambient temperature range expected from the application, along with the thermal specifications of the power supply. Convection cooling may be satisfactory, but forced air cooling may be required.

Additional standards

In addition to the IEC medical equipment standards we' ve already mentioned, equipment may also need to comply with related medical equipment regulations such as IEC 60601-1-2, which deals with electromagnetic compatibility.

Aside from these international regulations, it's important to remember that many countries – including Japan, Australia and Denmark – have specific component requirements for power cords.

For more information on power cords for medical devices from MEGA Electronics Inc., go to http://ept.hotims.com/65991-23

Dev boards prototype temperature, RH and pressure designs

Measurement Specialties Grove system development boards are small, plug-and-play devices that allow designers to incorporate firm's environmental sensors with the Seeed Grove prototyping system, which features standardized four-pin connectors with an I≤C communication interface. The easy-to-use boards are suitable for creating designs for wearable and miniature devices, health monitoring, fitness, air quality, aerospace, and battery-powered applications.

TE CONNECTIVITY

http://ept.hotims.com/65991-24

50ohm multiport coaxial connectors optimized for high density RF

Datamate Coax series 50ohm multiport coaxial connectors comprises multiple (ganged) coaxial contacts in a compact housing. Devices provide access to numerous coaxial lines through a single connection point. Devices feature 2, 4, 6 and 8 contact options, contained within each connector are arranged into single or double ended jack formats with 4.00mm pitch. Products deliver strong RF performance characteristics up to frequencies of 6GHz. Device's robust construction permits high levels of shock (100G) and vibration (10G/200Hz), plus extreme temperatures (-55°C to +125°C).

HARWIN

http://ept.hotims.com/65991-25

OEM lasers suit medical, demanding applications

OEM line of lasers for use in levelling, alignment and positioning are suitable for use in medical and other demanding applications OEM applications. Devices are provided with packaging to suit customer requirements, including housings, mounting devices/hardware, with leads and optional power supplies. Output options include laser color, output power and working voltage, among others. Medical laser applications include X-ray, MRI, Cat Scan and other OEM equipment and devices requiring exact patient positioning.

BEA LASERS

http://ept.hotims.com/65991-26

Ac-dc power supplies serve medical applications

MUI30 series of universal input ac-dc power supplies for medical applications boasts 85 to 264Vac universal input range, 47 to 63Hz input frequency and low leakage current under 100 microamps. For use in applications up to 30 watts, product provides high efficiency up to 95% and a wide operating temperature range of -40° to +85°C. Unit also integrates 2 MOPP insulation, 4000Vac reinforced isolation and 5,000 m operating altitude. Devices meet all medical safety standards, including IEC/EN/ANSI/AAMI ES60601-1 and IEC/EN/UL 60950-1. It is available in a 2.89" x 1.50" x 1.00" pin-type package. Other available packages include terminal block and din rail.

POLYTRON DEVICES

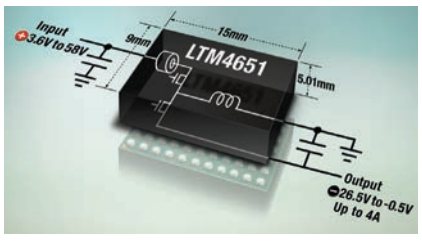
http://ept.hotims.com/65991-27

Multi –tier lockable IEC socket saves panel space

C13 multi-tier outlet family of IEC lockable devices is available with either 4 or 6 outlets. The integral locking system improves the reliability of electronic systems exposed to vibration or traction. The patented locking system provides a space saving alternative to separate outlets and is compatible with all standard C14 connectors. Each individual power outlet has its own locking mechanism which protects against accidental disconnections and maintains uptime. The 4-tier unit saves 12mm and the 6-tier outlet saves up to 21mm when compared to fitting single connectors. All outlets are powered from a single connection point reducing assembly time.

SCHAFFNER

http://ept.hotims.com/65991-28



Inverting regulator is EN55022 Class B compliant

LTM4651 nonisolated inverting output µModule regulator generates –26.5V to –0.5V output from a positive input supply voltage. Device operates over a 3.6V to 58V input voltage range and is housed in a 15mm x 9mm x 5.01mm BGA package. The compact solution provides –5VOUT, –12VOUT, –15VOUT and –24VOUT from industrial standard 5VIN, 12VIN or 24VIN supplies. Product meets the EN55022 Class B EMC standard for Information Technology Equipment. Device includes a dc-dc inverting regulator, inductor, MOSFETs and compensation circuitry.

ANALOG DEVICES

http://ept.hotims.com/65991-29

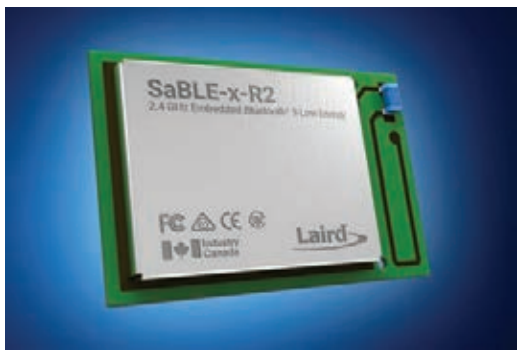
Advanced Mezzanine Card connects FPGA and DSPs

AMC540 double-module AMC (Advanced Mezzanine Card) with Xilinx Virtex-7 XC7VX690T FPGA and dual multicore TI TMS320C667x Digital Signal Processors (DSP) provides an on-board managed switch that connects both DSPs and Virtex-7 FPGA to dual GbE base interface on the backplane and dual front-panel RJ-45. DSPs, which can be optionally TMS320C6670 or TMS320C6678, are connected by HyperLink and have PCIe and SRIO connections to the FPGA. The Virtex-7 FPGA supports up to 24 TX/RX front panel fiber connections.

VADATECH

http://ept.hotims.com/65991-30

Bluetooth module accelerates development time



LAIRD SimpleLink-based SaBLE-x-R2 Bluetooth 5 module builds on the original field-proven hardware of the SaBLE-x module to accelerate the development time for implementing cutting-edge Bluetooth low energy connectivity in Internet of Things (IoT) sensors and beacons for commercial, medical and industrial applications. Module comes with an external or pcb trace antenna, takes full advantage of the range, speed, throughput of the Bluetooth 5 specification and include increased flash memory for application usage and OTA capabilities. Based on the Texas Instruments SimpleLink CC2640R2F wireless microcontroller, the self-contained module integrates an Arm Cortex-M3 application processor, Arm Cortex-M0 processor for the radio frequency (RF) core, Sensor Processor Engine and high- and low-speed clocks.

MOUSER ELECTRONICS

http://ept.hotims.com/65991-31

PushPull variants address space-saving demands

M12 PushPull connector solution is available in an angled housing form saving space and helping meet railway sector and rail transport market demands. Device is available with new housing shapes and female versions. Product also comes as device-side flange socket, suitable for the M12 PushPull, while also offering additional benefit of reverse compatibility with the tried and true screw locking. Side cable exit reduces the distance from the housing door to any switches.

HARTING

http://ept.hotims.com/65991-32

C14, C16 and C18 snap-in inlets serve 2mm - 3mm panels

IEC 60320 inlet product line is manufactured at firm's Iowa facility, including C14, C16, and C18 snap-in inlets designed for 2.0mm and 3.0mm panel thicknesses. Devices are rated 10A/250Vac international and 15A/250Vac North American, provide QD and solder tab options and fit a 20 x 27.5mm cutout. Devices carry VDE and cURus approvals and are RoHS compliant.

INTERPOWER

http://ept.hotims.com/65991-33

64GBaud BERT solution simplifies test setup

M8040A high-performance bit error ratio tester (BERT) solution for testing PAM-4 and NRZ devices operates up to 64GBaud. Unit simplifies test setups and repeatable and provides accurate results for engineers in validation labs and R&D who characterize receivers on the physical layer for emerging 400G data center interconnects. The pattern generator module provides built-in de-emphasis, jitter injection and an optional second channel.

KEYSIGHT TECHNOLOGIES

http://ept.hotims.com/65991-34

Ac-dc-rated miniature circuit breakers are UL 489, 1077 listed

BR and SU Series of DIN-rail mounted, thermal magnetic miniature circuit breakers (MCB) provides a complete range of UL 489 listed Branch circuit breakers and UL 1077 listed Supplementary circuit breakers, all rated for both ac and dc circuits. Devices are equipped with a trip-free, snap action toggle and easy visual status indication. At 17.6mm wide (one-pole), they are available in one-, two- and three-pole versions with an amperage range up to 63A, and in B, C, or D trip curve options to meet application needs. Devices deliver a wide voltage range of 120/240/277/480Vac and 60/125Vdc for single-pole and double-pole versions.

WEIDMULLER

http://ept.hotims.com/65991-35

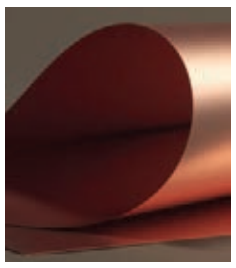
6UL System-On-Module supports Android Things

SprIoT 6UL is a Wireless IoT SOM (System-On-Module) based on NXP i.MX6 UL high performance application processor and Cypress 2.4 GHz Wi-Fi b/g/n and Bluetooth combo solution. Device supports Google Android Things software platform or Linux based solution. Product integrates application processor, Wi-Fi/Bluetooth IC, PMIC, RF front end, clock and on-board antenna. Module dimensions are 40mm x 40mm x 5.5mm.

MURATA

http://ept.hotims.com/65991-36

Laminates serve 5G and millimeter wave applications



CLTE-MW laminates are ceramic filled, woven glass reinforced PTFE composites developed to provide a cost effective, high performance material for circuit designers. System is suitable for applications that have limitations in thickness due to either physical or electrical constraints. Available from 3 mils to 10 mils thickness options, plus a variety of copper foil options are available including rolled, reverse treated ED, and standard ED. Resistive foil and metal plate are available upon request.

ROGERS

http://ept.hotims.com/65991-37

IEC Appliance Outlet F for Intelligent PDUs and UPSs

Series 6610-5IEC appliance outlet with integrated guides for light pipes channels light from LEDs placed on a printed circuit board to the outlet surface. Product improves functionality to the 6610 version, known for the highest level of efficiency during assembly due to its IDC terminals. Product features are especially suited for use in PDU and UPS applications. The light pipe status indication allows technicians to clearly see which systems are working properly, or respond to required maintenance adjustments. The control of the LEDs is freely configurable, wherein each state can be represented clearly and independently. The light pipes are ordered separate and inserted after installation of the outlet.

SCHURTER

http://ept.hotims.com/65991-38

Ultra-rugged mounting rail serves enclosure frames

Rugged modular extrusion mounting rail supports very high insertion forces and accepts standard OpenVPX or other architectures boards based on the IEEE 1101 specification. Unit provides a thicker metal, has two mounting screws and a reinforced design to provide strength and durability. When utilized with firm's offset card guides, both 4HP and 5HP plug-in modules can be used in the same subrack.

PIXUS TECHNOLOGIES

http://ept.hotims.com/65991-39

Pcb design tool permits direct search for digital models

Sunstone Circuits PCB123 Version 5.6 free pcb CAD design tool and SnapEDA's parts library for pcb design, co-launched an integration that allows designers to search for digital models directly inside the PCB123 design environment. This release permits designers to search and download free, cloud-based symbols and footprints directly during design capture and layout, significantly boosting design productivity. Product is comprised of a schematic editor, physical layout editor, 3-dimensional mechanical previews and BOM editor. By augmenting the tool with cloud-based libraries, designers will get real-time access to new symbols & footprints added to SnapEDA's catalog.

SNAPEDA

http://ept.hotims.com/65991-40

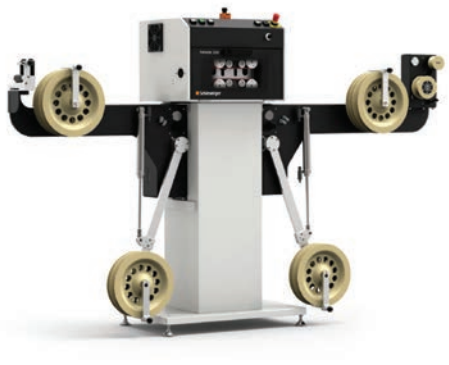
120W quarter brick dc-dc converters serve industrial applications

GQA120 series of 120W industrial grade dc-dc converters utilize the industry standard quarter brick pin-out and has four packaging options. Product series can accept a 12Vdc or 24Vdc nominal input, making it suitable for ruggedized communication equipment, automated vehicle mounted electronics, trackside rail and marine radar and navigation applications. For convection cooled environments the flanged baseplate version is suitable for cold-plate cooling and models with the non-flanged baseplate can be fitted with a standard quarter brick heat-sink. All models have a baseplate temperature rating of -40C to +105C.

TDK-LAMBDA AMERICAS

http://ept.hotims.com/65991-41

Puller type prefeeding machine handles wires, cables



PreFeeder 3200 puller type prefeeding machine for wires and cables comes with an outer diameter of up to 35 mm (1.37"). Made for use with firm's cut and strip machines, unit provides constant tension to the downstream wire processing machine. The belt driven unit can pull wires and cables from a spool. The system is available with different accumulator systems, including a pendulum arm accumulator for high dynamic feeding. Product provides loop limit control for rigid cables and delivers inlet pendulum arm for smoothly acceleration of the spool. Unit is adaptable for various applications and cable types.

SCHLEUNIGER

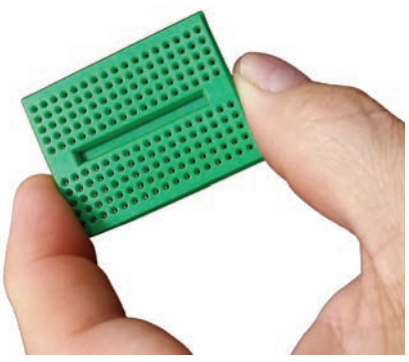
http://ept.hotims.com/65991-44

Desktop pcb software adds Quadcept output, new symbol options

Latest update to Ultra Librarian includes symbol and footprint output for Quadcept pcb design software, providing users with access to one million parts through Digi-Key and over 12 million parts through ultralibrarian.com, as well as part creation capabilities using Ultra Librarian desktop software. Ultra Librarian also supports two methods of organizing pins on a schematic symbol. The standard pin ordering is by pin number, which solves the basic problems of having the right number of pins, assigning correct pin numbers and pin names, and matching those with their corresponding pcb footprints. Many engineers, however, have requested that pins be ordered by function and type.

EMA DESIGN AUTOMATION

http://ept.hotims.com/65991-42



Solderless breadboards are miniature, colorful

GS-170 series of solderless, mini multi-colored breadboards are miniature and colorful. Units are suitable for introducing circuits in the classroom, as well as for the hobbyist who wants to prototype small projects. Measuring 4.5 x 3.5cm, products are suitable for projects with the Arduino or the Raspberry Pi. Devices maintain the center spacing for DIP IC's. Made from durable POM plastic, devices come with a peel and stick adhesive for easy placement on most surfaces.

GLOBAL SPECIALTIES

http://ept.hotims.com/65991-43

Avoiding supply chain disruption requires *an old school approach*

By Wally Johnson, VP finance, supply and IT, Firstronic

The electronics supply chain has now entered the perfect storm. Pre-Harvey and Irma, the passive component (resistors and capacitors) market was already in rough waters. Over the last year, lead-times became unusually long because demand for these parts has grown faster than component manufacturer capacity. For example, a quick snapshot of availability of 1,064 passive components in my company's supply chain taken in August indicated that 255 have lead-times of at least 26 weeks, 190 have lead-times of at least 32 weeks and 96, or almost 10 percent, have lead-times of at least a year.

As I write this, Hurricane Irma is battering Florida. Hurricane Harvey has already left a path of devastation that according to media reports includes 500,000 cars with flooding damage and over 100,000 houses with some form of water damage including 30,000-40,000 homes that are total losses. The replacement of vehicles, appliances, consumer goods and all the other products using electronics that have been damaged due to the unprecedented scale of these disasters will further challenge the supply chain. Passive components are used in just about every electronic product. From a supply chain perspective, we have found the perfect storm: an already overcapacity component market which will shortly be loaded with a huge demand spike.

How did we get here?

The component supply chain has always had feast and famine cycles. The current cycle has been exacerbated by two factors. First and foremost, pure electronic data interchange (EDI) models tend to cause trust issues.

One only needs to look back to the last supply chain disruption that occurred in 2013 to understand the basis for lack of trust. Capacity had been cut following the 2008 recession and mixed economic signals in 2011 and 2012 triggered additional component industry consolidation and cuts in capacity. When demand picked up again in 2013 it outstripped capacity and triggered allocation. Many companies were doubling and tripling their orders to game the system into giving them what they really needed. Once allocation eased, the extra parts were canceled. In a system with deep relationships, suppliers and customers would talk about that and work out a compromise in an atmosphere of trust. In today's world, suppliers now see any unexpected order increase as an attempt to game the system and don't concomitantly increase that customer's allocation. Even more troubling, lack of relationships and the visibility into future demand trends that comes with them is one of the reasons component manufacturer capacity industry-wide isn't increasing faster. They simply don't trust the forecasts they are seeing.

Firstronic's Juarez production area.

Another driver of capacity constraints has been industry consolidation. According to Karim Yasmine, corporate vice president supplier development at Future Electronics, another challenge faced by buyers in the multi-source world of components is the recent wave of mergers and acquisitions in the manufacturers' landscape. Consolidation has reduced customers' approved vendor lists (AVLs) significantly which also becomes a factor to take into account in a constrained or allocated market. Customers are now looking to value-added distributors who will invest in inventory and differentiated bonded inventory management programs to ensure continuity of supply.

While value-added distributors may be one part of the solution, the reality is that fewer component suppliers has translated to less pressure to rapidly increase capacity, particularly in an environment where many manufacturers were trying to determine if increased demand trends were sustainable, given the up and down spikes seen over the last two years. Even in this perfect storm, it is unlikely that capacity will increase to fully accommodate the added demand of replacement product manufacturing, since that demand will drop as products are replaced.

Firstronic employee barcodes a project.

So, where do we go from here?

There is no question that real-time systems visibility will continue to be a critical part of navigating this perfect storm. That said, in this type of supply chain chaos, real-time systems are simply delivering bad news faster. It is important to return the old school supply chain relationships, analysis of market trends and the common sense that got savvy supply chain managers through previous perfect storms.

FOUR PRINCIPLES SHOULD BE IN PLAY:

- **First,** talk with your engineering team to ensure that new products have supply chain flexibility built in from day one. At Firstronic, we are regularly seeing bills of material (BOMs) with obsolete parts or parts that have been not recommended for use in new designs due the point they have reached in their lifecycle. Take any advice contract manufacturers, distributors or component suppliers give you on best availability when it comes to parts selection. Pick parts that are easy to cross-reference, whenever you can.
- **Second,** avoid specifying unique parts wherever possible. Component manufacturers that make parts for specific programs rather than the general market are experiencing capacity constraints at the subcontractors that fabricate their parts.
- **Third,** go back to building relationships with your component suppliers. Give them visibility into new programs and any anticipated spikes in demand. It won't solve all the problems, but it will help to create trust as far as changes in the amount of components being ordered for your program. All manufacturers are double confirming orders before investing in new capacity. If all they see is a new or increased order through distribution, sometimes half way around the world they don't make the connection and they may delay that investment.
- **Fourth,** keep it simple and don't over specify. For example, for passive, commodity parts consider broadening your specifications as widely as possible so that the BOM doesn't have five different resistor values when one resistor value would be adequate.

This is an industry-wide problem that in the space of three weeks has grown tremendously in magnitude. As with any period of allocation, counterfeit parts will enter the market. Your franchised distribution supply chain and contract manufacturers will deliver bad news on some parts. The more flexibility and visibility they have, the more ability they have to identify alternate options. Legitimate non-franchised distributors may also have options that help prevent supply chain disruption for some period, typically at a higher cost. Again, visibility and flexibility is key to effectively utilizing this option. And, the unscrupulous will always have your parts in stock, or at least parts that appear to be labeled like your parts. This is the one option that should be avoided at all costs.

Combining the visibility good systems can offer with an old school relationship-based, common sense approach is the best way to survive this storm. Building trust back into the equation is a critical part of fixing this issue over the long-term.

For more information on electronics supply chain from Firstronic, go to http://ept.hotims.com/65991-45

How mobile robots will transform material handling, logistics industries

By Dr Khasha Ghaffarzadeh, research director, IDTechEx Research

Mobile robotics in material handling and logistics will become a $75bn market by 2027. It will then more than double by 2038. These staggering headline figures mask turbulent transformative change underneath: some technologies will rise and transform the fortunes of industries, fuelling growth rates far outpacing recent trends, whilst others will face with decay and obsolescence.

A recent report from IDTechEx Research on mobile robots and drones highlights the major changes coming our way. We are at the beginning of the beginning of a transformative change, and the time to plan is now.

AGVs are a mature technology that can safely transport payloads ranging from several Kg to multiple tonnes, essentially acting as semi-rigid distributor conveyer belts covering large areas. Their navigation technology is evolving. Today, multiple options are available ranging from the low-cost wire or magnetic tape guidance to the increasingly popular laser guidance. All however requires follow rigid guide points, thus requiring some degree of infrastructure modification and extended onsite installation. This industry is showing healthy, albeit small, grow rates.

This gives an illusion of security to this mature high-fragmented business where price competition is rise. The next generation navigation technology- infrastructure-independent flexible autonomy- has the potential to shatter this illusion. This new technology, whilst appearing just as the next natural step in navigation technology evolution, requires a wholescale change in the software side of the robots, giving an opportunity to new challengers to enter and to fully redraw the competitive landscape.

Avnet adds Opulent Americas LEDs

Avnet signed a distribution agreement with Opulent Americas Inc., part of Singapore-based Opulent Group, providers of Opulent LED lighting modules, heat sinks and other integrated LED lighting components and systems for solid state lighting, automotive, horticulture and medical solutions.

Opulent Americas, a globally integrated manufacturer with domestic and international manufacturing capabilities, also provides custom solutions ranging from PCBA design to full turnkey assembly. Opulent Americas' ISO certifications include ISO 9001, ISO 14001, ISO 13485 and ISO 16949.

"Energy efficiency has become both an environmental and economic mandate in the technology sector. With Opulent Americas' building block methodology for solid state lighting development and manufacturing, customers can create high-quality, versatile lighting systems that are not only built to last, but to operate at competitive price points," said Alex Iuorio, senior vice president, supplier development, Avnet. "Working together, Avnet and Opulent Americas will provide customers with best-in-class design and supply chain support."

TTI achieves audit for ISO AS9100-D Cert

TTI Inc., Fort Worth TX, global distributor of passive, interconnect, electromechanical and discrete components, has successfully completed the transition audit to the new revision of AS9100, Rev D. The designation is the recognized aerospace standard for quality management systems administered through the International Standards Organization (ISO) and SAE.

"We are excited to be one of the first companies in our industry to successfully complete the transition and audit to this version," says Kevin Sink, TTI vice-president total quality. "The new standard brings with it attention to the company's interested parties and their primary concerns. Additionally, the certification extends beyond processes alone and brings into focus the impact of long-range planning to our customers, suppliers and others."

Mouser signs disty deal with Basler, offers maker-ready Bluefruit

Mouser Electronics Inc. has reached a global distribution partnership with Basler, a leading global manufacturer of high-quality digital cameras and lenses. The company's embedded vision products combine the latest chip and software developments with industrial machine-vision technology for cost-effective board-level camera systems suitable for factory automation, logistics, robotics and the industrial Internet of Things (IIoT).

The Basler product line includes the dart series camera modules and Embedded Vision Kits for easy evaluation and development. The Basler dart camera line has been developed to meet the requirements of a broad variety of vision applications. Basler's Embedded Vision Kits provide developers with easy-to-use kits with all the components needed for hassle-free camera integration or evaluation.

Feather nRF52 Bluefruit from Adafruit

Mouser also recently announced that it is now stocking the Feather nRF52 Bluefruit from Adafruit, a line of standalone and stackable development boards that are Arduino-compatible. The Bluetooth low energy development board comes with built-in USB and battery charging. Using the powerful onboard Nordic system-on-chip (SoC), engineers and makers can run code directly on the board without requiring an external microcontroller, which improves performance and power consumption for a variety of Internet of Things (IoT), wearables, lighting, MIDI audio, and other applications.

Thermally conductive, electrically insulative epoxy bonds, seals

EP39MAOHT two component, thermally conductive, electrically insulative epoxy can be used for bonding, sealing, coating, potting and encapsulation. The mix ratio is a forgiving one to one by weight and after mixing, the epoxy flows smoothly. Upon mixing, this lower viscosity system has a relatively long working life. Product will cure at room temperature in 3-5 days. An alternative is to heat cure for 3-4 hours at 150-200°F. An optimum cure schedule would be overnight at room temperature followed by 3-5 hours at 150-200°F. Product has very low shrinkage and good dimensional stability upon curing.

MASTER BOND

http://ept.hotims.com/65991-46

Over-the-Air test systems meet 5G test challenges

R&S TS8991 Over-the-Air (OTA) Performance Test System is a single-source turnkey system for wireless testing that meets the needs of industry and regulatory certification tests. Unit includes an anechoic chamber, positioning equipment, antenna (link & measurement) systems, test instruments and automated measurement software. Compliant with CTIA, joint CTIA & Wi-FI Alliance and 3GPP test plans, test system is available in different sizes and its modular system design allows for customer-specific configurations. Systems can be custom designed to meet specific requirements in terms of size, functionality, frequency range and applications. Users can either purchase separate components (instruments, chamber, software) for their OTA test solution and assemble and integrate them themselves.

ROHDE & SCHWARZ

http://ept.hotims.com/65991-47

Cleaning fluid removes flux

Tergo High Performance Flux Remover is an innovative non-flammable cleaning chemistry designed to clean circuit boards in automated vapor degreasing systems. Product's formulation helps companies clean pcbs faster and more thoroughly, even in challenging applications, with a higher quality clean at a lower cost. Product can also can be used as a degreaser removing light oxidation and tarnish from finished surfaces. Product is specifically engineered to clean difficult high-temperature solder pastes and flux residues, including water-soluble (OA) fluxes. Product also removes stubborn white residues from pcbs.

MICROCARE

http://ept.hotims.com/65991-48

IO-Link modules provide transparency to sensor-actuator level

IP20 and IP67 IO-Link Master modules use the IO-Link open standard (IEC 61131-9) serial communication protocol to connect and communicate data to and from sensors and actuators. This increased transparency down to the sensor-actuator level helps improve diagnostics and efficiency, increase machine availability and reduce downtime. Products provide simple, user-friendly web-based configuration and monitoring. This allows users to conveniently change parameters using the web server and provides for both on-site and remote testing and diagnostics without the need for additional software. Processes and procedures can be simulated without a connection to the controller for simplified phase commissioning and faster service response in the event of unplanned downtime.

WEIDMULLER

http://ept.hotims.com/65991-49

Crimping applicators serve broad range of applications

Uni-M series of crimp applicators replaces the Uni-S series. The new applicator series provides a broader range of applications with improved delivery times. Precision devices provide easy set up and can accommodate virtually all forms of standard terminal types and carrier strips with mechanical and pneumatic feed applicators. Product series can accommodate insulated ferrules in continuous strip, splice terminals and Mylar tape terminals.

SCHLEUNIGER

http://ept.hotims.com/65991-50

3D AOI system boosts inspection process

FX-940 ULTRA 3D AOI system provides high-powered inspection with an improved false call rate. Unit runs faster than 2D systems, while dramatically improving coverage. Product can be used for the inspection of solder defects, lead defects/lifted leads, component presence and co-planarity of chips, BGAs and other height sensitive devices.

NORDSON YESTECH

http://ept.hotims.com/65991-51

24W dc LED drivers are tiny

NanoDriver Series phase-cut dc LED driver series deliver a power density 10X higher than conventional LED drivers. Product series measures 13.5mm wide, and is available in four versions rated for 16W and 24W output power for operating LED lighting with input power of 120V or 230V (50 – 60Hz), and can be driven by ac or dc power supplies. Devices feature an IC directly attached to the substrate, dramatically reducing the size of the converter.

SEOUL SEMICONDUCTOR

http://ept.hotims.com/65991-52

Thermal gap filler is easy to apply, form-in-place

SARCON SPG-20A is an easy to dispense, low-viscosity silicone compound that exhibits a thermal conductivity of 2.0W/m°K and a thermal resistance of 2.1°K•cm2/W. When applied between heat-generating components and a nearby heatsink or spreader, the form stable thermal material completely fills unwanted gaps as small as 0.08mm. This allows for more efficient transfer and dissipation of heat from the component and improved performance. Product serves as an alternative to thermal grease due to its superior handling properties.

FUJIPOLY AMERICA

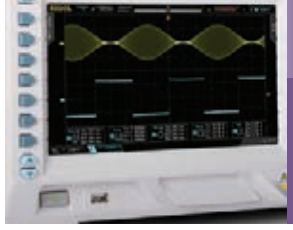
http://ept.hotims.com/65991-53

Miniature low voltage dc-dc LED driver

LUXdrive MiniPuck family of low voltage drivers delivers a total volume of less than one cubic inch, providing a dimmable, constant current power module suitable for driving all types of high-brightness, high-power LEDs where volumetric area is limited. Device provides a footprint measuring 0.79 x 0.66 x 0.43 (LWH) inches and it can deliver up to 1000mA of drive current which places it top in class amongst other industry solutions. Device is available in both a pinned package, as well as a surface mount version.

LED DYNAMICS

http://ept.hotims.com/65991-54



Instrumentation & Test

Power supply creates complex dc transient waveforms

62000P Programmable DC Power Supply provides design and test advantages not found in typical supplies including the ability to create complex dc transient waveforms. Unit allows users to program complex dc transient waveforms to test device behavior to spikes, drops and other voltage deviations. Product serves a wide range of high voltage/low current and low voltage/high current stimulus thereby reducing the number of supplies needed in typical applications. Unit includes built in 16 bit read back capability for accurate input voltage and current readings.

CHROMA

http://ept.hotims.com/65991-55

Optical analysis solution streamlines validation challenges

DPO70E1 calibrated optical probe and analysis software, for use with real-time oscilloscopes, is optical reference receiver (ORR) compliant for 28-GBaud PAM4 applications and supports IEEE/OIF-CEI standard specific measurements. Solution complements firm's optical PAM4 analysis tools for sampling oscilloscopes, giving design teams efficient test solutions for all stages of the optical transmitter workflow.

TEKTRONIX

http://ept.hotims.com/65991-56

Touchscreen thermal imaging camera delivers interchangeable lenses

FLIR E85 Touchscreen thermal imaging camera provides interchangeable lenses that auto-calibrate with the camera, as well as a vibrant 4" touchscreen with scratch-resistant Dragontrail cover glass and a fast and responsive interface. Lenses come in 14°, 24°, 42° and from wide angle to telephoto, providing complete coverage of near and far targets. Each lens can be set up to auto-calibrate using AutoCal with the camera for quick swapping in the field. Specifications include a detector resolution of 384 x 288 and an object temperature range of -20 to 1200°C. Device's thermal sensitivity is < 0.03°C @ 30°C (86°F).

ITM INSTRUMENTS

http://ept.hotims.com/65991-57

Optical spectrum analyzer covers all testing applications

FTBx-5255 Optical Spectrum Analyzer (OSA) for field applications to meet the live network testing needs of telecom service providers, internet content providers and network equipment manufacturers. Unit allows service providers and data centers to stay live for in-service network testing of OSNR from 10G to 400G; O-band pluggables and L-band transceivers; and CWDM spectral analysis, among other applications. Product is available in EXFO's FTB-2, FTB-2 Pro and FTB-4 Pro portable test platforms as well as in the LTB-8 platform for rackmount and lab applications.

EXFO

http://ept.hotims.com/65991-58

newswatch

Fluke Process Instruments launches new website

Fluke Process Instruments has announced the launch of a new website, **www.flukeprocessinstruments.com**, combining its extensive global capabilities in industrial temperature measurement. The website was designed to reflect the company's core competencies and mission to provide the most comprehensive infrared temperature measurement and profiling solutions for industrial, maintenance and quality control applications.

Fluke Process Instruments brings together more than 150 years of experience in pioneering new technologies into one integrated company. By joining three recognized brand leaders – Raytek, Ircon and Datapaq – it provides a complete line of infrared sensors, linescanners, thermal imagers and profiling systems for use in today's most demanding environments.

Fluke Process Instruments has consolidated multiple legacy domains into a single website with a new look and feel. Content and resources on the site are focused on industry and application-specific requirements, with solutions offered by type of technology.

EXFO to acquire Yenista Optics

EXFO Inc. Quebec City-based network test, monitoring and analytics providers, has signed an agreement to acquire Yenista Optics, a privately held company based in Lannion, France. The firm supplies advanced optical test equipment for the R&D and manufacturing markets.

Yenista Optics' product portfolio includes benchtop optical spectrum analyzers, tunable lasers, tunable filters and passive optical component test systems for network equipment manufacturers and optical component vendors.

Yenista Optics' offering is highly complementary to EXFO's optical test portfolio, which largely consists of portable test equipment for the network service provider market.

Signal and spectrum analyzer provides 5GHz signal analysis

R&S FSW85 signal and spectrum analyzer provides 5GHz analysis bandwidth, required for analyzing wideband signals such as automotive radar FMCW chirp signals, IEEE 802.11ay signals and 5G waveform candidates. The amplitude and phase response of the unit together with the R&S FSW-B5000 are fully characterized at the factory across the entire frequency range. The amplitude and phase measurement accuracy are guaranteed throughout the measurement bandwidth. R&S FSW-B5000 supports center frequencies between 9.5GHz and 90GHz.

ROHDE & SCHWARZ

http://ept.hotims.com/65991-59

Modular LXI Ethernet reed relay matrix modules are high-density

Model 65-22x LXI Matrix Reed Relay Modules provide access to all signal connections on 200 pin connectors. Product range includes four plug-in models covering matrices of up to 1,536x4 in increments of 128 (model 65-221), 768x8 in increments of 64 (model 65-223), 384x16 in increments of 32 (model 65-225), and 192x32 in increments of 32 (model 65-227). Users can specify as many or as few plug-in modules (up to six) required and can field upgrade the chassis to extend the matrix when necessary. More than 1,500 relays can be closed simultaneously for specific conditions for parametric testing.

PICKERING INTERFACES

http://ept.hotims.com/65991-60

Stop wasting time and money by struggling with data analytics while designing T&M experiments

Deliver products to market faster by using modern data analytics tools

By Brad Doerr and Ailee Grumbine, Keysight Technologies Inc.

The design-to-manufacturing (D2M) process typically involves sequential stages of design, simulation, fabrication, validation, compliance testing and manufacturing. Each stage requires data collection typically specified in an initial design of experiments (DOE) and aimed at providing confidence that the design can meet critical requirements. Effective data analytics tools can help engineers evaluate insights available within the dataset collected per the DOE in each stage of the design-to-manufacturing process. Time-to-market (TTM) can be greatly accelerated by utilizing modern data analytics tools while also increasing confidence in key technical decisions.

Today's design work flow

The first two stages of the D2M process are design and simulation. After the initial design is completed, the designer will perform simulation to ensure the design will meet the required design specification. The simulation can provide some key statistics and additionally produces waveforms that can be fed into compliance test applications that can validate industry-standard interfaces that are integrated into the design (e.g. DDR, USB, or PCIE). Simulation validation is a critical task to handle prior to committing to fabrication, which is typically very expensive for ASICs and complex printed circuit boards. This stage generates a great amount of data and measurement results which should be archived for later comparison with physical testing.

After fabrication, the next stage of the design work-flow is physical validation of the design. Design validation is performed on newly built devices (DUTs) by using test equipment such as oscilloscopes, bit error rate testers, and other measurement devices. At this stage, validation engineers will make measurements on multiple samples of the design per the DOE created during the design stage.

In the validation stage, the goal is to make many of the same measurements made in the simulation stage – but this time on real hardware. The DOE typically requires validation in a wide range of operating conditions, such as temperature, input voltage and various software configurations – a lot of data is gathered during this process. Furthermore, these tests must be made many times across many physical samples to ensure statistical significance of the test results.

As the engineering team is collecting the data, they will analyze the data to determine how the design has performed. This analysis is often slowed because of awkward or tedious tools and data management. The data comes from a wide range of instruments from various vendors with data in CSV, XML, binary, or other various formats. The data is often stored in multiple places and managed by multiple people. Furthermore, the analysis is often handled with a variety of tools such as databases, Excel spreadsheets, PIVOT tables, JMP, MATLAB, R and/or other home-grown tools. The challenge is compounded by the fact that most engineering teams directly manage this data and the home-grown tools and processes – and this distracts from making measurements and promptly analyzing the findings.

Once the design has been validated for basic system performance, the engineering team will progress to compliance testing on the physical DUT to validate that key interfaces fully comply with industry standard interfaces. Again, this testing must include a wide range of conditions, each with multiple measurements across multiple DUTs. The use of a trusted compliance application is ideal in this stage. Automated compliance test software can save a lot of time as it makes all the required measurements in an automated process and produces the test report with statistical analysis based on the test limits specified in the corresponding industry standard.

This allows the engineers to characterize and determine the margins they have in their designs. It also enables a backward compare to the original simulated design results. This enables an apples-to-apples compare of empirical test data with the original design intent. This data is also very useful if/when the first build is not sufficient for manufacturing release and a second design cut is needed.

Once the design is fully validated, the design can move to the manufacturing stage. As the manufacturing team is preparing to begin production, they will need to identify the production processes and measurements that will be made to ensure the design will meet the manufacturing goals. Often these goals are derived from the original DOE created at the start of the program.

As such, the manufacturing team will also need to have access to the design and validation data. By using a modern data analytics solution, this data will be readily accessible by the manufacturing team. As production ramps-up, the manufacturing team will progress into the manufacturing optimization stage – seeking efficiency improvements and/or yield improvements to improve profitability.

Again, the data is critical to driving these improvements. Along the way, the manufacturing team will typically capture many of the same data that was captured in the early stages of development. Together this data provides the basis for effective manufacturing management and optimization.

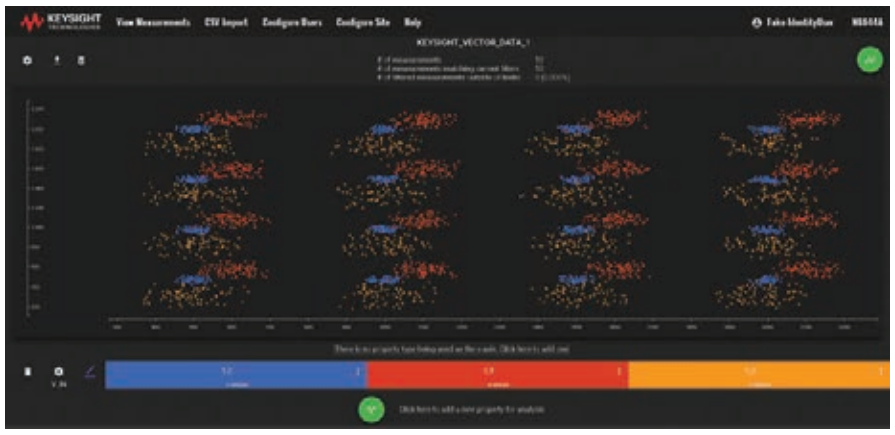


Figure 1. Overlay of 3 different input voltages (1V, 0.9V and 0.8V) 5G QAM4 constellation data.

Start with a clear DOE and then choose the right analytics tool

Clearly data management and information insight is key to a successful D2M program. A capable data analytics platform will help, and by integrating the DOE at the start of the process, the engineering team will be able to achieve efficiency and confident decisions.

The DOE is created in the early stages of design and it is aimed at providing the data that can answer key questions about the design (e.g. will it meet the key specs, how will it perform in various conditions, how much power will it consume). This DOE then defines the tests required to run in simulation and on the physical DUTs.

The DOE also identifies the test conditions and the number of tests that need to be run to achieve statistical confidence in the results. At this stage, it is also important for the team to identify the tools (e.g. oscilloscopes and/or compliance apps) needed to run the tests in simulation and physical environments.

It's also critical the simulation and validation teams use the same measurement tools and algorithms to ensure apples/apples comparison of results. Failing to do this will ensure doubt in the team's decision making process.

Yes, the DOE will evolve during the program, and it is critical to choose a data analytics platform that can adapt alongside the DOE evolution. Nobody likes to delay a program while the IT team "re-architects the database schema".

There are some key elements to a suitable data analytics platform:

- Can store all measurement data (bulk and real-time upload)
- Compatible with sim and measurement tools from any vendor (any format)
- High availability, backed-up, secure, enterprise-class performance
- Enable the team to run in parallel – adding data in parallel (from multiple sites/geographies)
- Low maintenance for the engineering team
- Flexible to real-time DOE changes (these will invariably happen and shouldn't slow the team down)
- Enable the entire team to retrieve the data promptly and perform analytics (from any location)
- Easy to use analytics so the entire team can participate in identifying insights and making decisions
- Export to other deeper analytic tools for custom analysis
- Automatic report generation.

Real-time analysis with modern visualization tools

There are many visualization tools in the market today that are used to help engineers analyze their test data. However, they are usually available as heavyweight native applications designed for a single user who has the time to acquire deep application expertise. These tools do not support the needs of an engineering team that must drive programs in real-time, making fast confident decisions as their program rapidly progresses. These tools just don't fit well in the test and measurement D2M world – especially as engineering teams are increasingly global and distributed. The visualization tool for D2M teams must provide data access to the entire team, with well-known visualization capabilities such as histogram, sweep, box-and-whisker, and scatter plots.

Sweep plots or vector plots allow users to view 2-dimensional "sweep-data". D2M and T&M applications rely heavily on sweep-data such as time-domain waveforms, frequency-domain magnitude plots, and eye diagrams. The right analytics tool will enable the team to overlay (for example) multiple eye diagrams with different test conditions. The overlay feature allows the user to determine test conditions that cause the eye to close or have less margin. The design engineer can use this information to optimize the design for best performance. Another example of a sweep/vector plot is a constellation diagram. **Figure 1** shows an example of a 5G QAM4 constellation diagram. There are

Figure 2. Box-and-Whisker plot of a jitter measurement with multi-level split capability.

continued on page 15

The six basic audio measurements

David Mathew, of audio analyzer manufacturer Audio Precision, explains the six main tests that lie at the heart of all audio testing.

When reduced to its basics, the process of audio test and measurement is concerned with a small number of performance benchmarks. At my company, we call these 'the Big Six', and they are as follows:


David Matthew

- Level
- Frequency Response
- THD+N (Total Harmonic Distortion plus Noise)
- Phase
- Crosstalk
- Signal-to-Noise Ratio (SNR)

Level

Any Device Under Test (or DUT, as often referenced in the world of test and measurement) may have a number of level measurements that are of interest. You must choose which level you are seeking. Target levels include:

- An input level that produces a given output level, such as 1 volt, or 1 watt, or unity gain (see below for a discussion of DUT gain);
- An input level that produces a certain output distortion, such as 1% THD+N;
- A level that provides good noise performance with comfortable headroom, often called the operating level;
- An input or output level specified in a testing document.

Any of these levels may be used as a reference level on which we can base further measurements. Frequency response measurements, for example, are expressed relative to the level of a mid-band frequency; THD+N measurements are made at specified levels, which should be reported in the results.

The ratio of a DUT's output voltage level to its input voltage level is the voltage gain of the DUT. For example, in a DUT with a gain of 2, an applied input of 2 volts will produce an output of 4 volts. A gain of 1, where the output voltage equals the input voltage, is called unity gain. Some DUTs offer no gain adjustments, and are said to have fixed gain. The gain may be fixed at unity, or at some other value.

A DUT with a volume control or other setting that affects gain is a variable gain device. When setting and measuring level, it is essential to consider whether or not the DUT gain is variable (not only volume controls, but tone controls and other settings can change gain), and, if it is, how to set the DUT controls for the desired test results.

Frequency response

A frequency response measurement reports the output levels of a DUT when stimulated with different frequencies of known level. The simplest of all frequency response measurements consists of only two or three tones, the first near the middle of a DUT's usable frequency range, and followed by a tone near the higher extreme of the range and sometimes a tone near the lower extreme. Assuming the tones are all generated at the same level, the DUT's output levels describe its response to these different frequencies.

Full-range frequency response measurements can be made by a number of different methods, the classic being a sweep of a sine wave from the lowest frequency in the range to the highest, with the results plotted on a graph. A 'flat' response describes the shape of a graph where the DUT responds equally at all frequencies, producing a trace with a slope of 0 and with minimal variations.

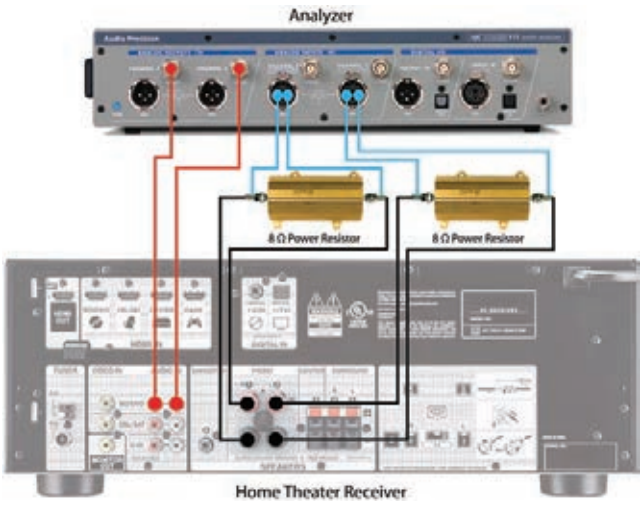
THD+N

THD+N stands for Total Harmonic Distortion plus Noise. Harmonic distortion is the unwanted addition of new tones to the audio signal. These tones are harmonically related tones to the original signal: when the signal is one sine wave of frequency f1, harmonic tones are f2, f3 and so on, at integral multiples of the original tone. Total harmonic distortion is the sum of all of the harmonics measured in the DUT's bandwidth.

Why THD+N? Why not just measure THD (the distortion) and N (the noise) individually? Well, in the pre-FFT days of audio measurement it was difficult to measure the THD by itself, without the noise, but it was relatively simple to measure the THD and the N together. So the accepted techniques handed down from years past specify THD+N, because that's what was practical. In addition, THD+N is a convenient and telling single-number mark of performance, widely understood and accepted.

The measured THD+N of a device will vary with the measurement bandwidth. You will almost always want to restrict the measurement bandwidth using high-pass and low-pass filters, and you must include the bandwidth used when you state the result. THD+N is typically measured and reported in a 20 Hz–20 kHz bandwidth.

The measured THD+N of a device will also vary with level and the frequency of the applied signal. Audio THD+N is typically measured and reported at a mid-range frequency (1 kHz or so) at the either the device's nominal operating level or at its maximum output level (MOL).



Phase

In audio engineering, phase measurements are used to describe the positive or negative time offset in a cycle of a periodic waveform (such as a sine wave), measured from a reference waveform. The reference is usually the same signal at a different point in the system, or a related signal in a different channel in the system. This choice of references defines the two most common phase measurements: device input/output phase, and inter-channel phase.

Phase shift varies with frequency, and it is not uncommon to make phase measurements at several frequencies or to plot the phase response of a frequency sweep. Phase is expressed in degrees.

Crosstalk

In audio systems of more than one channel, it is undesirable for the signal in one channel to appear at a reduced level in the output of another channel. This signal leakage across channels is called crosstalk, and in practical devices it is very difficult to eliminate. It's expressed as the ratio of the undesired signal in the unstimulated channel to the signal in the stimulated channel.

Crosstalk is largely the result of capacitive coupling between channel conductors in the device, and usually exhibits a rising characteristic with frequency. It's often expressed in the form of a single-number result; however, a crosstalk versus frequency sweep will show how a DUT performs across its operating bandwidth.

Signal-to-noise ratio

How much noise is too much? That depends on how loud your signal is. Signal-to-noise ratio (or SNR) is a measure of this difference, providing (like THD+N) a single-number mark of device performance. The signal is usually set to the nominal operating level or to the maximum operating level of the DUT. When SNR is made using the MOL, the result can also be called the dynamic range, since it describes the two extremes of level possible in the DUT. (Dynamic range in digital devices has a somewhat different meaning). SNR is usually stated in decibels, often shown as negative.

Using traditional methods, SNR requires two measurements and a bit of arithmetic. First you measure the signal level, then turn off the generator (and often, terminate the DUT inputs in a low impedance as well, to fully reduce the noise in the device). Then the noise level (often called the noise floor) is measured, using filters to restrict the measurement bandwidth. The ratio between the two is the SNR.

David Mathew is technical publications manager and a senior technical writer at Audio Precision in Beaverton OR. He has worked as both a mixing engineer and as a technical engineer in the recording and filmmaking industries, and was awarded an Emmy for his sound work in 1988.

For more information on audio analyzing from Audio Precision, go to http://ept.hotims.com/65991-61

Oscilloscopes available at 100MHz or 200MHz bandwidths

Rigol Technologies DS2000E Series 200MHz, 2 channel oscilloscopes are available at either 100MHz or 200MHz bandwidths. All models provide 2 analog channels with 50ohm input impedance standard. With real-time sample rate of 1GS/Sec (on both channels), memory depth of up to 28Mpts standard and waveform capture rate up to 50,000wfms/sec, unit provides the raw instrument performance required to meet advanced debug challenges. Product includes large 8 inch WVGA intensity graded display, complete network connectivity, hardware waveform record/playback, serial trigger and decode and other advanced analysis capabilities.

ELECTRO-METERS

http://ept.hotims.com/65991-62

Data analytics while designing T&M experiments

continued from page 14

3 sets of constellation data overlain which represent 3 different input voltages: 1V, 0.9V. and 0.8V. The plot shows us that the constellation diagram with input voltage of 1V has the cleanest transmitted symbol. The constellation diagram with input voltage of 0.8V appears to be the one with the lowest received signal quality with potential phase noise issues.

Another popular visualization method in the test and measurement world is a box-and-whisker plot. **Figure 2** shows an example of a box-and-whisker plot of a jitter measurement with multi-level split capability. The user can split on more than one property for analysis purposes. The plot on the left is split by the three usernames: Sakata, Fernandez, and Chang. The plot on right is split by username and input voltage. The plot indicated most of Chang's measurement values are higher than the upper limit, especially for the input voltage of 0.8V.

In summary, successful D2M programs require a clear DOE and necessarily generate a great amount of data. With upfront planning and by choosing the right analytics platform, engineering teams can optimize effectiveness and time to market. This same data can also be leveraged into manufacturing ramp and manufacturing optimization.

For more information on D2M programs from Keysight Technologies, go to http://ept.hotims.com/65991-63

Nanotechnology-based electronics waterproofing technology

By Edward Hughes, CEO of Aculon

The miniaturization of electronic products continues to drive printed circuit board (pcb) manufacturing towards smaller and more densely packed boards with increased electronic capabilities. With virtually every electronic device containing at least one pcb, they are a modern marvel and one of the most disruptive innovations of the last one hundred years.

Pcbs consist of sub components responsible for running electronic devices such as computers, smartphones, smart watches, medical examination devices, dialysis machines, military grade radars, and a range of other commercial and industrial products. They are comprised of glass-fabricated plastic on which circuits are printed with copper tracks where the individual electronic components are then soldered to the interconnecting circuits. With all the wiring and components fixed, they're easier to maintain than manually designed circuits and because they're designed with computers using specialized design software, they are compact in size and the chances of errors are next to zero. Since the copper tracks are embedded on the board, there are minimal chances of short circuits – except when in contact with water.

Pcbs are sensitive to liquid

Whether submersion, a splash or even fog, printed circuit boards are particularly sensitive to liquid exposure. Because of their delicate nature, electronics manufacturers are challenged to find reliable, economical and high-performance materials that minimizes or mitigates the damage that compromises safety and operation of electronic devices. Increasingly designers want to build fluid protection into the design to ensure product performance and reduce device failures. As a result of claims by several leading mobile phone brands, consumers are now looking for water resistance and protection as a feature of new and improved devices.

Unsealed electronics are also problematic when exposed to dust. When left unpowered in a humid environment, dust absorbs moisture from the air, which can cause corrosion. It's more likely, however, for corrosion to manifest itself at power-up – and when it does, dendrites form and creates a short circuit within seconds.

2 categories of sealing devices

In the last few years, engineers have tried several means for sealing devices. Those water-resistance product offerings generally fall into two categories: solution based hydro/oleophobic conformal coatings that repels fluids, but require some level of masking or 'keep-out' areas; and vacuum-deposited coatings, which also require masking, such as parylene-based treatments.

Waterproof epoxies are available in the market but they are not specifically used for pcbs. They are not comprised of metal additives, and hence, reduce the chances of short-circuiting. Although, they possess excellent chemical and abrasion resistance, they can cause stress on components during thermal extremes. Due to fluctuating temperatures during the application process it can cause considerable drift in viscosities and difficulties in controlling cure times and inconsistencies in coating thicknesses.

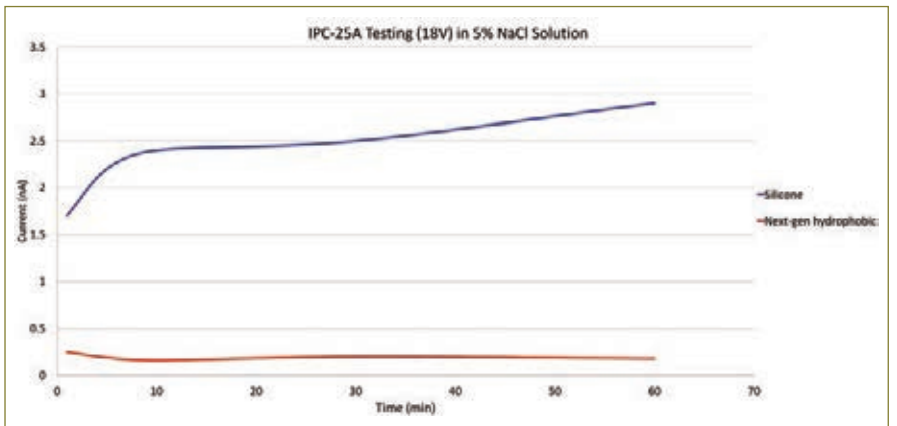
Waxing is a method that's also been used in electronic devices. Industrial wax is heated until it is melted and the board is dipped into the wax. When the wax cools it becomes watertight. However, it works well enough on rigid boards, but not on flexible circuits.

> These new technologies eliminate the need for costly capital investments and mitigate the bottlenecking batch process of vacuum-based manufacturing or masking operations.

Liquid electrical tape is yet another method. It uses a rubber coating that is designed to provide electrical insulation for electronic devices, which is applied over connectors and solder. However, liquid electrical tape makes minimal bond with most surfaces, rather it bonds to itself to surround an item. Eventually, water or dust can creep in especially along wire connections.

These processes are tedious, complex and can be expensive, and more importantly they are not effective in protecting the critical components of electronic equipment. Consumers have had to rely on specialty cases to protect their devices, which take away from the integrity and functionality of the design.

In the ever-evolving pcb market, a 'no mask' category of surface treatments has emerged. Hydro/oleophobic coatings can be applied inline at the manufacturer, and their performance, ease of use and range of treatments meet manufacturers' requirements for performance, thickness, application and economics. These new technologies eliminate the need for costly capital investments and mitigate the bottlenecking batch process of vacuum-based manufacturing or masking operations.



Testing of IPC Board at 18 volts immersed in salt water for 60 minutes to measure current leakage

There are technologies on the market today that provide water protection from humidity to full water immersion for any number of consumer electronics including cell phones, hearing aids, Bluetooth devices and household 'smart' electronics.

The IPX standard rating provides a clearer picture of how water resistant a component is compared to vague marketing terms such as 'waterproof'. In IPX testing which ranges from IPX0, or not water-resistant at all to IPX8, the ultimate protection against accidental water damage, up to immersion in water over a three-meter depth.

Waterproof technologies experiment

In an experiment for efficacy, coatings were applied to printed circuit boards with electrical test patterns. The pcbs were connected to an external power supply and maintained at a constant voltage while using a digital ammeter to measure current across the electrodes. Using a modification of the IPX7 testing standard, powered test boards were immersed in water or salt water for an extended time at a variety of voltages.

The circuit's current was measured while immersed and charted to determine the effect of the water on the circuitry. Increases in the measured current are due to the development of a conductive path (essentially making an electrochemical circuit) through the water medium between the two electrodes. Successful inhibition of such conduction is achieved by coatings providing a barrier to ion migration. Additionally three strips of tin coated stainless steel were dip coated with each a nano-enabled coating and the conductivity measured over time to demonstrate whether or not coatings prevented push through electrical connections.

IPC-Association Connecting Electronics Industries approved printed test boards were chosen, as recommended in the guidelines for testing solder masks and conformal coatings. Boards were cut vertically to isolate the E and F patterns, then to maintain testing uniformity, pattern F was used for immersion testing. Prior to coating, the boards were cleaned with Ionox I3416 Cleaning Solvent, rinsed with IPA then blown dry with compressed air to remove any common contaminants such as flux residues, dust or other particulates.

The water immersion test was based on the IPX7 test standard established by the International Electrotechnical Commission (IEC), a stringent test of the resistance of coated boards towards direct exposure to water. An unpowered electronic device was immersed in one meter of water for 30 minutes. After the 30 minutes, the device was removed and the power turned on. Another modification to test at more rigorous levels than IPX7 was immersion in electrically conductive 5% aqueous sodium chloride. This modification approximates extremely aggressive 'real world' conditions like sweat immersion. Seawater averages 3.5% and sweat contains even less salinity.

Using a BK Precision dc power supply model 1670A a constant voltage of 3, 6, and 12 volts was applied to the test pattern. The development of current flow across the open comb F test pattern during the 60-minute immersion test was then measured with a Vernier Energy Sensor. After 60 minutes, the board was removed, rinsed with water and evaluated.

Sample boards were tested at several voltages since power sources in electronic devices tend to vary substantially. For conductivity measurements a HP 34420A Nano Volt/ Micro Ohm meter was used in 4 point probe mode with 2.54mm gold coated Harwin spring probes.

While the IPX7 standards call for the immersion of finished devices in water, tests were performed on exposed boards to remove the effect of a specific devices' geometry on the utility of the coatings for water-proofing electronics. Additional modifications beyond enclosure removal were made to the IPX7 protocol to make testing more aggressive: **1**) immersing in water or salt water, **2**) delivering several different voltages to the circuitry during testing and **3**) increasing the immersion interval time to 60 minutes. In every

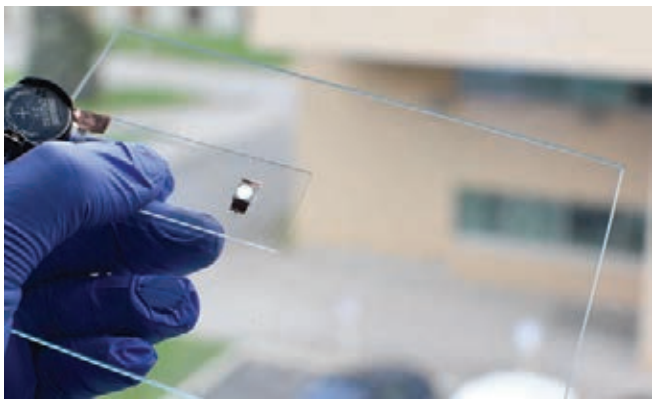
LED Light – Control i.e. not immersed in water

LED Light treated with silicone after being powered up at 12 volts and immersed in water- Corrosion evident.

continued on page 18

Waterloo startup NanoCnet rolls-out Next Gen Nanomaterial for flexible transparent electrodes

EP&T Magazine conducted an exclusive Question & Answer session with NanoCnet co-founders Dr. Hadi Hosseinzadeh Khaligh, CEO and Dr. Ehsan Mazbanrad, COO

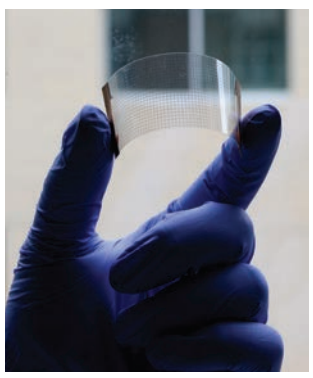


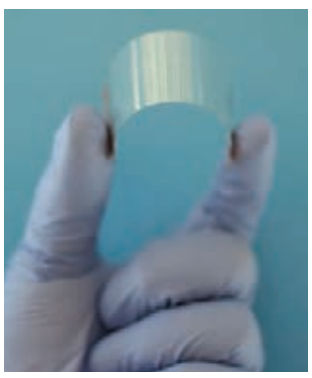
Company synopsis:

NanoCnet Ltd. is a Waterloo-based startup company established in 2016 with the objective to manufacture silver nanostructure ink and transparent conductive film.

NanoCnet recently introduced a new generation of nonmaterial for flexible transparent electrodes. Highly transparent electrodes, with high electrical conductivity and thermal stability can be fabricated using NanoCnet's silver based ink called 'Nanosilvex'. Compared to typical silver nanowire, synthesis process of NanoCnet's nonmaterial synthesis is faster and happens at room temperature which is essential for low-cost manufacturing. The unique properties of NanoCnet's electrodes make them a suitable option for device applications such as touch panels, solar cells, displays, and smart windows.

Q. Describe NanoCnet's silver nanostructure ink and transparent conductive film for our readers.
A. Conductive inks and transparent conductive films are being used widely for manufacturing many electronic devices including touchscreens, displays, solar cells, sensors and smart windows. Our silver nanostructure ink called 'Nanosilvex' is a unique nanomaterial dispersed in an aqueous medium and is compatible with roll-to-roll manufacturing processes. After depositing the ink on a transparent substrate, nanomaterials make a highly conductive network on the surface with lots of empty spaces between them which results in a highly transparent and conductive film. This film can be employed to make high performance, flexible electronics at much lower cost.





Q. Describe the unique properties of these electrodes.
A. Our 'Nanosilvex' ink is produced at room temperature and whole process takes a few minutes which reduces the manufacture cost significantly. In addition, their unique structure makes the film highly stable under chemical, mechanical, and thermal stresses that, is essential for durability of the films in devices.

Q. NanoCnet CEO, Dr. Hadi Hosseinzadeh Khaligh, describes how the firm achieved its early success.
A. I received my MASc. and Ph.D. degree in nanotechnology from the University of Waterloo. I spent last seven years studying transparent conductive films and mostly on deficiencies of the current technologies. After I graduated from the University of Waterloo I decided to find a way to address the problems of the existing technologies that I noted during my research and finally found it. I successfully gathered a strong technical team headed by Dr. Ehsan that could help me to develop a new generation of nanostructures that could solve the cost, flexibility, and durability issues of the current technology. We are working with dedicated aim to be the first in the market with our unique solution.

Q. What are the key advantages of using these products in an electronic design?
A. 'Nanosilver' ink is easy to apply using existing roll-to-roll manufacturing processes. The resulting 'Nanosilvex' film is a low-cost, flexible, and durable option for electronic devices. The high durability means these films can tolerate much higher level of thermal, electrical and chemical stresses compared to other competitor's products on the market.

Q. What are the main (design) applications you anticipate these production materials being used in?
A. Our 'Nanosilvex' ink and transparent conductive ink can be integrated in a wide range of applications. The main goal of NanoCnet is to integrate the films into the upcoming printed flexible technologies mainly flexible touch panels, displays, smart device and clothing.

Q. Briefly describe how NanoCnet's transparent conductive films will lower the cost of manufacturing.
A. Our ink is synthetized at room temperature and ambient pressure and the whole process take only few minutes. This reduces the manufacturing cost significantly. In addition, we use water-based and eco-friendly chemicals which reduce the raw materials cost as well.

Q. Describe the rise in use and importance anticipated for flexible and printable electronics in the coming years (decade).
A. Flexible electronics are becoming popular now days and even more popular in future. Records show a market growth rate of 20% per annum. Besides that, the touchscreen market is growing rapidly these years and the market value will be doubled in next 5 years reaching more than $7B. by year 2022.

Q. You are currently operating out of the Accelerator Centre in Waterloo. Describe the importance it has played in assisting NanoCnet through the early start-up phase.
A. The Accelerator has been a great source of help in three main areas of helping us to obtain access to financial assistance opportunities, use of experts and experienced mentors in all related areas of activities, as well use of the strong and national network they can provide us by helping develop and move toward our mission.

Q. Describe the process of licensing electronic device OEMs to use your technology.
A. We are currently negotiating with large enterprises to find the best industrial partner to scale up our manufacturing process and potentially license device manufacturing companies to use our products in their devices.

Q. Describe the importance of having strong IP protection.
A. We already have filed the provisional registration in USA. A completion application with the help of known and experienced Lawyer is in process. We will further continue to take all required steps to have full security and claim coverage on international base. Our technology and development being very unique with unbeatable advantages over existing technologies, it is very important to make sure the development is fully secured toward all possible claims. Accordingly the IP protection and license registration is of very high importance for us and we will do all needed to have that full security in place.

Q. Describe the importance of working in concert with smaller tech firms to help perfect your technology, prior to approaching some of the larger end-users of NanoCnet's products.
A. Working with all Beta manufacturers is highly valued and very important for us. We do have that objective in our mid and long-term agenda. Such cooperation and feedback as well the support we get from them help us to recognize any possible bottlenecks we may have as well to obtain validation from known and credible related industries. Smaller firms feedback results in maturing our developments faster by means of adjusting our final products with higher level of quality. This gain will save us lots of time and energy in creating a constructive platform for effectively negotiating with larger companies.

For more information on silver based ink called 'Nanosilvex' from NanoCnet, go to http://ept.hotims.com/65991-64

ProductSource

product source feature | product source feature | product source feature | product source feature

M12 Panel Mount Connectors with 18 AWG

Where voltage drop is a concern, customers prefer wire larger than the traditional 22 AWG used in M12 assemblies. Phoenix Contact now offers M12 panel mount connectors with 18 AWG. The larger wire provides lower resistance and reduces the chance of voltage drop. This results in creating greater accuracy of the monitoring systems.

PHOENIX CONTACT
www.phoenixcontact.ca
Tel: 800-890-2820 • cdinfo@phoenixcontact.ca

http://ept.hotims.com/65991-11

http://ept.hotims.com/65991-12

http://ept.hotims.com/65991-13

New Ka Shield Rack Cabinet Blocks Signals Up To 40 GHz For Positive EMI/RFI Protection

Equipto Electronics New "Ka Shield" Rack Enclosure far exceeds the toughest standard for EMI/RFI defense, with performance certified to 40GHz... TEMPEST requirement NSA 94-106; Custom sized; Front, rear or combination front/rear doors or panels; Line filters/wave guides; Honeycomb air filters • Many options; RoHS Compliant.

EQUIPTO ELECTRONICS
www.equiptoelec.com
Tel: 800.204.RACK (7225) • sales@equiptoelec.com

http://ept.hotims.com/65991-14

http://ept.hotims.com/65991-15

Strip Wire and Jacketed Cables with Ease

The UniStrip 2300 stripping machine strips wires ranging in size from 0.03 – 6 mm² (32 – 10 AWG) and jacketed cables up to 5.5 mm (0.22") in diameter. It's fully programmable and doesn't require any mechanical adjustments when processing different wire sizes and types. The first in its class, this innovative machine combines precision mechanics, short cycle times, and user-friendliness for increased productivity.

SCHLEUNIGER
www.schleuniger-na.com
905.827.1166 | sales@schleuniger.com

http://ept.hotims.com/65991-16

New DC Link High Temperature Film Capacitors

New EPCOS metallized polypropylene (MKP) film capacitors by TDK are ideally suited for high end-industrial and automotive applications such as frequency converters, power supplies, and DC-DC converter. These B3277*P series of film capacitors offer a high permissible operation temperature of 125°C,low ESL / ESR values, and are AEC-Q200 qualified.

www.epcos.com

http://ept.hotims.com/65991-17

http://ept.hotims.com/65991-18

ADVERTISERS' INDEX

printable electronics

Waterproofing technology

Continued from Page 16

test condition, coated sample boards demonstrated a significant reduction in the amount of corrosion and degradation of the metal traces compared to uncoated samples boards.

Uncoated test boards were visibly corroded and conducted significant energy when immersed with applied potential in both water and salt water. Test boards that were coated with waterproofing technology showed negligible current flow and minimal to no copper loss even after 60 minutes immersion. The coatings inhibited ion migration (and therefore conductive path formation) even with high applied potentials and an electrically-conductive fluid.

LED Light treated with next generation hydrophobic treatment after being powered up at 12 volts and immersed in water – No corrosion

Conclusion

Given the increase of liquid damages and the high cost of smartphones, phone repair has developed from a do-it-yourself and hope-it-works environment to a multi-billion dollar industry. The issue remains, however, how to repair phones that have been water damaged. The answer is with a syringe application. After disassembling and replacing the defective component, waterproofing technology can be applied via syringe to impart waterproofing properties to connectors.

In today's competitive marketplace where users are so attached to their electronic devices, water resistance isn't sufficient anymore. Applying hydrophilic coatings is a sophisticated process that requires skill and careful thought and devices coated with nanotechnology-enabled hydro/oleophobic coatings achieve longer lifetimes under 'real-use' circumstances in environmentally harsh conditions.

For more information on nanotech-enabled waterproofing for printed circuit boards from Aculon, go to http://ept.hotims.com/65991-65

products on review

All-in-one oscilloscope includes multiple built-in instruments

MDO-2000E Series Oscilloscopes combines several test instruments in one enclosure. An actual spectrum analyzer is included in the design, not just an FFT calculation to display the frequency domain. Product series includes two instrument combinations: MDO-2000EG and MDO-2000EX. MDO-2000EG models have a built-in true spectrum analyzer and a dual channel 25MHz arbitrary waveform generator, while MDO-2000EX models deliver a built-in a true spectrum analyzer, an arbitrary waveform generator, a 5,000 count DMM, and a 5V/1A power supply.

GWINSTEK

http://ept.hotims.com/65991-66

Your Source for Automation & Control

Over 3.5 million automation, electromechanical, cabling, and interconnect products from 300+ manufacturers.

thinkallied.com • 1.800.433.5700

ALLIED ELECTRONICS®

http://ept.hotims.com/65991-20