

EP&T



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Manufacturing, business mixed on Liberal majority in Ottawa

In the wake of the Liberals' decisive election victory, business groups related to the manufacturing sector have lined up with opinions on what impact Canada's voters delivered with a Liberal majority government – led by Justin Trudeau.

The Canadian Federation of Independent Business was quick to immediately congratulate Trudeau, but emphasized that its top priority is to reduce the corporate tax rate for small businesses as well as to control the overall burden of payroll taxes.

"We are eager to sit down with Trudeau and the Liberal Party and get to work on the issues that matter most to Canada's small businesses," CFIB president Dan Kelly said in a statement. According to The Canadian Press, BlackBerry CEO John Chen said Stephen Harper's Conservatives had been helpful to the tech company and said he'd like to see the 'status quo' from the Liberals.

Canada's largest high-tech trade association is calling for a beefed-up science and technology ministry dedicated to fostering business innovation. The recommendation from the Canadian Advanced Technology Alliance (CATA) includes dissolving Industry Canada and consolidating federal efforts around science, technology and business innovation under a single, senior minister.

Such a scenario would dovetail with Justin Trudeau's stated intention of appointing a federal cabinet that comprises a smaller number of ministers, who are empowered to implement a transformational agenda. As envisioned by CATA, the new minister would have the resources and the mandate to boost the

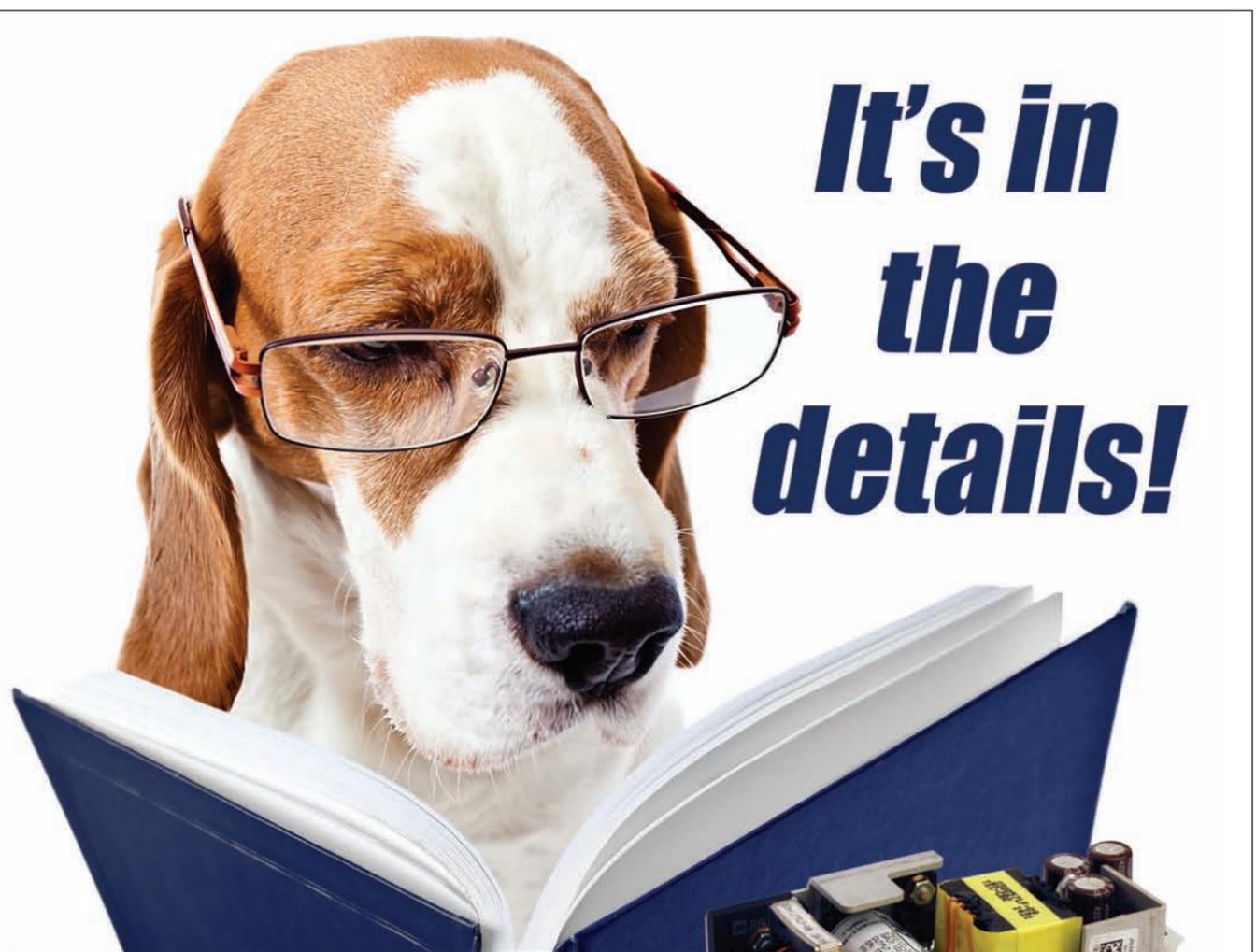
country's tepid private-sector R&D effort.

Many promises were made out on the campaign trail, and personal finance experts said there could be some positive implications for Canadians from the Liberal win. In their campaign, the Liberals made the following promises:

- Put up \$200-million a year for three years to help research facilities, small business incubators and exporters and invest another \$100-million a year for an industrial research assistance program.
- Scrap the purchase of the F-35 fighter jet and instead buy cheaper planes to replace the aging CF-18s and use the savings to pay for offshore Arctic patrol vessels for the navy being built in Halifax.
- Retain tax breaks for small businesses but want to ensure this doesn't primarily benefit the wealthy.
- Put \$100-million into organizations that promote clean technology firms.
- Provide infrastructure funding for 'smart cities.'

With virtually all areas of industry under rapid transformation because of digital technologies such as data mining and additive manufacturing (3D printing), a revamped federal ministry could help spur innovation culture in Canada, according to CATA CEO John Reid.

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*It's in
the
details!*

ZMS SERIES Long Lasting Power Supplies

Wanting a 2 x 4" that will go the distance? Check out TDK-Lambda's new ZMS100; a power supply that has been meticulously designed and tested.

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NEWSWATCH

IMS expands Calgary CEM production area

In an effort to continuously meet the growing needs of its customers, **Innovative Manufacturing Source (IMS) Inc.**, a Calgary-based full service contract electronic manufacturer (CEM) has taken aggressive steps in the past few years adding production space and equipment.

Within the span of two years the firm has taken significant steps in adding a new ERP system, as well as several pieces of new equipment, including X-Ray, board washer, selective wave, Juki pick and place machines, reflow ovens, inventory management system (Fortress XL 2000), 3D AOI, plus a new SPI, to name most of the impactful upgrades.

In addition to the production area equipment upgrades, IMS has gone through two renovations of both office and its temperature controlled production space, as the facility expanded from approximately 18,000 sq. feet to 40,000 sq. feet.

"We have invested heavily in state of the art manufacturing equipment to build even the most complicated circuit boards," says Stuart Henley, VP business development, IMS. "We continue to build our equipment capabilities as we grow as a business and expand our customer base. Our goal is to work together with our customer to meet their specific product needs."

Founded in 2004 and located in the Foothills Industrial Park in southeast Calgary, IMS serves a customer base that includes military, transportation, telecommunications, security, marine navigation and petroleum industries.

New rep firm focused on automated systems

A new Markham ON-based manufacturers' representative firm **R.W.A. Technical Sales Inc.** has been launched with the official signing of three key principals.

Formed by industry electronics supply chain veteran Bob Ashmore, RWA has signed an exclusive representatives' agreement with Klemsan, a Turkish maker of terminal blocks, automation products, wiring ducts, current transformers, and power transformers. Ashmore also has an exclusive arrangement with Nader, a Chinese manufacturer of circuit breakers. In addition, R.W.A. has signed a joint cooperative rep agreement with DEHN, a German-based lightning and surge protection solution provider.

"We know your automated system is the backbone of your business, which is why we offer innovative, Din Rail components that bring you better availability, and offer many products that meet the specific needs of our customer's business," says Ashmore.

R.W.A. Technical Sales also focuses on providing circuit and surge protection solutions to equipment from over-currents, surges and short circuits that can cause multi-million dollar losses.

TestEquity relaunches with broader mission, new products

TestEquity, Moorpark CA, a value-added distributor of test and measurement equipment, begins a new chapter in its nearly 45 years of service to the electronics industry - introducing a refreshed brand with full integration of an electronics lab and manufacturing tools and supplies business, significantly expanding the scope of its products.

From its beginnings as a supplier of refurbished test equipment in the early 1970s, TestEquity has grown to be the world's leading distributor of products from Keysight Technologies (formerly Agilent Technologies' Electronic Measurement Group) and products from Tektronix and its Keithley brand. In addition, the company serves as a major distributor for more than a dozen other A-list manufacturers including Rohde & Schwartz, Anritsu, Viavi (formerly JDSU), Fluke, and FLIR.

With the acquisition last year of EWD Solutions, a regional distributor based in Texas, TestEquity expanded the scope of its business beyond test and measurement equipment to include all of the related tools and supplies involved in the assembly, repair, and rework of printed circuit boards. Between solder, static control, and production supplies, more than a million additional products from more than 300 vendors are now available to TestEquity customers.

Gap Wireless open house showcases expanded facility

Gap Wireless, Mississauga ON, a leading distributor of products and services for the mobile broadband and wireless market, recently welcomed guests to an open house event that showcased the firm's new 15,000-square-foot facility.

"Gap Wireless was pleased to hold the open house to share our excitement about our recent expansion and to recognize the importance of our extended network of wireless customers, vendor partners, suppliers and supporters - relationships and partnerships that we value throughout our day-to-day business operations," says Marc Bouvrette, president, Gap Wireless.

Of particular interest at the event were the PIM Test Chamber and the GREAT Lab (Gap Wireless RF Experimental Application and Testing Lab), which enable custom testing services to be performed. The GREAT Lab provides complete component electrical, RF & optical characterization for IP, Wi-Fi, WCDMA & LTE systems using advanced instruments & qualified technicians/engineers. These services are available as random sample quality control for VMI programs or batch/lot testing. Typical physical layer testing includes: PIM, VSWR, OTDR, insertion loss & isolation measurements; plus advanced testing of antenna pattern validation and modulation analysis.

"The Open House was a great opportunity to open our doors to our extended Gap Wireless network and shine a light on our service and support innovations and warehouse capability," adds Glenn Poulos, vice-president and general manager, Gap Wireless.



Great test lab.

Intertek hosts customer appreciation event

Intertek Canada, Mississauga ON, hosted a customer appreciation event at its Mississauga ON-based facility this week. In addition to lunch and lab tours, the event featured a ribbon cutting and welcoming address from operations manager Paul Cerveney.

Intertek is a leading quality solutions provider to industries worldwide. From auditing and inspection, to testing, training, advisory, quality assurance and certification, Intertek adds value for its customers by helping improve the quality and safety of their products, assets and processes. With a network of more than 1,000 laboratories and offices and over 38,000 people in more than 100 countries, Intertek supports companies' success in the global marketplace, by helping customers to meet end users' expectations for safety, sustainability, performance, integrity and desirability in virtually any market worldwide.

Harting brings real-time service via video call

Delivering on its commitment to support customers in all phases of their projects, connectivity solutions provider Harting Technology Group is now providing live technical support through an expert service called VideoCall.

The free service is available online at HARTINGVideoCall.com or through the Harting USA website. There, customers will be able to call from their Apple or Android device or through their computer. Harting can deliver this service two ways, as customers can schedule a VideoCall to select a time in the future or opt for the 'VideoCall an Expert Now', which allows users to set up a face-to-face with one of Harting's field applications engineers (FAEs).

The VideoCall service aims to help reduce downtime by eliminating the difficulty of explaining challenges over the phone, according to Jon DeSouza, president and CEO of Harting Inc. of North America.

"We want to make problem solving simple for our customers," he says. "If an engineer has an issue, they can use VideoCall to show the problem to one of our FAEs and get help in real time, saving them time and headache while increasing productivity."



UBC students to open engineering centre

The University of British Columbia has opened a new Engineering Student Centre thanks to \$5.2-million in donations from students, alumni and industry.

The 10,060-square-foot, two-storey centre is a brand-new hub for more than 5,000 undergraduate engineering students on campus. It includes study and meeting rooms, a large atrium, a computer lab, student society offices and a dedicated space for first-year students.

"It allows our undergrads to connect with their counterparts from all disciplines ranging from civil, mechanical, electrical and computer engineering, to mining and materials engineering," says Marc Parlange, dean of the Faculty of Applied Science.

The funds raised form part of start an evolution - the most ambitious fundraising and alumni engagement campaign in Canadian history, which aims to raise \$1.5 billion and engage 55,000 alumni annually by fall 2015.

SMTC changes corporate HQ to San Jose

SMTC Corp. a global electronics manufacturing services (EMS) provider, announced that its San Jose CA location will become the new corporate headquarters.

The firm's Toronto location will be known as the SMTC Toronto Division and will remain an important part of the organization representing several 'Centers of Excellence.'

"This new direction will better position SMTC Corp. to its investors while continuing to develop new customers globally and serve existing customers with the same world class service levels that we have been known for," says Sushil Dhiman CEO and president of SMTC Corp.

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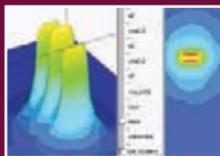
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Thermal Management & Enclosures

Orion's dc fans efficiently cool electric formula car

Orion Fans, Dallas TX, has helped ETSEIB Motorsport reach a milestone in electric formula racing, as the firm's Axial dc fans were a key element in developing the first effective fan cooling solution for the Formula SAE hybrid carbon fiber Monocoque car's power system. Orion joined the student-run ETSEIB Motorsport team in 2014, with a commitment to providing an efficient fan cooling solution that would keep the electric powered formula racecar batteries operating optimally in extreme conditions. Orion has delivered on its promise with a cooling system that utilizes more than 20 Axial dc fans and can move more than 80CFM.

The electrical systems used in these electric formula cars can run at 400 volts

with a discharge intensity of maximum 250A, generating significant amounts of heat. Traditionally, heat is channeled away from both electric vehicles and electric formula racecars via water-cooling and lightweight heat sinks. These unfortunately are expensive methods of removing heat. Orion Fans' cost-efficient Axial dc fan design provides more simplistic thermal management, maintaining core temperatures at a safe and operational level.

Recently, at the Formula Student Spain 22km endurance race, held at the Circuit de Catalunya, the ETSEIB Motorsport racecar was best-in-class as it was one of the only vehicles to complete the race. Most vehicles overheated and their electronics

and battery systems shut down after reaching temperatures of more than 70C. Orion's Axial dc fan cooling system kept the vital electronics inside the ETSEIB Motorsport racecar at under 56C, outperforming the competition.

"The Formula Student Spain competition is based on several different tests, the most important being the 22km endurance race designed to test the cars to the limit," said Ian Cusiné, ETSEIB Motorsport Powertrain Department. "With high air temperatures



reaching up to 39C, more than half of the participants experienced overheating problems. But heat was not a problem for our car thanks to the Orion Fans' products that provide high performance with low consumption of electricity."

Newark element14 reaches disty deal with CamdenBoss

Newark element14 has reached a distribution agreement with CamdenBoss, leaders in electro-mechanical components, custom enclosures and pcb connection solutions. Other products and services available to Newark element14 customers via CamdenBoss include the new Flat Sheet Plastic Technology (FSPT), providing custom-designed plastic enclosures without tooling.

With similarities to sheet metal fabrication, FSPT enables most enclosure concepts to be manufactured to the customer's exact size and specification. It is suitable for low-to-medium batch quantities – from the simplest to the most complex of enclosures.

The final design is constructed using state-of-the-art CAD/CAM technology. The prototypes and volume production are manufactured using the same assured production process, giving the customer production-ready products from the first sample. CamdenBoss also provides engraving, printing, shielding, finishing, assembly and packaging services.

The company offers an extensive range of electro-mechanical components such as fuses and fuse holders, batteries, LEDs and indicators, miniature switches, limit and safety switches, DIN rail mounted interface modules and control products.

Harting eligible for UL 508-certified Control Cabinets

Harting Technology Group has achieved a breakthrough that facilitates the use of connectors and connector-based cable assemblies in electrical control panels, switchgear and other control systems requiring UL 508 certification.

More than two dozen Harting connector configurations have passed rigorous safety testing by UL and been designated 'UL-Recognized', a new status created by UL at Harting's request.

Harting is the only connector manufacturer with products that have earned this status and corresponding UL mark. Users gain access to all the benefits of plug & play connectorization in panel assembly, including massive cost and time savings during commissioning and maintenance compared to the alternative – hard-wired connections.

Until now, an OEM could not use individual connectors in a field-assembled, UL 508-certified control cabinet unless it subjected the end product to extensive additional UL safety testing at its own expense, a time-consuming process that often delays bringing a new machine to market.



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Programmable thermal fan controller reduces energy consumption

TCAC001 thermal controller is designed for use with any ac fan or fan tray in medical, industrial, networking and telecom applications. The low cost unit reduces energy consumption by operating the fans only when needed. Additional energy savings can be achieved by combining it with any of the firm's controlled fans or fan trays that ramps fan speed up and down based on temperature in the cabinet. The 1U high device provides a remote sensor with a temperature range of -20°C to +60°C that is used as a trigger for fan activation /deactivation based on temperature settings. Product provides a temperature hysteresis of 5°C, providing more efficient cooling and thermal management.

ORION FANS

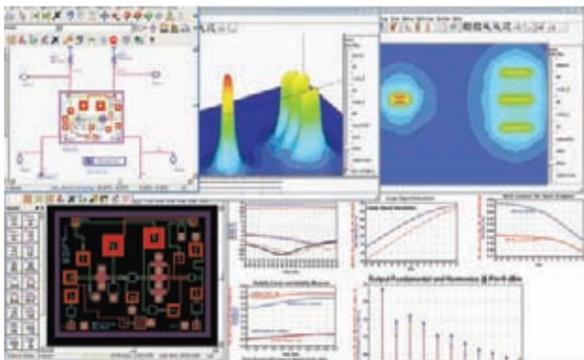


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Electro-thermal simulation software eases design efforts

W2349EP ADS Electro-Thermal Simulator Element improves accuracy, with temperature aware circuit simulation results based on state-of-the-art thermal solver technology. Product improves efficiency, as it is directly integrated with the ADS layout environment and circuit simulators; thus no need to transfer data to stand-alone thermal solvers. Product improves speed with high capacity thermal solver technology that has been tested on SoC designs with thousands of components.

KEYSIGHT



<http://ept.hotims.com/56240-48>

High temperature resistant epoxy cures at 200-220F



EP17HT-100 single part epoxy system cures in 60-90 minutes at 200-220F. Formulated for potting, encapsulation, bonding and sealing applications, cures can be accelerated at higher temperatures. The moderate viscosity compound has good flow properties and can be cast in sections up to 1/2" thick. Product is not pre-mixed and frozen and has an unlimited working life at room temperature. It is a reliable electrical insulator

providing a volume resistivity of >10¹⁵ ohm-cm. The dimensionally stable system bonds well to metals, composites, ceramics, glass and many plastics. Product exhibits a tensile lap shear strength exceeding 2,700 psi at ambient temperatures after being post cured for several hours at 350-400F.

MASTER BOND

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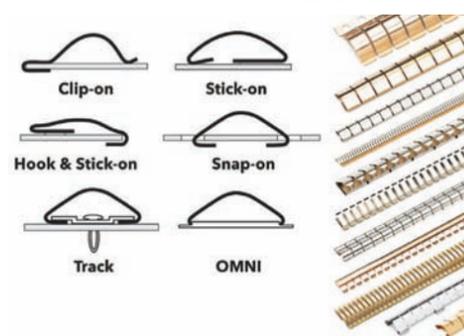
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Quick delivery program covers EMI shielding gaskets

Quick delivery program for standard and configured EMI shielding gaskets support customers' urgent requirements. All products are manufactured in the US where a variety of in-house plating options and a large inventory of shielding profiles keep lead times short. Standard gaskets can also be modified, minimizing the cost of producing a custom gasket, as it reduces time to market. EMI shielding BeCu finger stock gaskets are provided in more than 100-standard profiles. Downloadable interactive sales drawings are available to modify the shielding strips to exact customer requirements. Mounting options include snap-on, stick-on, clip-on, track, extrusion, welding and soldering.

TECH-ETCH



<http://ept.hotims.com/56240-50>

5.0 W/m²K FIP thermal compound fills gaps on fragile solder points



SARCON SPG-50A high-performance form-in-place (FIP) gap filler compound is a 5.0 W/m²K silicone based material, serving as an option for electronic devices that have delicate components or ultra-low compression force requirements. The form stable material fills large gaps around fragile circuit board solder points without causing damage or loss in performance. This facilitates efficient transfer of heat from any board-level source to a nearby heat sink or heat spreader. Due to its composition, the thermal compound improves vibration absorption capabilities and maintains all initial properties across a wide temperature range (-40C to + 150C). Product is available in easy-to-use tubes or syringes.

FUJIPOLY

<http://ept.hotims.com/56240-51>

Heavy-duty rotary latch is noise, vibration resistant

R4-10 stainless steel rotary latch with integrated bumper is available in single and two-stage options and features an integrated rubber bumper that eliminates noise and vibration caused by normal operation. Product provides corrosion resistance for consistent performance in harsh environments. Product traps the striker between a rubber bumper and rotor. Without extra clearance or room to move, any noise potential that could be caused by metal-on-metal movement or vibration is eliminated. Product's high-strength, compact design occupies minimal space within the enclosure, providing concealed latching and increased security.

SOUTHCO

<http://ept.hotims.com/56240-52>



Shield clamping saddles are easy to use



790 Shield Clamping Saddles now come with a patented latching mechanism, making them easy to use. Force-free installation is guaranteed via a spring that can be easily latched open while positioned over the conductor and the bus-bar and just as easily released on the conductor shield. For added safety and convenience, device provides two marking locations to accommodate the WMB marker and multi-line continuous marking strip. Ergonomically designed to ensure enhanced usability, products provide large, recessed grips that make tensioning of the spring convenient. Product delivers the precise pressure required for optimal contact and shielding effect.

WAGO

<http://ept.hotims.com/56240-53>

Multiple frequency harmonic comb injector greatly eases EMI testing

USB Harmonic Comb Injector test signal generator for EMI testing applications is a fast, easy-to-use, ultra-portable harmonic comb signal generator for interrogating your Power Distribution Networks (PDN) to identify noise sensitivities. Product includes impulse & square wave outputs and has multiple modes of operation including time and frequency jitter. Unit is designed for power supply and clock EMI spectrum testing and has a usable frequency range of 1kHz to 1.5GHz with edges as fast as 300ps. The comb injector is USB powered with a single SMA output connector. No external power supply is necessary.

PICOTEST

<http://ept.hotims.com/56240-54>



High-performance FSG gaskets target electronic Enclosures

FSG fabric shielding gaskets properly shield all gaps, seams and opening of an electronic enclosure. Products are available in 125 different sizes and profiles that are both lightweight and easy to install. Each unit is manufactured with a resilient polyurethane foam core and a highly conductive nickel/copper ripstop outer fabric that exhibits a shielding effectiveness up to 115dB when installed. As chip speeds and operational frequencies increase, even the smallest gaps can allow unwanted electromagnetic and radio frequency interference to escape into the surrounding environment.



LEADER TECH

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NEMA 4X plastic enclosures target electronics market

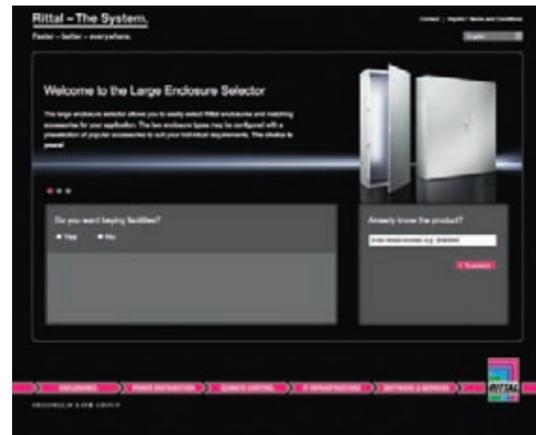
SK and SG Series NEMA 4X plastic enclosures are German engineered, weather-resistant, shockproof and can easily withstand tough industrial environments with an IK 08 impact rating and UL508 Type 4X and 12K listing. Molded in fiberglass-reinforced polycarbonate, SK Series is available in 12 sizes ranging from 2" x 2" to 14" x 10 and comes standard with metric knockouts in its base. SG Series is suited to protect outdoor applications with an IP67 rating for temporary submersion. Available in 7 sizes ranging from 3" x 3" to 11" x 9", products are molded from impact resistant, flame-retardant polycarbonate with a clear cover option.

POLYCASE

<http://ept.hotims.com/56240-56>

Online selector tool targets large enclosures

Online Selector Tool can be used when specifying and ordering racks and cabinets. Created as part of firm's online support programs for its TS 8 enclosure system, a freestanding enclosure used around the world in multiple industries. Starting with whether you want the cabinet to bay or not, the selector tool walks the user through a series of radio button choices and drop-down options that quickly presents the a specific configuration for the user's needs. The user can then request a price quote for that specific design, transfer the order list to an online shopping basket, or download the parts list of all the pieces required for that configuration.



RITTAL

<http://ept.hotims.com/56240-58>



IP66 Aluminum enclosure suited for DIN rail apps

DMX Series DIN-rail-mounting enclosure is attractive, easy-to-mount, NEMA-4X/IP-66 rated and made of extruded aluminum and plastic endcaps. Product holds up to three printed circuit boards and may be used independently or easily mounted on a standard 35mm DIN rail. The flexible unit is suitable for DIN-rail-powered industrial controls, test devices, controllers and relays in power, lighting, industrial automation and security applications.

An IP66 rating makes product suitable for dusty industrial settings or outdoor locations. Units have integrated slots for mounting pcbs, which are an optional accessory.

BUD INDUSTRIES

<http://ept.hotims.com/56240-57>

Temperature forcing system automates temperature cycling of power devices



The integration of rapid temperature cycling with the Keysight B1506A Power Device Analyzer has created the Temprotonic ThermoStream temperature forcing system that automates temperature cycling of power devices by interfacing with a specially designed enclosure from Keysight. Programmable control of the product permits a wide range of temperatures, from -100 to +300C. With fast thermal cycling rates, product promotes rapid circuit design of power devices such as IGBTs and MOSFETs. Programmable hot and cold thermal cycling adds to the previously announced capability where power devices are in contact with firm's hot plate integrated in the analyzer's test fixture.

INTEST THERMAL SOLUTIONS

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3D Printing

Will 3D printing play a role in the next manufacturing revolution?

EP&T speaks with 3D printing expert Daniel Stolyarov, Ph. D., CEO, Graphene 3D Lab Inc., a spinout of Graphene Laboratories Inc. and creators of conductive graphene filament for 3D printing.

Q. Many consider recent progress in 3D printing to be the start of the Third Industrial Revolution. Describe the role 3D printing is expected to play in the future development of modern manufacturing.

A. Every Industrial Revolution has introduced a new way to automate the way we make things. The first industrial revolution began when the spinning jenny, a steam-powered version of the spinning wheel, was invented. Henry Ford sparked the second industrial revolution with large scale assembly lines. Both developments introduced manufacturing automation thereby reducing the cost of goods.

3D printing is yet another step in this direction. It simplifies the manufacturing process by making the design and the actual manufacturing of the product separated by one push of a button. Design and final product are only separated by one step: the push of a button. We want to take this even further by introducing concurrent printing with multiple materials.

All functional things around us are built from a variety of materials, each with different functionalities (i.e. structural, electrically conductive, semiconductor, thermally conductive, and so on). 3D printing technology, once capable of combining these materials during printing, eliminates the assembly process. This technology will require a set of functional materials suitable for this 3D printing process. The development of these materials and technology is the mission of our company.

Q. How big a role does the development and adoption of graphene play in the future success of 3D printing?

A. Developing a series of functional 3D printable materials is a challenge. Metals are commonly used as electrical conductors. Although metals can be used in some varieties of 3D printing, they can't be co-printed with commonly used 3D printing polymers due to the tremendous

3D printing is the ultimate prototyping tool. It makes the turnaround time extremely short, thus allowing the designer to make multiple iterations in the gadget design.

difference in melting temperatures.

We are working on the development of materials that differ by functionality, but are still very similar to each other from a processing perspective. Nanocomposites provide an elegant solution. By mixing a nanomaterial, such as magnetic nanoparticles with a polymer matrix, we can come up with a material that will behave like a polymer and yet attain magnetic properties.

Graphene nanoplatelets are an important nanomaterial. Graphene-based nanocomposites can be formulated as thermal or electrical conductors. Graphene nano-

platelets can also be used for mechanical reinforcement of polymers.

Q. Describe some of your firm's product successes including the 3D Printed Graphene Battery, as well as Conductive Graphene Filament. What are the advantages and applications?

A. Our conductive FDM filament is an example a functional 3D printing material created by mixing graphene platelets with polymer matrix. The graphene platelets form a conductive network which provides the conductivity for the resulting composite.

We exploited the same principle when making a fully 3D printable battery. In this case we used polymer with high ionic conductivity as a matrix and a conductive graphene network acts like an electrode. We also added some compounds that participate in an electrochemical reaction and produce electricity.

Q. Though still in the early stage of commercial development, 3D printing has many possibilities to improve the design process? Describe what the future of 3D printing looks like.

A. First of all, 3D printing is the ultimate prototyping tool. It makes the turnaround time extremely short, thus allowing the designer to make multiple iterations in the gadget design. Eventually, 3D printing will be capable not only in creating the prototypes but the actual products.

At that point people will be able to manufacture goods at home. It will also become possible to download and exchange gadget design files to be manufactured easily at home in the same manner people exchange computer software and smartphone apps nowadays.

We made a first step in this direction when we launched ShareStation3D – a web portal when people can exchange their designs for 3D printed products. Unlike similar web sites, ShareStation3D has a focus on sophisticated engineered projects where 3D printing is used for making functional objects involving electronic circuitry.

Q. Does 3D printing technology have the capability to challenge the traditional mass-manufacturing model?

A. In my opinion, although 3D printing will occupy a substantial share in overall manufacturing it will not completely eliminate the conventional manufacturing

technology. Primarily, this is because conventional manufacturing is quite mature and it might take a while before 3D printed products will be able to compete with goods produced by conventional means in quality and performance. Secondly, 3D printing is an inherently expensive process of making goods and there always be the need to produce bulk identical items at a low price. 3D printing shines when there is a need to produce a single unique item. There's a similar situation with printers. Everyone has a laser printer or similar in their house. Yet, it's much cheaper per unit to print these pages using offset printing as you would with published books or magazines. There will always be a need to produce single items on demand.

Q. Is it possible for new companies to develop innovative business models built on 3D printing?

A. Without any doubts! The economy of scale has its dark side: although price goes down with the number of identical items being made, the opposite is also true: the price of making a single unique item is high. 3D printing is capable of reducing this burden and becomes a handy tool when a new product is introduced. 3D printing will simplify the developing process by making design iterations faster and less expensive and also can be used for making actual products before production volume is high enough to warrant conventional manufacturing. 3D printing can also be employed for manufacturing discontinued and obsolete parts.

Q. Describe how innovations in 3D printing will allow for the creation of a variety of products, such as printed electronic circuits, sensors, or batteries to be manufactured.

A. Our Holy Grail is to make it possible to 3D print electronic components. The conductive filament can also be used for making resistors. We have already developed a method for 3D printing batteries. We will need a specialized software tool that would allow combining the mechanical design with electronic design and arranging the electronic components in the design 3D printed device.

The 3D printing provides a very exciting capability of incorporating distributed network of sensors inside of 3D printed objects. The sensors could be compress-

sion sensors or temperature sensors or any other type of sensors that could be 3D printed. When this technology will be applied for manufacturing robots, the robots will be getting closer to having humanlike abilities and senses.

Q. Describe how some of your firm's newer technologies have the potential to bring 3D printing to the next stage of commercial development.

A. The mission of our company is to revolutionize the 3D printing technology and make it capable of making working devices. We are planning to accomplish it by introducing a line of functional materials formulated for 3D printing.

We recently developed and start offering a conductive graphene based filament for desktop FDM printers, which are very popular nowadays. The filament can be ordered from our web site BlackMagic3D.com. The volume resistivity of this filament is 1ohm cm which allows you to use this filament for 3D printing conductive traces.

Some models of FDM printers equipped with multiple printing heads allow for combining several materials in one print. In particular, one can combine our conductive filament with regular plastic used for FDM printing. This opens the possibility of making Printed Circuit Boards on a home 3D printer.

To make this technology available to electronic designers, we developed several software tools that are capable of converting standard pcb design files (Gerber) files into the design files for a 3D printer. Development of these tools was done in collaboration with Jeff Casey, owner of Rockfield Technologies. By using these tools, one can use his or her home 3D printer for making a multilayer pcb board rather than have it manufactured in a PCB house. We shared these tools on the ShareStation3D web site and on the web site of Rockfield Research. There is also instructional video on YouTube. We encourage electronic designers to use these tools to make their projects easier.

We are working on developing other exciting products — a filament with improved thermal conductivity that will be useful in making heat sinks and a magnetic filament, to mention few.

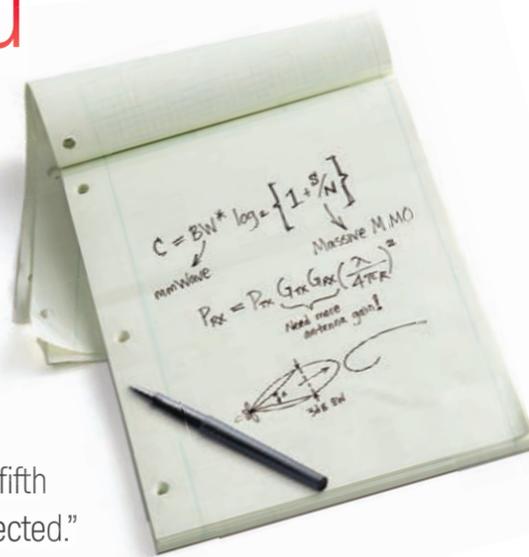
Q. Describe which business (design) sectors you anticipate being big adopters of 3D printing technologies. Some already include aerospace, automotive and defense.

A. I believe that 3D printing should not be an exclusive toy for big industries such as aerospace and automotive. As I already mentioned, the 3D printing is the ultimate prototyping tool and will be extremely beneficial to small startup companies in the course development of innovative products. I envision that with our products and the software tools we developed, 3D printing will become an instrument in every electronic shop.

For more information on 3D printing from Graphene 3D Lab Inc., go to <http://ept.hotims.com/56240-60>

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Internet of Things (IoT)

The Industrial Internet of Things

What is it?

By Fluke Electronics Canada

You've no doubt heard that phrase "Internet of Things" tossed around in media reports or conferences but were unsure what it means. Here's a simple example. Think about a home security camera that you can view on your smartphone. The picture is sent to you via the Internet. That small security camera is the Thing. You have just scratched the surface of the Internet of Things (IoT).

Now think about other devices that have the ability to send information to your phone or straight to the Internet. Fitness bracelets. DVRs. Television sets. Home thermostats. Coffee makers. The list of devices that can connect to and send data across the Internet is growing faster than this article can be typed.

And, there's yet another branch growing off the Internet, the Industrial Internet of Things (IIoT). This is a world where machines send data about their status across the Internet to plant engineers, facilities managers, electrical technicians and others charged with keeping the facility running at full efficiency.

The growth of IIoT can benefit workers today. The technology is here, and it does not mean replacing equipment in the plant. The benefits of IIoT can be had today by deploying measurement devices that send results across the Internet to a database that tracks the status of the assets in a facility.

How it works

Think of the equipment in a manufacturing plant and the parameters that must be measured to keep that equipment running, and think deeper than the process parameters that are continually monitored (the temperature of an oven or the time an object sits in that oven). Think of the electrical consumption of the oven's heating elements, the vibration of the bearings in fan motor moving the hot air and the heat emitted by the power distribution panel feeding the oven and the fan.

These are parameters that are typically measured on a periodic basis. But, the measurements are transient; they only last as long as the user keeps the digits on the display. Worst case, the measurement is made, found to be within acceptable limits, and promptly forgotten. Only slightly better, the measurement is written down manually, which introduces legibility and transcription issues. This data could, and should, be entered into a

database, but that also introduces another opportunity for transcription errors.

But the IIoT can change all this. Test tools that take measurements, record the results and transmit those results to smartphones, the cloud and the company's maintenance database are available today. The essential parameters needed to build a preventive maintenance program – voltage, current, resistance, temperature, insulation breakdown, vibration, even thermal images – can be measured and stored with tools already familiar to maintenance technicians.

What are the benefits?

Using a set of wireless tools, a smartphone app and an asset management database, technicians can realize several immediate benefits:

- **Safety** – an IIoT program built around wireless test tools allows the technician to put the measurement tool in locations that could be potentially dangerous to the user. For instance, the technician can disconnect power to a motor following standard safety procedures, then connect current meters to the power lines. The motor can then be reenergized, with only the test tools exposed to electrical hazards or moving machinery. Test results can be read, recorded and stored on the cloud while the technician is a safe distance away.
- **One benefit of wireless data transmission is keeping workers away from potentially hazardous electrical panels or moving machinery.**

- **Accuracy** – manual recording and transcription of data is replaced by wireless transmission and storage. This makes the technician's job both faster and more accurate, as transcription errors are eliminated.

- **Preventive maintenance** – with data stored on the cloud, results for a particular piece of machinery can be reviewed for changes. Potentially damaging trends can be identified before failure occurs, allowing maintenance to be scheduled at a favorable time.

- **Speed and efficiency** – the technician is no longer required to stay with a piece of test equipment waiting for intermittent faults to occur. Instead, wireless tools will record relevant events while the technician is performing other tasks or not on shift. Even better, measurement data from several tools can be viewed together, helping spot related events. Such interactions would be very difficult to identify using traditional tools.

What it takes

The IIoT is evolving, offering more



One benefit of wireless data transmission is keeping workers away from potentially hazardous electrical panels or moving machinery.

capability with each new generation of Internet-enabled equipment. But certain trends are appearing which speed up the acceptance of the tools and technology involved.

One key to IIoT growth is the widespread adoption of the smartphone. Putting a smartphone, essentially a pocket-sized computer with Wi-Fi and Internet connectivity, in the hands of every worker makes the sharing of real-time work-related data possible. More and more organizations expect their staff to carry a smartphone. This makes transmission of measurement

data quite feasible. The next step is the office-to-field exchange of historical data, analysis and determination of action, which will mean work orders being sent to the field in real-time. The adoption of tablet PCs that can survive in industrial

settings is also making this scenario a reality.

Another trend desired by facility managers is a common software platform supporting all tools and assets in a given plant. This is beginning to take place, with suppliers offering a single software package for collecting, transmitting, storing, organizing and analyzing the data is a big advantage to users.

An area that should not be overlooked is expertise in the various measurement disciplines. IIoT connectivity doesn't mean much if the measurement tools do not provide reliable, accurate measurements in a wide range of industrial settings. Facility managers are looking for measurement tools that perform in harsh, industrial environments while turning isolated data points into actionable information. Fortunately, this is also available today.

What it looks like

Workers who are mobile are able to have more tools at their fingertips now than they used to, according to Glenn Gardner, business development manager, Fluke Corp.

"It's not just wireless communication between handheld test and measurement equipment like Fluke devices, but it's also the fact that work order systems that govern the work that they do can be with them in the field on a mobile device,"

Gardner said. "Before smartphones became pervasive, it was difficult to access the work order management software system in the field. In addition, most of the test and measurement equipment didn't have wireless capabilities, so you couldn't get rich data from the equipment into the work order system without going all the way back to your home office, connecting with a USB cable, and getting it into the computer. It was pretty cumbersome. So the combination of pervasive smartphones/tablets and wirelessly enabled test and measurement tools is what will really drive change in the industry."

A typical scenario would unfold as follows. Data from weekly maintenance rounds is captured using test tools equipment with wireless connectivity. The data is transmitted through a smartphone and its Internet connection to the analysis dashboard in the maintenance manager's office. The lead technician notices that current draw from one motor has increased dramatically since the last periodic inspection and the thermal image associated with that motor shows a significant temperature rise.

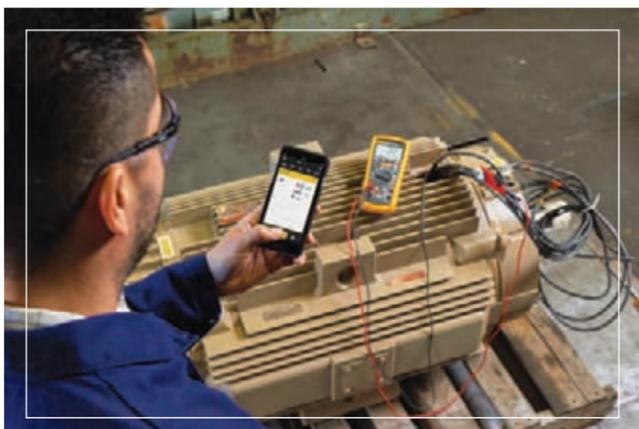
IIoT data can be collected and presented in graphical form, prioritizing actions that need to be taken in the field.

The lead technician sends a message to the nearest field technician. Part of that message is the graph showing current measurements and the most recent thermal image of the motor. The field technician performs additional measurements, discovers a phase unbalance and shares all data with the lead technician. After looking at the details from the field, the lead technician sends a work order to the field, asking for the motor to be replaced. The field tech then can then perform the motor exchange, take and share new measurements, and close the work order.

The takeaway

Measurements have always been a cornerstone of maintenance. Now, because of the IIoT and manufacturers producing new tools that share measurement data across the Internet, that data is becoming more valuable, more actionable and more immediate. IIoT is an enabler that allows maintenance issues to be identified before they become major problems. It also allows field technicians to work safer, faster and more efficiently.

For more information on IIoT from Fluke Corp., go to <http://ept.hotims.com/56240-61>



Wireless test tools can send test results to a smartphone, to the Internet and to a centralized database – all part of the Industrial Internet of Things (IIoT).

Manufacturing consultancy finds security in the Cloud

1st Peak Manufacturing Solutions works with Chi Networks



The current trend of intellectual property theft involved in offshoring manufacturing to China and Russia is a significant challenge facing companies across many industries.

In this case study feature we take a look at how cloud provider and data security leader Chi Networks has helped manufacturing consulting innovator 1st Peak Manufacturing Solutions surmount the types of security concerns that come with the business and enhanced the company's workflow processes with a cloud based infrastructure that is fast, reliable, and secure by design.

Client challenge

1st Peak Manufacturing Solutions specializes in designing customized manufacturing parts for companies in industries spanning aerospace, marine, gas and oil, medical, automotive, defense and energy. With its global 500 clients' valuable proprietary designs and intellectual

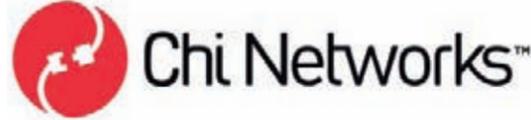
property at stake 1st Peak Manufacturing Solutions has no room for security loopholes or delays in design production.

However, finding a cloud provider who could actually support the firm's intense security needs and figure out how to run Siemens NX in the cloud became a huge challenge for the consulting company.

It took interviewing 20 cloud providers for 1st Peak Manufacturing to find Chi Networks, a Chicago-based Cloud provider and security leader. Chi Networks was the first vendor who said its team of engineers could do it, and that 1st Peak's team had the confidence could do it. Once onboard, the engineers at Chi Networks were ready for this unique set of challenges, and they worked with Siemens NX support staff to create customized solutions that no one out there had tried before.

The need for performance

In addition to the need for Chi Networks



to develop an innovative path to pull off running Siemens NX in the cloud and do it securely using Chi Networks Data Armor Managed Security performance was also a consideration along with reliability. But, Chi Networks was ready to provide a new cloud based infrastructure to 1st Peak Manufacturing Solutions that soon became a huge competitive advantage on several levels.

For one thing having everything available in the cloud enables 1st Peak Manufacturing Solutions to work with the most talented designers in the business no matter where they are located. Also, having all the tools available in the cloud on demand has enhanced collaboration across the team.

"We are able to pull from the best talent nationwide. They log into the cloud, and all the tools are there at their disposal,"Griffeth says. "It's made it very easy to cross pollinate ideas and to set our employees up with the technology and applications they need to be productive and share our work easily with our clients in real time."

Enabling virtual access of CAD programs requires a high performance network infrastructure that supports the data center all the way to the customer site.

Top 5 considerations when outsourcing CAD. Ask yourself:

1. Do you have adequate bandwidth at all of your sites?
2. Can your vendor provide service level guarantees for availability and low latency bandwidth?
3. Does your vendor have the capability to manage a customizable list of complex applications?
4. Does your vendor offer data security by design ensuring your system is continuously protected and monitored?
5. How will your company be informed of service changes?
6. Does your vendor answer the phone when you call?

Mobile & secure

Chi Networks has also met the demand for enabling the modern workforce to work from anywhere with its Ultimate Managed Services. By providing 1st Peak Manufacturing Solutions with secure remote access Chi Networks is also helping with another level of data security and cost savings to 1st Peak Manufacturing.

"We no longer have to ship laptops, or collect laptops when the contract ends,"Griffeth says, "and it's much less expensive to maintain our infrastructure in the cloud. On a security note too there are quantifiable improvements. It's difficult to lock down a laptop. Now all of the drawings and other intellectual property stay in the cloud, and there's no way to pull that out."

By centralizing apps, software and desktops in the data center and securely delivering them to users on demand anywhere 1st Peak Manufacturing Solutions is able to leverage a form of design collaboration and design only offered by their firm enabling them to thrive in a very competitive marketplace.

Success with ultimate managed services

1st Peak Manufacturing continues to provide industry leading CAD-CAM design services using the infrastructure built and managed by Chi Networks. This partnership offers some the best IT security possible. Protection within the system prevents outside attacks and tampering from inside users. With the amount of data being stolen by client competitors, 1st Peak takes pride in ensuring that their customers' valued information is secure in a system that meets today's stringent standards.

Is it possible to advance the success of a company through outsourced DaaS? In 1st Peaks Manufacturing's case the answer is yes and it's been critical to the company's success.

For the full length version of this story, please visit www.ept.ca online, or go to <http://ept.hotims.com/56240-62>

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Power Supplies, Batteries

Understanding the 3rd edition medical safety standard and using dc-dc converters to provide isolation

By Ann-Marie Bayliss, Product Manager, Murata Power Solutions

Any electrical medical appliance, healthcare or dental product must comply with specific country or industry safety standards that are based on IEC60601-1. Now in its third edition, the standard includes the general requirements for the provision of basic safety and essential performance for any dc-dc and ac-dc component power supplies in the equipment.

Regional certification authorities, such as the European Union, where the initial compliance date for the 3rd edition was June 2012, have adopted the standard. As part of the European Union Medical Device Directive the end equipment must also have a risk analysis management package provided as per the requirements of ISO 14971. However, the IEC60601-1 3rd edition standard stipulates two categories of protection, each with their own requirements. These are 'Means of Operator Protection' (MOOP) and 'Means of Patient Protection' (MOPP).

For both MOOP and MOPP the key requirement is reducing the risk of any unintended electrical current from passing through the human body. The need for electrical isolation is vital in order to prevent this happening in the form of physical spacing and/or insulating material. With hazardous voltages present in a system a robust and reliable approach to isolation is needed such that multiple and un-related insulation system failures would need to occur before an operator or patient is put at risk.

In the context of medical applications the overall aim of a safety standard is to protect users of equipment such as vital signs monitors, drug dispensing equipment and dialysis machines from potential hazards and most importantly electric shock. This also relates to operators or patients who might touch or have sensors directly connected to them. The 3rd edition standard stipulates two categories of protection, each with their own requirements. These are 'Means of Operator Protection' (MOOP) and 'Means of Patient Protection' (MOPP).

For both MOOP and MOPP the key requirement is reducing the risk of any unintended electrical current from passing through the human body. The need for electrical isolation is vital in order to prevent this happening in the form of physical spacing and/or insulating material. With hazardous voltages present in a system a robust and reliable approach to isolation is needed such that multiple and un-related insulation system failures would need to occur before an operator or patient is put at risk.

To achieve this, two independent measures of protection (MOOPs or MOPPs as appropriate) are required or a single measure of physical isolation such as creepage/clearance or solid insulation deemed equivalent. Previous iterations of IEC60601, a power supply for example that meets the 2nd edition requirements for reinforced isolation is likely to comply with the 3rd edition for 2 x MOOPs. However for patient protection (2 x MOPPs) the requirements are more stringent.

Notably the creepage and clearance distances need to be greater as does the thickness of the insulation used. (Creepage

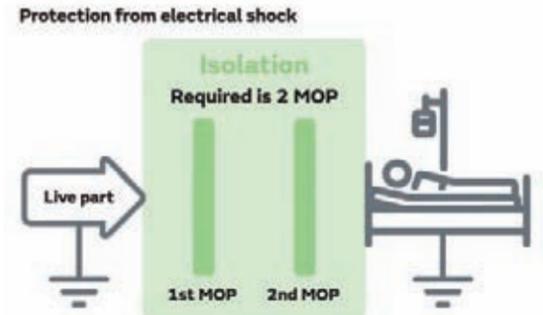


Figure 1 – Isolation from electrical shock - two measures of protection required.

is defined as the shortest distance along the surface of the insulating material between two conductive parts. Clearance is the shortest distance through air between two conductive parts). Also for patient protection, there is a higher dielectric high potential (HiPot) test value and leakage currents need to be a lot less.

Design to achieve the required category of insulation/isolation will vary depending on a number of factors. These will include the operating system voltage (i.e. the mains supply), the overvoltage

..... continued on page 16

Using an isolated DC-DC converter to provide two means of protection

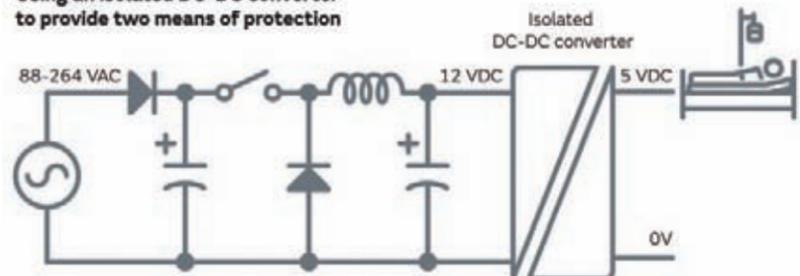


Figure 2 – using an isolated dc-dc converter to provide two means of protection

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10	11	12	13	14	15	16	
17	18	DesignCon 2016 January 19-21 Santa Clara, CA • http://www.designcon.com/santaclara/		21	22	23	
24	25	26	27	28	29	30	
31	March/April EP&T Editorial Closing				March/April EP&T Ad Closing		

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10	11	12	13	14	15	NAB Show April 16-21 Las Vegas, NV www.nabshow.com	
17	18	19	Canadian PE Symposium April 19-20 Oakville, ON http://cpeia-acel.ca		21	22	23
		EPTECH Montreal www.ept.ca		EPTECH Markham www.ept.ca	June/July EP&T Ad Closing		
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30	31	EPTECH Mississauga www.ept.ca		EPTECH Ottawa www.ept.ca			

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21	22	23	24	25	26	27	
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28	29						

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	IMS 2016 May 22-27 San Francisco, CA • http://www.ims2016.org						
29	30	31					
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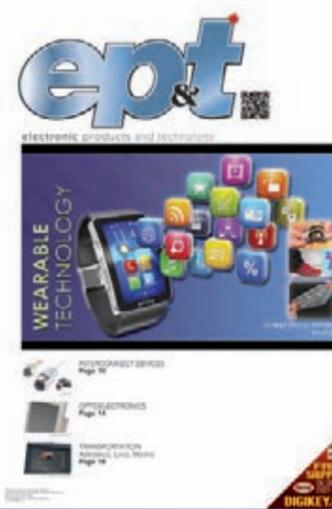
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Medical safety standard

continued from page 12

category of the system, and the material group type for creepage surfaces, pollution degree category and operating altitude. Altitude is often neglected but must be considered with a correction factor applied to clearance distances. For example equipment that could be operated in Quito, the capital of Ecuador at 2850 m altitude should increase clearance distances for operator protection by 15%.

Figure 1 illustrates the basic concept of providing isolation from electrical shock between a live part and a patient with two means of protection. The exact methods of the protection can differ and can be a combination of physical distance, solid insulation or multiple layers of thin insulation. For example, for patient protection in 250Vrms systems, the isolation could be 8 mm physical separation across one barrier or two barriers each with 4 mm separation. 1 MOOP, 2 MOOP, 1 MOPP and 2 MOPP. A practical example would be

where the first measure of protection is provided by an IT-grade ac-dc converter meeting the requirements of IEC60950 for reinforced isolation followed by a dc-dc converter meeting 'basic' or 1 x MOPP requirements for IEC60601, the combination being equivalent to a 2 x MOPPs insulation system. The reason is that the ac-dc converter that meets IEC60950-1 Reinforced Insulation would meet the IEC60601-1 requirements of 2 MOOP or 1 MOPP. Note however that other factors such as fusing and overall leakage current need to be considered for full patient protection compliance.

In some applications, isolated dc-dc converters be to provide two means of protection. **Figure 2** illustrates a mains powered circuit generating an intermediate non-isolated 12V which is passed through an isolated dc-dc converter to produce 5V. The dc-dc is powered from a seemingly 'safe' 12V but with a direct

connection to high voltage ac so the converter must have two means of protection for the 5V to be deemed safe.

Another example where a dc-dc converter may need to have a defined level of insulation is shown in **Figure 3**. Here full patient protection against mains voltage is provided by the ac-dc converter under normal conditions (barrier B). However, the dc-dc converter, 1 MOPP barrier E, is providing protection from current flowing through the patient back through the dc-dc to ground from other faulty equipment energising the patient. If there are unspecified input and output lines connected to the equipment (shown as SIP/SOP in the diagram), the dc-dc must have 2 MOPP. If the SIP/SOP lines are specified with a minimum of 1 MOPP, the dc-dc only requires 1 MOPP.

Sometimes a high level of dc-dc converter isolation provides a convenience in product testing. **Figure 4** shows a typical application where a low isolation

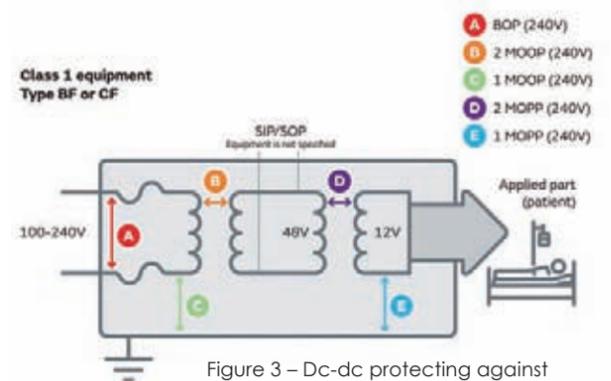


Figure 3 – Dc-dc protecting against external equipment faults.

rating dc-dc with low capacitance and high insulation resistance follows a full safety rated ac-dc supply. If an end-to-end hi-pot test is performed, most of the test voltage drops across the dc-dc by a simple pot-down effect perhaps way above its rating. If it happens not to fail, the main safety barrier in the ac-dc has not been verified. If the dc-dc is anyway fully safety rated this at least leaves the confidence level in the equipment high.

End-to-end 4kV hi-pot test imposes only 1kV across the safety barrier and 3kV across the low isolation barrier

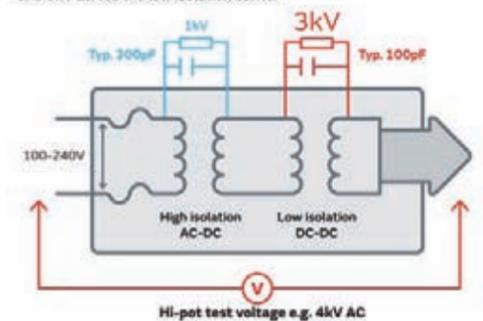


Figure 4 – Safety testing of combined ac-dc and dc-dc systems.

When selecting power converters in medical and other safety rated applications, the 'working voltage' must be specified. For ac-dc converters this is normally the ac mains input. For dc-dc converters, the working voltage can vary depending on the application. For example the Murata MEJ1 series is rated for 1 MOOP at 200Vrms up to a maximum ambient of 85C while the Murata NCM6 series is rated for 2 MOOPs at 250Vrms. These are combinations that the manufacturer has elected to have agency tested. The same products can qualify for different ratings for example the MEJ1 series could be rated for 2 MOOPs but at lower working voltages. The manufacturer will be able to advise what combinations are possible.

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MVAD040	40W	40W	90-264	12V 24V 48V	89%



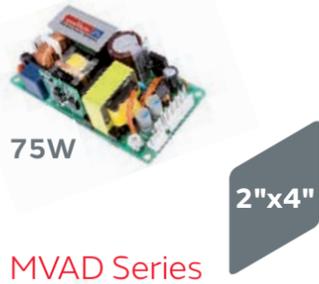
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Weidmüller celebrates 40 years in North America

2015 marks the 40th anniversary of Weidmüller's operations in North America that include corporate headquarters in the United States, Canada and Mexico.

Weidmüller's Canada location has grown over the past 40 years from just a two-person operation to the market leader in Industrial Connectivity in Canada. With over 45 direct employees and 25 field representatives, Weidmüller Canada has made it their mission to provide the very best in customer service and market coverage. This year, their growth has continued with a 30% expansion in warehouse and assembly workstation space in the National Headquarters in Markham, Ontario.

Weidmüller's North American headquarters, located in Richmond, Virginia is marking its 40th year with a 20,000 square foot expansion to their U.S. facility. The added space includes offices for the customer/technical support organization, product management and the value-added services group. It also features a new Customer Innovation Center— a training facility with high tech multi-media displays. The addition of 15,000 square feet for service and production gives Weidmüller the capacity to build customer solutions and provide value-added services to a growing customer base.

"This expansion increased Weidmüller's footprint of office space by over a third, allowing us to grow our employee base and accommodate the heightened business growth of the North America operation," said Bruce Hofmann, director of marketing and business development. "The investments in both facilities will enable us to deliver better service to our channel partners and customers, both today and into the future."

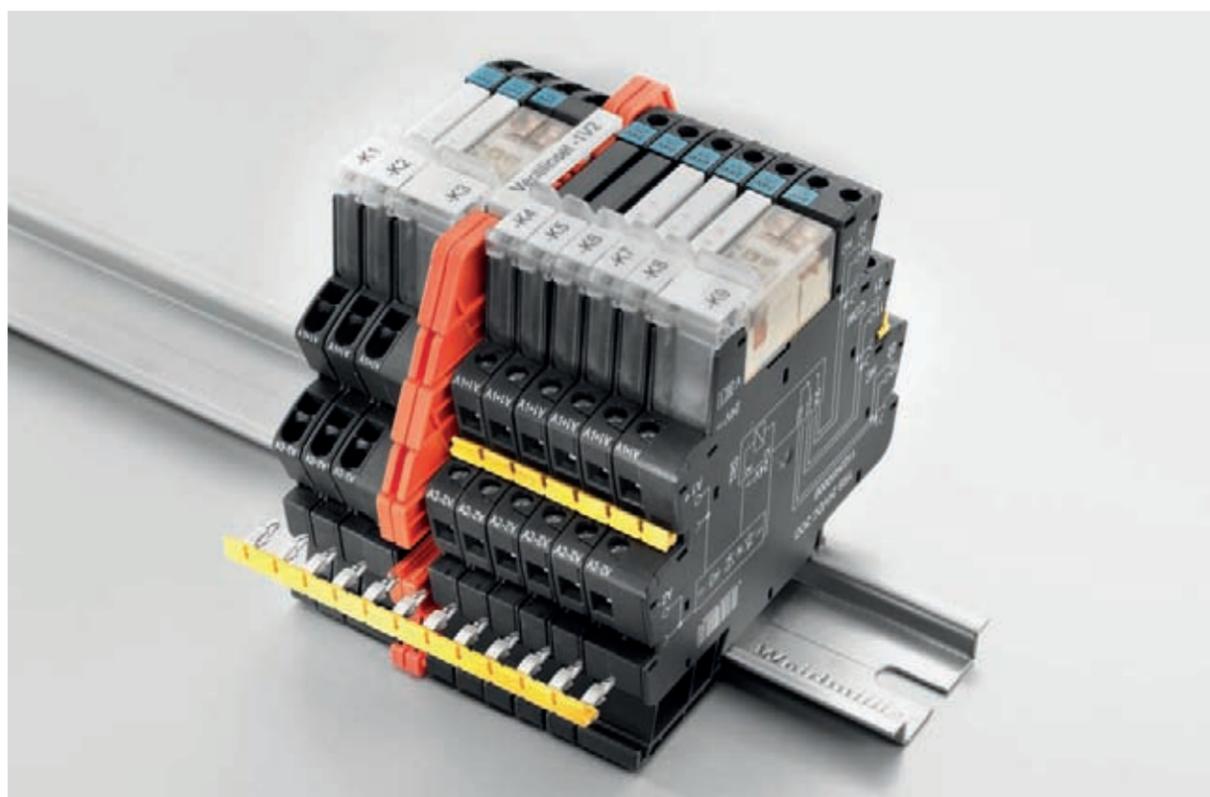
Weidmüller company owners, management and team members celebrated 40 years with a company-wide meeting, ribbon-cutting ceremony and events in Richmond, Virginia in September and in Markham, Ontario in October.



An event was held to open the new Richmond, Virginia Customer Innovation Center and expanded Value Added Assembly production facilities. The event was conducted by several of the owners of Weidmüller, including Mr. Christian Glaesel, Owner/Chairman of the Supervisory Board (left) and Brian Schofner, President Weidmüller North America (right).



To celebrate 40 years of customer service and sales excellence in Canada, the team members from the National Headquarters in Markham, Ontario gathered on October 13th, 2015 for a company lunch.



Weidmüller 

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Double-row PCB connector with push-in connection



Only double-row connector with push-in spring connection and 2.54 mm pitch. The new DFMC 0,5 (connector) / DMC(V) 0,5 (header) product range from Phoenix Contact sets new standards in the 2.54 mm pitch. Despite its compact size and height of just 10.5 mm, the connector offers convenient operation by means of the push-in spring connection with integrated spring lever.

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products on review

PXIe vector transceiver speeds solution creation, reduces test times

VXT PXIe vector transceiver fully calibrated instrument module provides vector signal generation and analysis in four slots. With accelerated measurements and deep software, unit is purpose-built for rapid solution creation and faster throughput in manufacturing test of wireless components and IoT devices. Up to four units can run in a single 18-slot PXI chassis. Products cover 60MHz to 6GHz and provides 160MHz I/Q bandwidth in both vector signal generation and analysis, with a maximum of +18dBm output power.

KEYSIGHT TECHNOLOGIES



<http://ept.hotims.com/56240-72>

Cat 7 cable connector extends data cables

P/N 130863-01-E IP67 rated cable connector connects and extends data cables up to Cat 7A data speed. Device achieves its IP67 rating due to its heat shrink tubing. Product complies with Class E to ISO/IEC 11801 Ed.2.2:2011-06 in combination with Cat 6, Cat 6A, Cat 7 and Cat 7A cables and Cat 6 connectors. Wires can be terminated quickly using our LSA-PLUS crimp tool (P/N 130818-E) and the dual sided cable feed can accommodate data lines of AWG 26/1 to 22/1. Product provides a fully shielded metal housing, strain relief and separate captive 360° shield connection.

METZ CONNECT



<http://ept.hotims.com/56240-73>

Connector brings IP69K protection to splash zones

Han F&B connector series brings modular, user-configurable connectivity with IP69K protection to the splash zone (Zone 2) in food and beverage production. The versatile FDA 21-approved circular devices are made of non-toxic, high performance PP plastic, providing improved chemical, heat and cold resistance and are resistant to Ecolab certified cleaning agents. Device's hygienic design provides large radii and smooth surfaces; so-called dirt pockets and the potential bacteria load on the connector don't have cracks or crevices in which to build.

HARTING



<http://ept.hotims.com/56240-74>

High-bandwidth optical receiver pairs with oscilloscope

IQS series of Coherent Optical Receivers deliver high bandwidth and enable the creation of flexible, modular systems with improved performance and ease of use. When combined with firm's LabMaster 10Zi-A oscilloscopes and integrated Optical-LinQ analysis software, products test DP-QPSK and DP-16QAM optical signals at speeds up to 130GBaud. Completing the OMA solution, Optical-LinQ is an intuitive and fully integrated software package for measurement and visualization of optically modulated signals. It runs entirely within the user interface of the LabMaster 10Zi-A.

TELEDYNE LECROY



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ProductSource

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Introducing the Most Versatile Cut & Strip Platform

Schleuniger's new MultiStrip 9480 family offers six machine versions to cover a wide range of applications and budgets. Its high speed indexing cutter head and programmable rotary incision capability set the benchmark for high precision processing of coaxial and other shielded cables while SmartBlade™ technology and magnetically held guides increase output and reduce changeover times.



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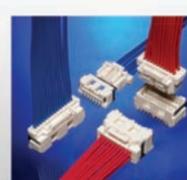
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Learn more at: www.ema-eda.com/ArenaPLM-OrCAD

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NANUK durable protective cases are designed to protect the most sensitive equipment in the harshest environments. Whether transporting your gear through the unforgiving Amazon jungle or across the planet's most punishing terrain, every detail of NANUK durable, hard-sided cases has been refined and perfected to offer the utmost in protection and performance.

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High Density Inductors for 1U Power Supplies

MPS's H2104 series of Helical Edge Wound (HEW) inductors is the lowest profile, highest current density package in the industry, ideal for high-density 1U power supplies above 2kW. The HEW flat wire coil minimizes losses at high frequencies and can handle up to 160 Amps (with cooling) per inductor and can be paralleled to meet 300 Amp requirements.



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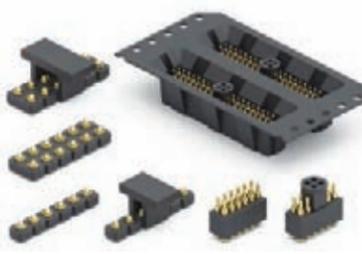
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products on review

SMT spring-loaded connector available on tape and reel

855-22-XXX-30-002191 SMT spring-loaded connectors are available packaged on tape and reel for automated pick & place assembly, from 4-40 positions. Devices are double row and on a space saving .050" (1.27mm) grid. Each spring pin provides a base geometry of .029" (0.74mm) round by .010" (0.25mm) tall to maximize soldering surface area and provide secure attachment to the pcb. Low profile device measures .100" in height and come in single row, series 815-22-0XX-30-001191 and double row, series 817-22-0XX-30-001191, both on .100" (2.54 mm) grid.

MILL-MAX



<http://ept.hotims.com/56240-76>

ATI high performance oscilloscope delivers low-noise performance

DP070000SX Performance Oscilloscope Series includes 50GHz and 23GHz models. Product provides low-noise performance of the patented asynchronous time interleaving (ATI) architecture for technologies such as 28GBaud PAM4 and Kband frequency testing. Units provide compact dimensions and built-in scalability using the UltraSync synchronization technology. Products use a compact 5 1/4 inch form factor so the instrument can be positioned very close to the device under test (DUT) for shorter cable lengths and cleaner signals. The low height means each unit fits in a single 3U rackmount space, or two oscilloscopes can be stacked in the same space as a single standard bench oscilloscope.

TEKTRONIX



<http://ept.hotims.com/56240-78>

Relay provides internal magnetic shield

S-HV series molded single in-line high voltage reed relay is small and compact, providing an internal magnetic shield is suitable for a high density board assembly. Having a high-breakdown (hold off) voltage of 4kVdc and a typical contact resistance of 70m0hm allows for the best condition for high voltage test and measurement applications. Device provides a high voltage and high power switching capability of 100W/1000Vdc / 1A and a breakdown voltage and dielectric strength up to 4kVdc.

STANDEX-MEDER ELECTRONICS



<http://ept.hotims.com/56240-77>

Compact VNAs extend frequency coverage to 43.5GHz

Frequency coverage of MS46322A Series ShockLine Economy Vector Network Analyzers (VNAs) and MS46122A Series ShockLine Compact VNAs have been extended to 43.5GHz. Units can conduct S-parameter and time domain measurements on RF and microwave passive devices up to 43.5GHz in a variety of applications. All units provide best-in-class performance. Model MS46322A is available in three frequency ranges of 1MHz to 8/20/43.5GHz, while MS46122A offers six models with coverage of 1 MHz to 4/8/14/20/30/43.5 GHz. Both instruments have typical dynamic range of 110dB at 43.5GHz and wide IF bandwidths.

ANRITSU



<http://ept.hotims.com/56240-79>

Hydraulic crimping machine is programmable



CT 65 hydraulic crimping machine is designed for loose-piece, heavy gauge crimping applications. Unit's parallel crimping action delivers up to 150kN (16.9 tons) for applications up to 400mm² (750 MCM). The quality of the crimp is guaranteed by a full-cycle mechanism that assures that the dies have closed completely before they are reopened. The ergonomic 15-degree tilt of the machine provides an optimal viewing angle and the LED light enhances visibility of the crimping area. Product provides 3 programmable crimping profiles and job memory for up to 30 different jobs. Open and close positions can be programmed to minimize processing time and maximize quality. The quick change system allows for fast changeover times between a variety of optional die adapters.

SCHLEUNIGER

<http://ept.hotims.com/56240-80>

Heavy-duty connector line available in metal

Heavycon EVO heavy-duty connector line is now available in metal, including gland options for EMC applications. With its patented, innovative bayonet locking glands, devices provide the same inventory cost-reducing advantage as firm's plastic units. Products meet high shielding requirements, while cable exit direction can be determined on-site. Devices accept fixed or modular inserts and come with four bayonet locking glands.

PHOENIX CONTACT

<http://ept.hotims.com/56240-81>



M12 cable connector provides crimp termination

M12 crimp style cable connectors withstand vibration more effectively than screw and solder terminated devices, as the crimp connection provides a prominent benefit against acute working conditions and high motion applications. Device guarantees a secure connection with high vibration and shock loads. Product's gas tight pin connection ensures low contact resistance, even under extreme loads. Another advantage is the processing of the contacts outside of the connector and later latching during the assembly process. Male and female gold turned contacts are sold separately and accept wires between 22 and 20 AWG.

BINDER

<http://ept.hotims.com/56240-82>

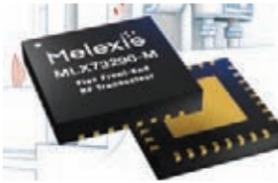


Multi-channel RF transceiver is programmable

MLX73290-M multi-channel RF transceiver IC addresses the sub-GHz ISM bands from 300MHz through to 960MHz. Product delivers two RF channels, each with a programmable RF power transmitter and a highly sensitive RF receiver. It is fully programmable via its serial peripheral interface (SPI). Device's output power level ranges from -20dBm to 13dBm while its receiver sensitivity can attain -120dBm in a 15kHz bandwidth. With a maximum data rate of 250kbps, the transceiver is also capable of handling heightened data throughputs. Device is supplied in 5mm x 5mm 32-lead QFN package. It has an operational temperature range of -40°C to 105°C.

MELEXIS

<http://ept.hotims.com/56240-85>



Cable jumpers boost design flexibility with custom solutions

Premo-Flex cable jumpers with the addition of round flat cable (RFC) and hot bar soldering cable versions provide an extensive range of custom pcb-connection solutions. Custom versions are durable, flexible and available in a variety of pitches, cable lengths, thicknesses and formats for use in multiple applications such as automotive electronics, consumer devices, home appliances, and

medical. Utilizing a simple solder wave assembly process, products provide cost savings by eliminating the need for connectors or wire stripping. The direct-to-board solution is suitable for electrical connections between pcbs and display boards in high-vibration applications.

MOLEX

<http://ept.hotims.com/56240-86>



High-performance SMD fuse extends current range to 12.5A-16A

UMT-H universal modular fuse provides extended current range of 12.5A and 16A. With its square, compact design of 5.3mm x 16mm, device is a space-saving alternative to classic cylindrically shaped cartridge fuses (e.g. 5 x 20mm) and is well suited for automated assembly. Product's smaller footprint saves valuable board space, allowing for further downsizing of equipment. The time-lag device provides overcurrent and short circuit protection and is available in 21 rated currents from 160mA through 16A at voltages up to 277Vac and 250Vdc.

SCHURTER

<http://ept.hotims.com/56240-88>



Next-Gen 5.7" LCDs suit industrial displays

5.7-inch TFT LCD modules for industrial display applications, includes four VGA resolution models and two QVGA resolution models. Units provide a built-in LED driver board, wide operating temperature range (-30 to +80 Celsius), high contrast ratio of 900:1, and improved display performance in a range of environments where industrial equipment is used. Products are interchangeable, as they have the same module outline and the same mounting hole positions. Five of the new displays have CMOS interfaces while one of the VGA offerings has an LVDS interface.

TIANMA NLT USA

<http://ept.hotims.com/56240-89>



Protocol exerciser tests PCI Express 4.0 technology

Summit Z416 PCI Express (PCIe) protocol exerciser/analyzer for testing PCI Express 4.0 designs and products addresses the needs of PCI Express developers by providing high performance 16GT/s traffic generation on devices with link widths up to 16 lanes. Product supports exerciser functions that can be used for traffic generation and device/host emulation, as well as providing the industry a platform for development of standardized compliance test suites. Product supports error injection functions to enable developers to test error recovery routines important to reliable interoperability of PCIe 4.0 products.

TELEDYNE LECROY

<http://ept.hotims.com/56240-83>



Brass waterless tip cleaner removes flux

Plato Brass Tip Cleaner (part #CS-50) removes burnt flux and oxidation from tips to improve wetting, heat-throughput and tip life. Product cleans quickly without water, eliminating thermal stress of tip from the wet sponge. Operators jab the hot soldering tip into the pad and the brass micro-coils scrape off the solder without scratching the tip's surface. The tight coil structure prevents hot solder from flinging back out, so the solder is safely retained inside the pad. Product is engineered for greater life and faster heat

recovery, and are available to fit popular soldering stations.

TECHSPRAY

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Medium-power driver amplifier delivers high gain, output power

HMC1131 medium-power, distributed driver amplifier operates between 24 and 35GHz and provides 22-dB of gain, +35-dBm output IP3 and +24 dBm of output power at 1-dB gain compression. Device reduces the number

of components required to achieve the desired output power and small signal gain, which lowers development costs and design time by enabling simpler transmit line-ups and higher integration. Based on a GaAs (gallium-arsenide) pHEMT (pseudomorphic high-electron mobility transistor) design, device is suitable for civil and defense communications systems, including point-to-point and point-to-multi-point radios and VSAT and SATCOM applications. Device is capable of supplying +25 dBm of saturated output power with 16 percent PAE and is housed in a compact, leadless 4x4 mm ceramic surface-mount package.

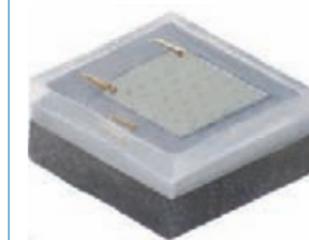
ANALOG DEVICES

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High intensity color LEDs boost candela performance

XLamp XQ-E High Intensity family of color LEDs optimized for optical performance. The drop-in upgrade for proven XQ-E High Density designs enables lighting manufacturers to double the candela performance with minimal redesign. Product leverages proven optical symmetry and consistency across all colors to improve color mixing and simplify the production process for lighting manufacturers. Built on firm's SC5 Technology Platform, device is a small building block available for color LED designs, boosting performance and drastically reducing size for directional applications such as track and architectural lighting. Products come in white, red, red-orange, PC amber, green, blue and royal blue.

CREE

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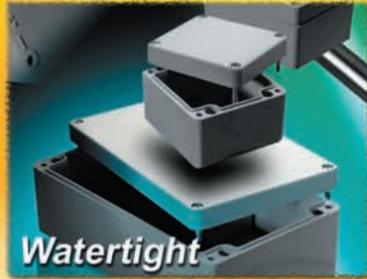


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Waveform Update Rate	>100,000 wfms/s	>1,000,000 wfms/s	>1,000,000 wfms/s	>450,000 wfms/s
Display	8.5"	8.5" touch	12.1" touch	12.1" multi-touch
Zone Touch Triggering	N/A	YES	YES	YES
Instrument Integration	Arbitrary waveform generator, digital voltmeter, protocol analyzer, counter, MSO			

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