

# EP&T



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electronic products and technology - SEPTEMBER 2016

## SWITCHES & CIRCUIT PROTECTION



AN EP&T SPECIAL REPORT  
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FUJITSU

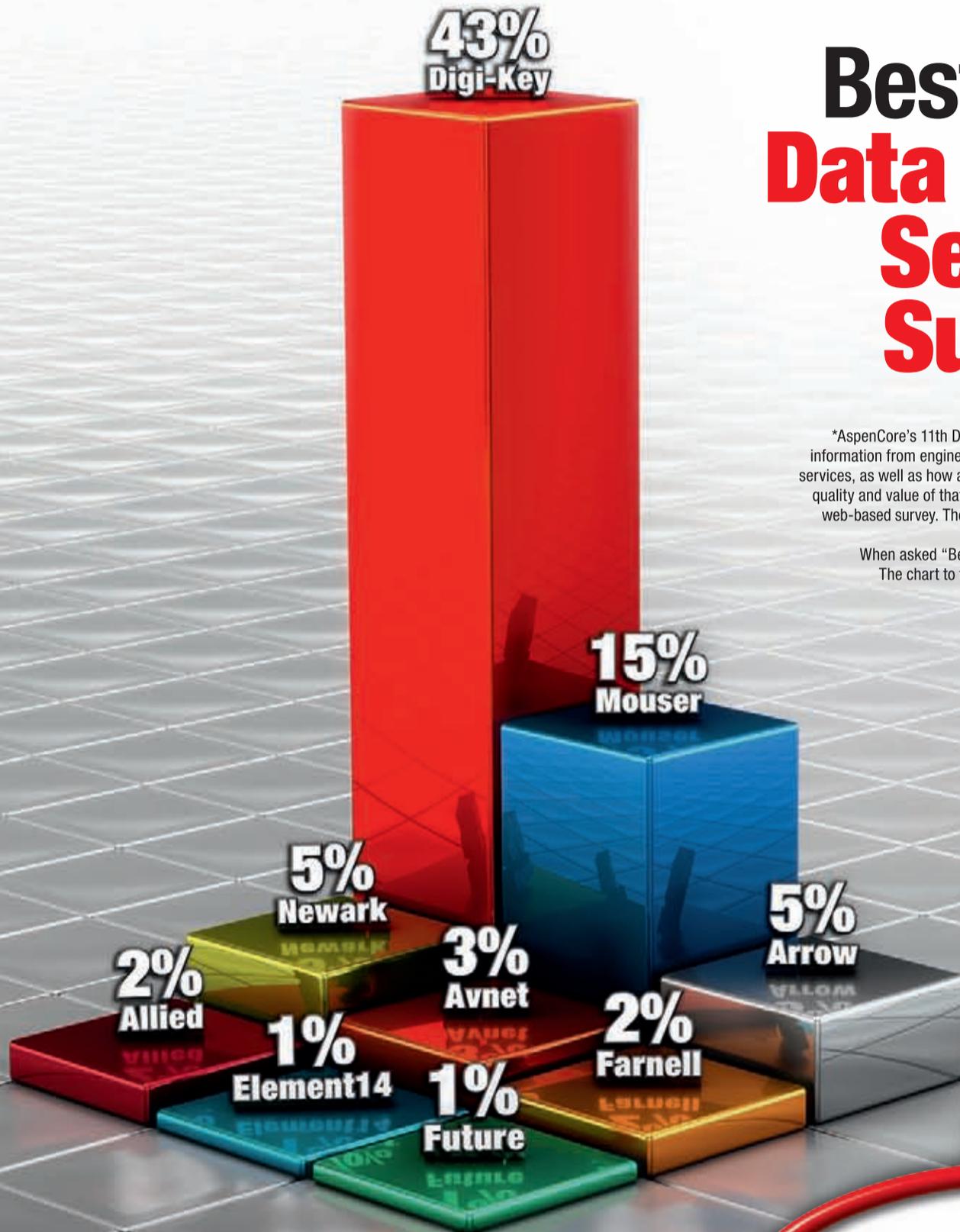
EMBEDDED SYSTEMS  
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\*AspenCore's 11th Design Engineer and Supplier Interface Study gathered information from engineers regarding their need for product information and other services, as well as how and when they interface with suppliers and how they see the quality and value of that interface. 1,750 U.S. engineers participated in this year's web-based survey. The results represent those surveys completed by April 2016.

When asked "Best in Class for Data & Product Selection Support?" The chart to the left shows the results among the industry's electronic component distributors.

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## Technology shift sends tremors into tech job markets

As hardware companies struggle to keep up with rapid technology shifts, analysts and recruiters describe the hi-tech industry as going through a serious 'deconstruction'.

Companies that traditionally make most of their money selling computers, chips, servers, routers and other equipment are especially vulnerable, according to analysts, as mobile applications and cloud computing become increasingly important.

So far this year, technology companies in the United States have shed thousands of jobs in these fields. This includes significant layoffs at Cisco, Intel and Dell. Analysts suggest that further cuts are expected.

These types of old-guard technology firms have been pursuing a challenging shift to software-oriented services. Margins in software services are higher than hardware because they bring recurring revenue and there are "fewer people involved on the cost side," says Roger Kay, an analyst at Endpoint Technologies Associates. Hi-tech can be defined as a combination of technology manufacturing, information services and products and professional, scientific and technical services.

Employment recruiters predict further collateral damage for hardware engineers, as more companies subscribe to 'super cloud' services. These services manage hardware, software, networks and databases and eliminate the need for workers to manage various technology layers.

Fewer tech jobs today involve working in factories and other production facilities. In contrast, the digital and information side of technology is booming – opening up opportunities within the 'softer' side of hi-tech. These jobs include the Internet, software, mobile communications, social media and research and development.

The combined upheaval and radical reshaping of the tech sector means that today's hardware engineer will need to be flexible and willing to retrain to remain relevant in this new paradigm. The evolution of tech is a reflection of a shifting global economy. Emerging industries constantly supplant legacy sectors. In this case - tech is replacing itself.

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# NEWSWATCH

## Testforce Systems launches spin-off of Xpresstest

**Testforce Systems Inc.**, a leading supplier of Test and Measurement solutions, has officially launched Xpresstest, a spin-off aimed at accelerating the customer's development process, while focusing on the industry's leading brands including Associated Research, Fluke, Keithley, Kepco and Tektronix.

Whether it's new product introduction, sustaining engineering practices, or maintenance and support, Xpresstest supports the challenges faced at each stage of the product lifecycle and how to deliver solutions to navigate all of them, according to Testforce Systems president Sami Stephan.

"Xpresstest takes a collaborative approach to selling transactional products, because the purchase is only one step of a much longer journey. Xpresstest support staff is readily available, knowledgeable and helps an organization simplify complex decisions," explains Stephan.

Headquartered in the Toronto area (Pickering), Xpresstest will provide and support programs including on-site company visits, in-depth training and technical seminars.

## Lumenera donates cameras to Ottawa schools

**Ottawa-based Lumenera Corp.**, manufacturer of high performance digital cameras and custom imaging solutions, has donated 48 of its high performance research-grade microscopy cameras to be used as a teaching tool in science classrooms across the city of Ottawa.

Lumenera donated a camera to every high school in the Ottawa area, within the Ottawa Carleton District School Board (OCDSB), Ottawa Catholic School Board (OCSB), and the French Public School Board of Eastern Ontario (CEPEO). Lumenera worked with science programs and curriculum advisors from each of the school boards to facilitate the delivery and installation of the cameras, while hosting training sessions for the teachers to become familiar with the cameras and imaging software.

The cameras will create a collaborative learning environment, facilitating discussions between the students and their teachers as they study specimens at the same time on a monitor or projector, rather than taking turns looking down the eye piece of a microscope. The camera will enable students to capture images of their scientific experiments and investigations utilizing a high-end imaging solution that is found in post-secondary institutions and professional research laboratories worldwide.

## DNA achieves ISO 9001-2015 certification

**Vancouver-based** contract manufacturer and distributor DNA Data Networking and Assemblies Ltd. has recently been awarded ISO 9001-2015 certification. The firm has been supplying to a wide spectrum of industries including automotive, fuel cell, mining and medical for more than 15 years.

Since it was founded in 1997, DNA's founders have strived to deliver a company that provided the highest service levels, quality products and on time delivery at a competitive price, according to company vice-president Rob Rosser.

"This certification is a testament to our team and their ongoing efforts to continually improve on not only the quality of our products we manufacture, but the overall support and service we provide to our customers," Rosser says.

DNA manufactures a wide range of products from the simplest cable harness to large box builds. The firm remains partners with manufacturing leaders in a wide spectrum of markets, including automotive, transportation, lighting and printing.

ISO 9001:2015 is based on a number of quality management principles including a strong customer focus, the motivation and implication of top management, the process approach and continual improvement.

"Using ISO 9001:2015 helps ensure that customers get consistent, good quality products and services, which in turn brings many business benefits," Rosser adds.

## Canada's tech sector contributes to economy

**Canada's tech sector** is a major driver of innovation and a dependable source of economic growth for the foreseeable future, indicates new research from the Brookfield Institute for Innovation + Entrepreneurship (BII+E) at Ryerson University. The report, entitled The State of Canada's Tech Sector, has updated and broadened the definition of the sector, taking into account how pervasive of an impact technology and technology-related jobs, has on the size of Canada's economy and its contribution to our workforce.

The report states that the value of Canada's tech sector has grown steadily and that the sector itself is broader in scope than previous assessments, ranging from digital technologies, to aerospace and pharmaceuticals. It is a diverse, highly innovative sector that is also a significant economic driver. In 2015, the technology sector was directly responsible for \$117 billion or 7.1 per cent of Canada's economic output—greater than that of the finance and insurance industry. The tech sector also has the key attribute of being a more dependable, less volatile, source of growth than the real estate, manufacturing, extractive and construction industries, which are currently Canada's largest economic contributors.

"The key to future economic growth and stability is understanding where Canada's strengths lie," says Sean Mullin, executive director, Brookfield Institute for Innovation + Entrepreneurship. "This benchmark study demonstrates a vibrant and diverse tech sector, and its potential as a driver of innovation and economic growth."

## Sciometric appoints chief technology officer

**Ottawa-based Sciometric Instruments**, a pioneer of Industry 4.0 smart technologies used by many global manufacturers to increase yield, improve quality and optimize manufacturing processes, has named chief research engineer Richard Brine as the firm's chief technology officer.

Brine joined Sciometric after graduating from Queen's University 25 years ago. His expertise and customer commitment has earned him increasing levels of responsibility to drive industry-leading advances across Sciometric's entire portfolio of tools and applications for in-process testing, according to Sciometric founder and CEO Nathan Sheaff. For the past 10 years, Brine has led most aspects of new technology development and commercialization, working hand-in-hand with customers. As CTO, he will be responsible for the total product vision, from concept to deployment and ongoing customer support.

## Velocity seeks to commercialize battery technology

**Salient Energy**, a company developing new high-tech batteries that will enable the shift towards renewable energy, was among the top winners at the Velocity Fund Finals, held recently at the University of Waterloo.

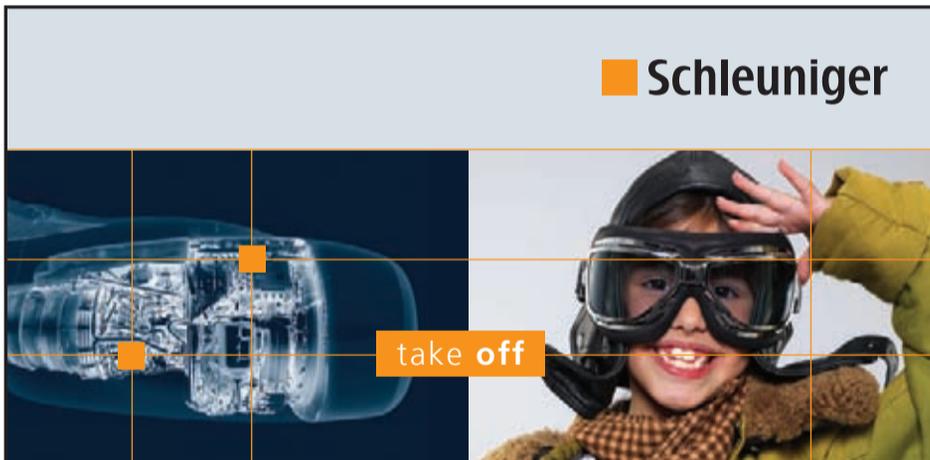
Founded by a student, two researchers and a chemistry professor from the University of Waterloo, Salient Energy is working to commercialize battery technology that will help address fluctuations in power supply and demand that have been a hurdle in advancing renewable energy. In addition to winning a \$25,000 prize, Salient Energy also won the top hardware prize of \$10,000.

"Not many people know that the supply and demand in our electrical grid needs to be equal. This has been fine with fossil fuels, because even though demand can't be controlled, we could just burn more or less coal to control our energy supply. However, if we want to rely on renewable energy, where we can no longer control supply or demand, we need to change how the system works," says Ryan Brown, business lead and co-founder at Salient Energy. "The way we do this is to incorporate batteries, charging them in times of excess supply, and discharging them in times of excess demand, balancing the system."

Winning the Velocity Fund Finals will allow Salient to move from its current model to build an application scale prototype and secure partners for their pilot project.

Velocity is an entrepreneurship program at Waterloo, providing the workspace, mentorship, community, and funding that startups need to build a successful business. In addition to receiving a share of today's \$125,000 in funding, the winners will be admitted to the Velocity Garage, the largest free startup incubator in the world.

## Schleuniger



## NEW EcoStrip 9380

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The EcoStrip 9380 offers the most complete feature set at an economical price point. This flexible machine can be configured with rollers or belt feeding unit capable of short mode processing and is easily operated via the 5.7" color touchscreen and underlying Schleuniger S.ON software. Turn the EcoStrip 9380 into a fully automatic processing line with a wide range of accessories for prefeeding, marking, stacking, coiling and tying.

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"The displays and software are similar from machine to machine. This makes integrating a new piece of equipment into production a smooth transition." **JR Palumbo, Owner, Royce Electronic Sales**

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# What are **human machine interfaces** and how do they work?

*Human Machine Interface by definition encompasses all the elements a person will touch, see, hear, or use to interact with a machine. When it comes to human interface technology, advancements are rapidly evolving.*

 By EAO AG

**HMI Components** are often considered switches and can consist of individual devices such as pushbuttons, emergency stops, keylocks, indicators and more. For basic switch understanding, technology drives the energy through the switch to a conductor, which can make or break an electrical current through a system.

A basic switch in a single circuit system is said to have one pole representing the amount of circuits that can be activated through this switch. Switches can have normally open contacts, normally closed contacts, or a combination of both. In order to create ultimate performance, switches have evolved to using gold and silver contacts that are suitable for various power levels and applications requirements.

Changing the contacts, however, soon caused other problems such as arcing, welding and bounces. Using modern technology, switch designers are finding ways to reduce these issues by focusing on how making or breaking contacts occurs. To minimize bounce, engineers are reducing the amount of kinetic energy of the contact by adding buffer springs, air, or oil shock absorbers to dampen contact recoil. As for arcing, snap-action switching elements reduce it by rapidly moving contacts from one spring-loaded position to another independent of actuator speed. On the other hand, slow make/break switching elements, usually used in emergency-stop switches and in high-power applications, employ rigid contact arms that force necessary contact separation to overcome contact welding.

Many switches today are modular, comprised of quickly assembled components including actuators, switching elements, illumination blocks, lenses, marking plates and mounting systems.

The actuator assembly, including the front-lens touch surface, is the part of a switch that directly interacts with a user. They are designed to require a specific

level of force to affect switching action. Tactile feel is a subtle feature that makes the actuator simple to control. It provides an indication – sensed by human touch – that the point has been reached where slight additional pressure will activate the switch. For touch-sensitive switches, capacitive, high frequency, or Piezo technology is used rather than mechanical actuators to sense when they have been touched and initiate a response, such as turning on lights or opening passenger doors on mass transit vehicles.

Another important aspect of modern day switches is environmental sealing. The type and amount of environmental sealing needed for a switch depends on where it is located. Switches operated in clean, indoor environments do not need protected switchgear. For industrial, transportation, indoor/outdoor public access and lifting/ moving environments rugged oil-and water-tight switches are needed. And in certain hazardous conditions, explosion-proof enclosures are needed as well.

Another area one will see major technological change is in the use of light emitting diodes (LEDs) in illumination. While LEDs cost more, they can last 10



times longer and consume half the power of an incandescent bulb and excel in applications requiring frequent on-off cycling that may cause incandescent bulbs to fail faster. For colored illumination, switches with multiple lenses or red, green and blue (RGB) LEDs can provide more information by using different colors to indicate specific switch states. Truly intuitive designs can be achieved by synthesizing or blending colors utilizing PWM (Pulse- Width Modulation) techniques, which give the ability to create any color in the spectrum.

Overall, today's advanced HMI components are precisely crafted devices, made adhere to specific design specifications and very close tolerances from high-grade plastics, metals and carefully calibrated springs.

The task of an HMI System is to make the function of a technology self-evident to the user. A well-designed 'mixed technology' HMI fits the user's image of the task he or she will perform. The effectiveness of the HMI can affect the acceptance of the entire system; in fact in many applications it can impact the overall success or failure of a product.

The HMI System is judged by its usability, which includes how easy it is to learn as well as how productive the user can be. An HMI System performs the functions that the user requires to carry out the prescribed task with a minimum of expended effort while improving productivity.

Finally, it needs to perform to the user's satisfaction. It is the task of everyone involved in the HMI design, the engineers, management, HMI consultant and industrial designer, to meet the defined usability requirements for a specific HMI System.

A well-designed HMI System does more than just present control functions and information; it provides an operator with active functions to perform, feedback on the results of those actions and information on the system's performance.

## What services and benefits do Human Machine Interfaces provide?

The interactive impact of the human/machine interface is much more significant than its basic functionality. HMI is the principal point of contact between the user and a machine or process. A good implementation of HMI design practice makes this interaction seem intuitive. Poor HMI design can alienate users or potential customers, encourage users to circumnavigate the system, or result in poor or unsafe system performance. As the direct link to the user, HMIs directly represent

the core system's quality and value.

For HMI components, this new technology has allowed for easy customization, a range of different switching configurations and long-term reliable switches. With great flexibility of switch designs, it is possible to create switches with different lens colors, materials, shapes, colors and actuator functions, making it easy-to-use for all industries.

A well-designed HMI System does more than just present control functions and information; it provides an operator with active functions to perform, feedback on the results of those actions and information on the system's performance.

## What is the business model and how do Human Machine Interfaces affect the bottom line?

Selection and implementation of proper HMI can have a critical impact on the use and overall efficiency of equipment. Failure and poor performance can often lead to costly equipment downtime that can negatively affect the bottom line, brand and frustration of end users.

The business model is creating advanced and carefully crafted HMI components and systems that allow customer supplied solutions to have long, reliable service lives.

The basic concept is – be mindful that the HMI is the user link to all system functions. Failure to consider this can affect the acceptance and usability of the entire machine. A poor HMI System can alienate users or potential customers and encourage users to circumnavigate the system.

## What is the implication of Human Machine Interfaces to each industry segment and industry if applicable?

HMI design and 'mixed technology' implementation practices have implications specifically for the following industries. Meeting industry best practices is important in placement of components, large surface area, legend size and color, emergency stop switch configuration, protection guards and shields and other ergonomic factors.

- **Industrial industry:** With today's focus on space saving solutions, HMI systems incorporate sophisticated human interface design and space utilization. User-friendly panel design using advanced switch technology combine to deliver greater industrial system uptime and productivity.

- **Transportation industry:** As transporta-

continued on page 8

## LP9 Sealed, Momentary Snap-Action Pushbutton Series from OTTO

- New, fully illuminated button option!
- Flush dome and raised dome button styles
- Six standard LED colors in either 2V or 12V DC
- Customize with lettering, a legend or your logo



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## Latching pushbutton delivers precision

**P9M latching pushbutton switch** provides quality precision for use in control panels, grips, computers, instruments and other applications where attractive rugged, long life pushbutton switches are required. Small device is sealed normally open, suitable for basic ON/OFF functions. When the button is pushed, it latches into position and with another push, it unlatches. Device comes with a standard 15/32" threaded case for hex nut mounting and features a short behind panel depth. Product is available with flush or raised buttons in nine different colors.

OTTO



<http://ept.hotims.com/61400-36>

## Anodized LED indicators come in 14mm size

**Q14 series** 14mm LED indicators include flush mounted anodized bezels in red, green, yellow and blue. These options enhance series' broad offering of customization with a large selection of LED colors, bezel finishes and types of illumination. Devices are low profile and light-weight and are available in all voltage ranges. Product's front panel is sealed to IP67 and salt tested.

APEM

<http://ept.hotims.com/61400-37>



## Human machine interfaces

continued from page 6

tion systems grow more complex, operator controls and passenger access products should be easier to understand and use in order to reduce the risk of human error. Switches and control panels are used in driver compartments, for passenger doors, emergency controls, operating panels and passenger communication systems.

• **Public Access/Security industry:** Vandal resistant and virtually non-destructive keyboards and keypads are used indoor and outdoor for banking terminals, kiosks, parking meters and access control. Factors such as environmental sealing, product marking and labeling techniques and the durability of exposed materials are critical in selecting the most optimal choice of HMI.

• **Lifting/moving industry:** Elevators, forklift trucks, cranes, conveyors, robotics and special ground support equipment require durable, reliable control systems that function in all environments and resist shock, vibration and heavy wear.

A key to the entire HMI design cycle is a thorough knowledge of federal, industry,

ergonomic, safety and design standards. These include Human Engineering standards, such as MILSTD- 1472F, which establishes human engineering design criteria for military systems, subsystems, equipment and facilities; federal standards like those set by the Americans with Disabilities Act; and industry guidelines such as those from SEMI, the global semiconductor industry association, covering HMI for semiconductor manufacturing equipment. Additional HMI specifications are furnished by ANSI, IEEE, ISO and others.

The effectiveness of HMI selection and design practices depends upon an exacting process that incorporates all technical, ergonomic and communication requirements. The impact of the human/machine interface is much more significant than its basic functionality. HMI components and systems are the principal point of contact between the user and a machine or process.

For more information on human machine interfaces from EAO, go to <http://ept.hotims.com/61400-38>

## Vertically actuated on-on-momentary slide switch is subminiature

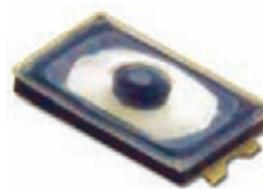
**JS207 Series** subminiature, vertically actuated on-on-momentary slide switches provide a double-pole, triple throw (DP3T) configuration that can be used to replace a two-position slide switch and a separate momentary push switch for applications that require the on-on-mom function. Product series is comprised of SPDT, DPDT and DP3T switches in vertical and right angle configurations and offered with a J-Bend SMT lead option that significantly reduces their pcb footprint by up to 50%. Contacts are rated for 0.3A at 6Vdc, with a minimum electrical life of 5,000 cycles.

C&K COMPONENTS

<http://ept.hotims.com/61400-39>



## Surface mount tact switch is ultraminiature



**TL3780 Series** ultraminiature tact switch is surface mount and measures 2.0mm x 3.0mm in size with a very low profile of 0.60mm. Device comes in two operating force options: 240 grams and 330 grams. Device has a life cycle of 300,000 to 500,000 actuations depending on the operating force and it has a rating of 20mA @ 15Vdc.

E-SWITCH

<http://ept.hotims.com/61400-40>



## Illuminated pushbutton switch is splash, vandal resistant

**FH Series** splash & vandal resistant illuminated pushbutton switch comes in a small, but robust package size of 12mm. The panel mount switch line is heavy-duty and rugged in construction and available as momentary in SPST. Flush and raised actuator styles provide non-illuminated, bi-color ring illumination or dot illumination. Bi-color illumination choices are red, yellow, green, blue, white and orange. Devices provide IP65 sealing, with electrical rating of 2A at 48Vdc. Electrical life is 50,000 cycles with contact resistance of less than or equal to 50mohm. Dielectric strength is 1500Vrms contact to contact and 1500Vrms contact to LED.

CIT RELAY & SWITCH

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Robust Metal Switch with Ceramic Actuator



Robust stainless steel latching action switch with backlit ceramic actuator resists scratches, abrasions and chemicals.

- Maximum Rated Current: 16 A @ 250 VAC
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- Mounting Diameter: 19 or 22 mm
- Ingress Protection: IP64 from Front Contact Area
- Impact Resistance: IK07
- Temperature Range: -20 °C to +85 °C
- Approvals: ENEC, UL, CSA, and CQC
- Standards: IEC 61058-1 and UL 1054

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## Faster Installation Time & Lower Production Cost



E-T-A's new 3120-PT is the first rocker switch/circuit breaker available with push-in terminals and offers:

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## Safety interlock switches are stainless steel

**K-SS Series** tongue operated safety interlock switches are designed to fit to the leading edge of sliding, hinged or lift off machine guards to provide positively operated switching contacts. Devices provide a choice of various actuators to aid installation and maintain durability, while providing robust position interlock detection for moving guards. Product has a rugged 316 stainless steel body and IP69K enclosure protection, designed to cope with the rigorous applications of the food processing, pharmaceutical, packaging and petrochemical industries.

OMEGA

<http://ept.hotims.com/61400-42>



## Production inspection unit improves adjustability

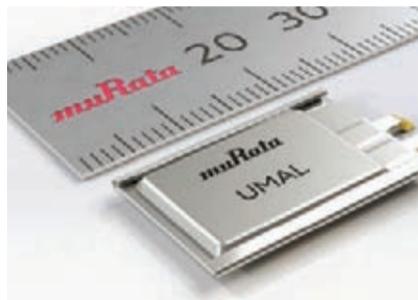
**O.C. White Company MacroZoom 12"** Integrated 'Heads Up' Inspection unit provides ball bearing base for increased adjustability. Unit comes with auxiliary 'close-up' lens that provides a range of 1-60x and a working distance from 5" to 24". Unit comes with 5 Megapixel hybrid HDMI/USB3 camera that delivers advanced imaging & measurement software. Product's 12" Retina HD LCD screen with on-board camera controls including image capture, video capture, measurement, split screen and digital zoom. Compatible with all Micro-Lite Illuminators, this ESD safe unit is available in four light source options.

EMX ENTERPRISES

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## Thin laminate-type energy device meets wireless sensor node demands



**UMAL** low-profile high capacity energy device measures 2.0 x 14.0 x 21.0mm and delivers a slim, high-capacity energy source with a maintenance-free extended life cycle. Device is suitable for numerous applications, such as wireless sensor nodes, wearables and back-up power solutions. Device also has charge/discharge and life cycle characteristics superior to conventional secondary batteries. Product has a nominal voltage of 2.3Vdc, can supply 12mAh

with a maximum discharge current of 120mA and is able to withstand load fluctuations.

MURATA

<http://ept.hotims.com/61400-44>

## Board mount power supplies have medical, ITE certs

**KMS-A 15W to 60W** board mount ac-dc medical and ITE certified power supplies are capable of starting up at -40C. The convection cooled units will operate in ambient temperatures of up to 80C and are rated for full load over a -30 to 50C range. Rated for Class II operation, products require no earth ground connection and accept an input voltage of 90 to 264Vac, while requiring no external input filtering components. Efficiencies are up to 89% and have an off-load power draw of <0.1W for the KMS15A, <0.15W for the KMS30A and <0.3W for the KMS60A.

TDK-LAMBDA

<http://ept.hotims.com/61400-45>



## Soldering iron holder prevents splatter, burns

**JA-50 Soldering Iron Holder and Cleaner** helps to keep your work area free from splatter and burns. The coil is designed to hold the solder iron securely and also dissipate heat. Product also comes with an integrated bass mesh ball that will effectively clean the oxidation from the soldering iron head without the use of water, which can reduce the temperature. This in-turn will increase tip life.

NTE

<http://ept.hotims.com/61400-46>



## Ac-dc converter specialized for 3-phase, four-wire system

**LS03-16BxxSS and LD03-16Bxx** series 3W three-phase four-wire ac-dc converters meet UL60950/EN60950/FCC part 15 standards. Product series provides 90~528Vac wide input range and meet the requirements of 3x220VAC/380VAC nominal voltage and any two-wire connection from three-phase four-wire system. Devices provide high efficiency up to 76%, 4000Vac isolation and output short-circuit and over-current protections. Products remain cost effective while providing high reliability and improved performance.

MORNSUN

<http://ept.hotims.com/61400-47>



## think green

# Environmental compliance: The new TSCA

By: Aury Hathout M.Env, certified environmental auditor, Enviropass

**As is well known**, the American presidential election will take place in November of this year. This question on everyone's lips is which candidate is going to lead the country for the next four years? One thing is certain, the US environmental compliance landscape is going to drastically change with the implementation of the new TSCA.

### Background information

Since President Obama's signing of the H.R. 2576, Frank R. Lautenberg Chemical Safety for the 21st Century Act, on June 22nd of this year, the TSCA has a new beginning. TSCA stands for Toxic Substances Control Act and was enacted in 1976. Since then, TSCA only enabled the Environmental Protection Agency (EPA) to request testing of certain toxic substances. Overall, it did not fully succeed in controlling toxic substances and a reform appeared necessary.

After several attempts throughout the last four decades, Congress finally agreed with a TSCA reform! Consequently several are expected and will certainly apply to the electronic industry.

### Changes for existing chemicals

Existing chemicals in the US market undergo a Prioritization, Risk Evaluation and Risk Management by the EPA. By 2018, the existing chemicals should be classified into two categories following a transparent process. They will either be listed as high risk or low risk chemicals. High risk chemicals that may show an unreasonable risk of hazard and exposure will be

regulated, according to risk management actions that are being taken. The risk management actions include warning requirements, usage restrictions or bans. When the EPA bans a use, availability of technically and economically feasible alternatives will nevertheless be taken into account. An interesting fact is that by default, a substance will be listed as a high risk chemical when hazard and exposure information are missing.

### Changes for new chemicals, uses

Another EPA's reformed role is to manage chemicals or chemicals usage that are new to the US market. Unlike existing chemicals, new chemicals or usages are being classified by the EPA into any of the following three categories depending if:

1. **They present an unreasonable risk;**
2. **The information is insufficient; they may present unreasonable risk; has substantial production and exposure;**
3. **They are not likely to present unreasonable risk.**

Prior to their commercialization, the EPA has to regulate these new chemicals and usages and publish its reasons 'why not'.

### What about U.S. actions to substances management?

This question was one of the toughest concerns of the TSCA revision. What is the Federal VS State relationship going to be? The decision was to maintain any State's action taken before April 22, 2016. State's regulations, such as the Californian Proposition 65 - which requires

providers to notify the consumer whether a product contains at least one chemical known to cause cancer, birth defects or other reproductive harm - remain in force. Nevertheless, some exemptions apply, for example in tort actions cases.

### Similarities between the new TSCA and the European REACH?

Only the future will tell, depending on the risk management actions that are going to emerge from the modernized TSCA. However, it is reasonable to foresee that some chemicals that are regulated under the European Union REACH (Registration, Evaluation, Authorization and Restriction of Chemicals) will also be regulated under TSCA, due to the properties, toxicity and usage of these substances. The REACH obligation to disclose the identity of Substances of Very High Concern (SVHCs) in articles looks similar to the warning requirement on TSCA's cards.

### What should be done at this point?

As a manufacturer, if you export electronic products to the EU (European Union), you probably are already familiar with both the RoHS (Restriction of Hazardous Substances) and REACH requirements. There is a good chance that chemicals that are regulated under RoHS and REACH will also be part of TSCA's high risk chemicals list and therefore be regulated. It is recommended to maintain your product's technical documentation and to determine the concentrations of the hazardous substances that constitute your product's components

and materials. Solid processes must be in place to maintain such documentation. Also important to note, the regularly updated EU RoHS exemptions and REACH SVHCs lists should be monitored according to your processes and be reflected in your products RoHS and REACH statements.

Additionally, the EPA keeps the public informed on TSCA's implementation plan, according to EPA's new responsibilities. In spite of the fact that the imposed deadlines are quite short, the EPA wants to engage partners and stakeholders early in the process and to be as transparent as possible (The Frank R. Lautenberg Chemical Safety for the 21st Century Act, First year implementation plan, June 29, 2016). Staying informed on these implementation plans and participating in information sessions are two good ways to anticipate the coming chemical risk management actions.

As soon as such actions are made available; whether these are warning requirements, usage restrictions or bans; you will then be able to verify if your product's technical documentation is sufficient to confirm compliance. If compliance cannot be confirmed, you will be able to make corrective actions, like updating your processes, replacing non-compliant parts, filling product's documentation gaps etc. Using these due diligence actions, you should be able to confidently address your US customer's new requests about restricted chemicals.

For more information on environmental compliance issues from Enviropass, go to <http://ept.hotims.com/61400-48>



## Connectors

# Universal sockets are unsafe:

## Here's why

By Interpower Corp.



The Continental European plug used throughout Europe needs the plug to be inserted into a recessed socket.

A universal socket is not the answer to try to create one source that will accept the huge variety of plugs that are available throughout the world. Serious safety issues come into play in trying to do so. To summarize a 'universal socket' in one word—unsafe!

There are a number of different reasons why a universal socket is unsafe. To begin with, national and international electrical standards have specific requirements for the dimensions of a plug and socket which the construction of a universal socket does not meet. The IEC 60884-1 is an example of an international standard that gives specific dimensional requirements. There are many national standards to consult, including North America UL 498 and CSA C22.2 no. 42, United Kingdom BS 1363, Germany DIN VDE 0620-2-1 and Australia AS/NZS 3112.

### Safety implications of installing universal socket-outlets

There are also safety organizations who have issued warnings about the use of a universal socket. The Electrical Safety Council in the UK had Nemko Ltd. (an independent test and certification body for electrical and electronic products) look at "the safety implications of the installation of universal socket-outlets in the UK for domestic and commercial use, using reference standards BS 1363-2:1995 +A4:2012 and BS 5733:2010."

In the *Conclusions and Observations* at the end of this test report, it stated: "From the test results it is clear that, as well as the legal implications of installing these universal socket-outlets in the UK for domestic and commercial use, there are also serious potential hazards including risk of electrocution and risk of fire." It continued with the following recommendation: "It is recommended that electricians are alerted to the potential hazards detailed in this report, in case they are requested to fit such socket-outlets in

domestic or commercial installations (for example in hotels)."

The Safety Authority in Singapore, SPRING Singapore, issued a "Safety Alert: Risks of Using Universal Portable Socket Outlet." In it, it was stated: "The Universal Portable Socket Outlet (UPS0), falls under the PSO (Portable Socket Outlet) category. However, it is NOT approved for use in Singapore." The two main safety risks were a fire hazard and an electric shock hazard.

### Universal socket is not safe to use because of voltage

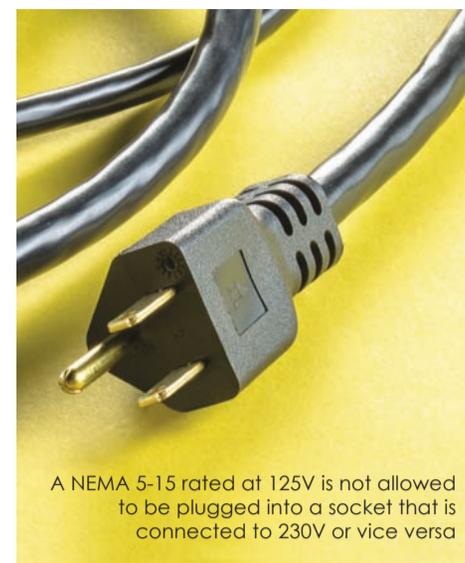
Another primary reason why a universal socket is not safe to use is because of voltage. Different mains voltages are used throughout the world. Most of the world uses 230V, while in North America the voltage is 120V and in Japan it can be either 110V or 120V. "A NEMA 5-15 rated at 125V is not allowed to be plugged into a socket that is connected to 230V or vice versa. The fear is if a device that is intended for only 120V is plugged in, the higher voltage will cause overheating and a fire," explained Dan Ford, technical support specialist at Interpower Corp.

The design of different plugs and sockets throughout the world is another major concern when it comes to universal sockets. For example, the plug used in the UK and some other parts of the world contains a fuse and the outlet incorporates shutters on the neutral and line contacts to prevent someone from pushing a foreign object into the socket. The Continental European plug used throughout Europe needs the plug to be inserted into a recessed socket. In North America, the NEMA 5-15 plug has a completely different configuration than these. With all of the different styles of plugs available, it simply is not possible for a universal socket to meet all of these dimensions and features in one receptacle.

### Various plugs and sockets have different amperage ratings

Along with that, it's important to note that the various plugs and sockets have different amperage ratings. For example: in North America it is 15A; in the UK, 13A; in Germany, 16A; and in Australia, 10A. A plug should be used in a socket that has the same amperage rating. There are potential fire hazards if the amperage rating is exceeded. A universal socket is usually constructed to meet minimum current ratings, meaning that it may be extremely unsafe under normal loads.

Grounding is another huge issue. The UK and NEMA plugs, along with many others, use a third pin to ensure a safe ground connection, but the Continental



A NEMA 5-15 rated at 125V is not allowed to be plugged into a socket that is connected to 230V or vice versa

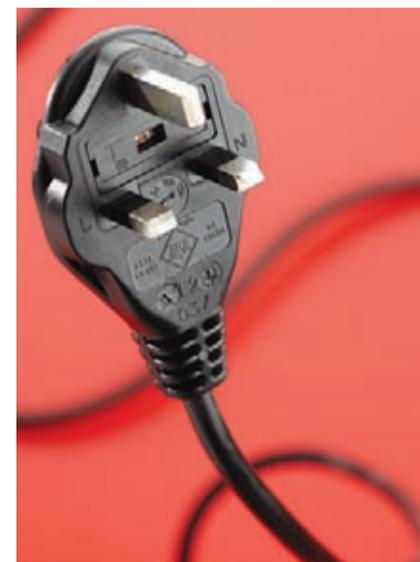
European plug has grounding clips on the sides of the plug body. The contacts found on the Continental European plug are not present in the universal socket and even if it's plugged into the socket, it means it would be ungrounded. In the event of a short circuit, this could be potentially fatal.

Polarization also makes a big difference. Electrical polarization means a designated method of wiring the line, neutral and ground wires to the plug or socket. Pin polarization is the dedicated alignment of the pins. While some countries have polarized plugs, others do not. Because of these differences, a universal socket cannot cover all of the combinations appropriately or safely.

### Serious safety hazard of potential arcing

The pins of a plug should make complete contact within the socket—that is a key purpose of a socket. It is also another reason why a universal socket is not advised. It is extremely difficult to create one that has full contact with the pins using all of the various plug patterns. They are too different in design and safety becomes compromised. A serious safety hazard of potential arcing and the threat of fire may be created, because the pins are not touching properly. By not having the pins make proper contact within the socket, it can also lead to plugs not

continued on next page



A NEMA 5-15 rated at 125V is not allowed to be plugged into a socket that is connected to 230V or vice versa.

The Electrical Safety Council in the UK had Nemko Ltd. look at the safety implications of the installation of universal socket-outlets in the UK for domestic and commercial use.

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continued from previous page

staying in securely or being inserted incorrectly. Both of these actions can again cause serious safety concerns.

"In addition to the seriousness of a plug pin not making proper connection to the socket contacts, it's possible that the plug may not have the proper retention to remain in place in the socket during use," explained Ron Barnett, product development manager at Interpower.

**Conclusion**

While it may be frustrating having to deal with the various plugs and sockets found in different countries, there are major safety issues involved in trying to

create one socket to fit all which makes a universal socket unsafe—and potentially life-threatening.

The electrical connections throughout the world are just too different and are not compatible with each other to have a single socket to accommodate each one. Therefore, it is strongly advised to not purchase or use a universal socket from any company or any source, no matter what claims for safety are made. A universal socket is, to put it simply, not safe and no electrical national or international standard approves it.

For more information on international plugs and sockets from Interpower Corp., go to <http://ept.hotims.com/61400-49>

**Hybrid connector system reduces installation time**



**OptiFlex Hybrid Connector System (OHCS)** provides a quick and reliable installation or retrofit of a hybrid cable. Device combines multiple fiber optic and power connections into a single unit, reducing the chance of contamination or damage of the individual fiber connections. Product's quick mating provides an ergonomic 1/3 turn locking feature with

audible click. Built-in MPO or MU high density fiber optic device can accommodate up to 22 single mode or multi-mode fiber connections. Product includes up to 3 contacts for copper wires between AWG 16 to AWG 8 in size. Made of high strength thermoplastic, devices are UV- resistance, corrosion free and IP 68 rated for outdoor harsh environment operation.

**CABLES UNLIMITED**

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**Tool-less connector terminates quickly**

**Han ES Press connector** is based on a cage clamp terminal and enables rapid tool-less installation and contact bridging with pre-fabricated jumpers. Unlike other implementations of this type of termination technology, device's cage clamp terminal is delivered pre-loaded. Product user needs to merely move an actuator into the contact chamber to close the cage clamp terminal around the conductor again. Device provides high tensile strength, vibration-resistant and reliable. Product is available in versions for housing sizes Han 6 B, 10 B 16 B and 24 B. All variants are compatible with the other inserts in the Han E, ES and ESS series.



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**Corrosion resistant RF connectors are waterproof**

**Pisces waterproof connectors** come in a nickel aluminium bronze alloy, suitable for use in harsh environments. This material has a highly-durable non-reflective surface, provides a high level of corrosion resistance, is inherently resistant to erosion in desert type environments and provides high resistance to sand and dust as there is no plated surface

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**SMA end launch connectors boost VSWR performance**

**Line of high frequency SMA end launch connectors** improves VSWR performance up to 26.5GHz. Device provides an optimized end launch design with either through-hole legs or traditional slide-on mounting legs, making it suitable for high frequen-

cy applications. Product line includes through-hole and traditional edge-launch options for a variety of pcb thicknesses, in addition to captivated 0.010" and 0.015" diameter center contacts that will accommodate different substrate widths.

**AMPHENOL RF**

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**Two position connectors environmentally sealed**

**High-power AMP MCP 9.5 two position connectors** are designed for harsh environment wire-to-wire and wire-to-circuit board connections. Devices withstand the extreme conditions of rugged design environments and have a current rating of 78 amps for 10 mm<sup>2</sup> wire. Products are constructed of heavy-duty thermoplastic and withstand severe vibration and mechanical shock and are IP 67 & IP 69K rated and protect connections from dust, dirt, and moisture. Devices have a -30° to +100°C long term operating temperature.

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# Application of solder ball technology on QFP pads improves processing reliability

By Advanced Interconnections Corp.

IC complexity and higher I/O counts have pushed older technology like Quad Flat Pack packages (QFP) to the limit of finer pin placement. Solder bridging between closely spaced gull wing leads of fine pitch QFP packages presents a significant yield issue in production.

This, along with other challenges associated with QFP packages such as non-coplanar leads 'lifting' after reflow, opened the door for newer, high density packages, such as Ball Grid Array (BGA), that are ultimately more cost effective and process friendly.

Until recently, however, the only options to accommodate device transition from QFP to BGA were to re-spin boards or purchase a custom package conversion adapter employing lead frames that match the rectangular pad layout on the existing printed circuit board (pcb). Conventional adapters using lead frame technology inherently pose the same reliability and processing issues (solder bridging, coplanarity, etc.) associated with the end-of-life QFP devices. (see Figure 1).

A robust alternative has been developed for using BGA devices on boards designed with QFP pads. This patented



Fig. 1 – Conventional adapters depend on 'gull wing' leads to attach to the existing pcb land design. In some cases, coplanarity issues reach a critical point when four individual lead frame additions are used to breakout a new BGA footprint to an existing QFP pad layout.



technology employs the advantages of the BGA package directly on the board interface – eliminating the design weaknesses and processing challenges associated with gull-wing leads, while allowing uninterrupted production using existing board inventory.

Advanced Interconnections Corp. has extended its field-proven solder ball attach process from BGA Socketing Systems to a new interposer design that replaces traditional lead frames with a solder sphere interface. The streamlined interposers maintain the existing board layout while seamlessly converting BGA packages for use on QFP footprints. (See Figure 2)

The patented technology can be applied to cover a wide range of package types and footprints; BGA and PGA can be converted to the original QFP pad layout as well as adapting finer pitch QFP packages to older designs. The solder ball interface on the bottom of the interposer provides a robust attachment that exceeds QFP process yields by employing a predetermined

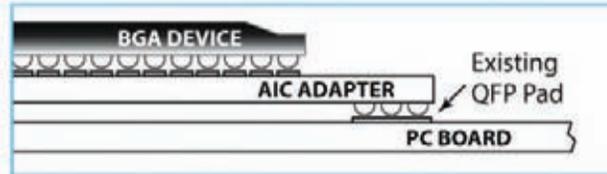


Fig. 2 – A series of solder balls are applied to the bottom of the adapter/interposer, in the same pattern as the QFP footprint using a patented process. Existing board inventory is maintained, and processing issues caused by fragile leads are eliminated.

number of solder balls in place of the traditional lead frame, producing a consistent, reliable solder fillet. With multiple balls for each QFP pad, there is redundancy in the design, virtually eliminating the possibility of a bad solder joint or fracture. Also, this system minimizes coplanarity issues among the pads themselves for further processing reliability.

## Additional Benefits

Higher density BGA packages are much smaller than their QFP predecessors, leaving room on the interposer to include a mix of additional active and passive



Fig. 3 – QFP Package Conversion Adapters maintain the 'keep out' areas of the original design, so there is no board space penalty from adding components.

surface mount components to enhance the product design or accommodate other changes to updated ICs. (See Figure 3)

In addition to device obsolescence, QFP Interposers & Package Conversion Adapters also solve issues associated with the transition from tin/lead to lead-free packages. In a recent application, the only replacement for the original tin/lead QFP device was a lead-free BGA package.

The customer wanted to maintain its existing, fully qualified tin/lead reflow profile. Advanced deployed eutectic tin/lead solder balls on the QFP interface to the customer's PC board.

However the interposer board assembly was first processed using a high temperature, lead-free device attach process. The two-step interposer assembly process helped the customer avoid costly interruptions to its supply chain and eliminated the need to requalify the reflow process.

## Conclusion

Having a reliable alternative to either re-spinning boards or using custom adapters that have the same processing challenges as the device packages they are replacing will save time, cost, and ease inventory management issues for electronic OEMs dealing with device obsolescence.

The patented Solder Sphere Interface technology from Advanced Interconnections addresses a wide range of issues from QFP device obsolescence, to lead-free transitions, to the device enhancements and corrections. The innovative solution ensures that existing boards can be used with current reflow processes, while improving processing results and providing a more reliable solder joint.

For more information on solder ball technology from Advanced Interconnections Corp., go to <http://ept.hotims.com/61400-56>

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## Wire termination contacts accommodate 22-26 AWG wires

Wire crimp and solder cup receptacles can accommodate wires from 22-26 AWG and accept mating pins in the popular .025" (.63 mm) - .040" (1.02mm) range. Devices provide solutions for solder terminations of disparate uses. Model 9177 is suitable for high current, rugged applications handling currents in the 15 amp range. Model 4485 can be used on pin-to-pin spacing down to 2mm. Three of the five parts have inspection holes to accommodate wire viewing and to promote plating coverage inside the wire termination holes.

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## USB Type-C connectors handle next-gen high-speed data delivery

USB Type-C range of high-performance connectors provides design flexibility, improved transfer speed, power and usability. Designed for mobile and smart devices, devices are suitable for next generation applications delivering speeds up to 10Gbps for data transfer, audio and video connectivity, supporting HDMI, DisplayPort and VGA. Device supports USB power delivery standards of charging capability, with rapid charging up to 100 watts.

### GLOBAL CONNECTOR TECHNOLOGY

<http://ept.hotims.com/61400-57>

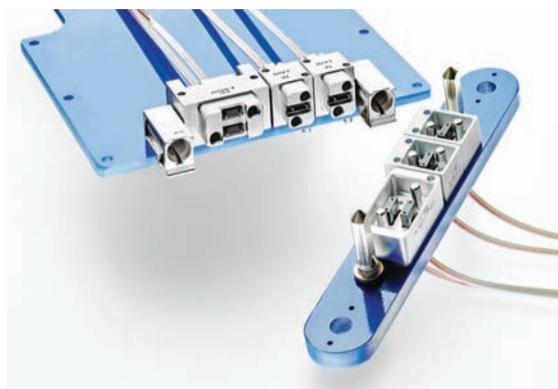


## Ruggedized backplane interconnects support VITA 66.1, 66.4 standards

Ruggedized Optical Backplane interconnect systems provide a high-density, blind-mate optical interconnect in a backplane/daughtercard configuration. The half-sized connectors are fully compliant to the ANSI/VITA 66.4 standard. The fiber optic ribbon cable interconnect feeds through the backplane to removable system modules using MT ferrules. The VITA 66.1 modules are full width and accommodate two MT ferrules and the VITA 66.4 modules are half width and hold a single MT ferrule.

### TE CONNECTIVITY

<http://ept.hotims.com/61400-59>



## Front lock FPC connector comes with 0.3mm pitch

XF32 high reliability rotary front lock FPC connector with 0.3mm pitch and low profile can be used for a variety of applications. Ultra-slim device with a depth of 3.5mm provides side molding wall on the rear bottom of the connector allowing greater freedom in board design.

Slider open locking mechanism makes work efficient. Gold-plated with an applicable FPC thickness of 0.2mm, device is halogen free (900 ppm max. for BR, 900 ppm max. for CL, and 1,500 ppm max. for Br+Cl)

### OMRON

<http://ept.hotims.com/61400-58>



### newswatch

## PennEngineering to acquire Heyco Products

PennEngineering, Danboro PA, has entered into an agreement to acquire Heyco Products Inc., Toms River, NJ. The acquisition is expected to expand sales growth opportunities for both companies.

Heyco Products will continue to operate as a separate company under the PennEngineering corporate umbrella, keeping the Heyco brand unaffected.

"PennEngineering and Heyco share a common culture of solid brand recognition and quality engineered products, with a strong R&D and customer service focus," says Mark Petty, CEO of PennEngineering. "This will allow for a seamless transition. The acquisition will diversify the PennEngineering product portfolio by expanding into engineered plastic fasteners, components and wire protection products."

## Infinite RF Holdings to merge with L-Com

Infinite RF Holdings Inc., an urgent needs supplier of engineering-grade radio frequency (RF), microwave and millimeter-wave components and cable assemblies through their Pasternack and Fairview Microwave branded lines, has acquired L-com Inc., manufacturer of wired and wireless connectivity solutions with significant custom manufacturing capabilities.

Headquartered in North Andover MA, with global manufacturing, sales and distribution operations, L-Com serves the wireless engineering community with short lead time design and product solutions. Its comprehensive offering includes wireless components, cable assemblies, antennas, specialized Military/Aeronautics connectivity solutions, electrical connectors and wireless sensors for IOT applications through the branded product lines L-Com, HyperLink, MilesTek, Aiconics and Point Six Wireless.



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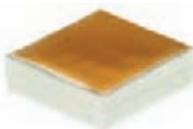


## Next gen high-power LEDs meet DLC 4.0 premium requirements

**XLamp MHB-B** option new generation high-power LEDs delivers a more-effective way to achieve low-cost systems and meet new DLC 4.0 premium requirements than mid-power (MP) LEDs. Device provides 44% less weight and 36% smaller size. Devices deliver a 13% higher LPW than its previous generation in the same 5mm x 5mm package. Products provide a lower system cost and higher reliability than mid-power LEDs for high lumen, directional DLC applications such as outdoor high bay lighting, offering 130 LPW.

CREE

<http://ept.hotims.com/61400-60>



## Infotainment RF signal source serves as all-in-one

**AST-1000** all-in-one infotainment RF signal source based on National Instruments Vector Signal Transceiver 1000 handles all infotainment signal-testing requirements with software-defined flexibility. Product can generate all common infotainment RF signals, including AM/FM, DAB, GPS, HD Radio, and Sirius/XM. Given its software-defined architecture, the instrument will soon accommodate new signals, including connectivity protocols like Bluetooth and WiFi, and non-RF signals like CAN for bus monitoring.

AVERNA

<http://ept.hotims.com/61400-62>

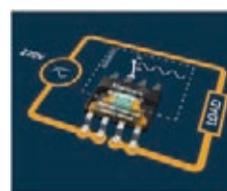


## Voltage MOSFET minimizes total conduction losses

**UltraMOS** energy efficient, high voltage MOSFET minimizes total conduction losses while maximizing power density. Device is a 6A, 800V MOSFET in the TO-220 package. The low  $r_{DS(on)}$  of  $0.8\Omega$  and low total gate charge of  $24.3nC$  are key energy efficiency characteristics of this device, which surpasses the operational performance of similarly rated standard MOSFETs. Device delivers high speed operational benefits for phase shift compensation in Power Factor Correction (PFC) applications.

CENTRAL SEMICONDUCTOR

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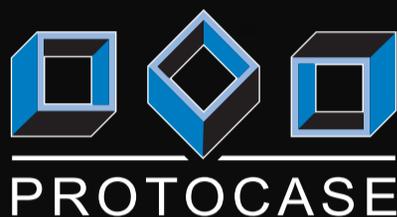


## Isolated calibrated current sensors deliver 100kHz bandwidth

**MLX91210** Isolated Calibrated Current Sensors run off a 5V supply and provides current sensitivity levels down to  $26.7mV/A$  and supports linear current measurement ranges that span as far as  $\pm 75A$  corresponding to 30ARMS current. Available in S08 and S016 package formats, the fully integrated Hall-effect devices have extremely low resistive losses ( $0.8m\Omega$  for the S08 and  $0.7m\Omega$  for the S016) and provide high voltage isolation ratings ( $2.1kVRMS$  and  $2.5kVRMS$  respectively), as well as accelerated responsiveness (within just 5 $\mu s$ ). The sensor output of each IC is factory-calibrated for a specific current range and compensated for optimal stability in relation to temperature and over the course of its working lifespan, so that long term accuracy is maintained.

MELEXIS

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(for producing a wide variety of machined parts & enclosures)



## WHY CNC MACHINING?

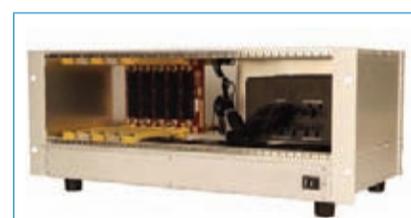
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Enhance aesthetics and functionality with powdercoat finish, silkscreening/direct digital printing and engraving.



## Development system for 3U OpenVPX boards

**VPXD4500** OpenVPX Development Chassis provides a 5-slot OpenVPX backplane with a BKP3-DIS05-15.2.13-n profile per the VITA 65 specification. The distributed mesh backplane is versatile to a wide range of 3U OpenVPX boards. The enclosure facilitates rear I/O access and Rear Transition Module (RTM) connectors are optional in the system. The 19" wide 4U development platform comes with rubber feet for desktop applications, however the unit is also rack-mountable. A 350W ac power supply is standard and offers typical 3U VPX voltages of 3.3V, 5V, 12V,  $\pm 12V$  AUX, and 3.3V AUX. Other backplane and PSU options are available.

PIXUS TECHNOLOGIES

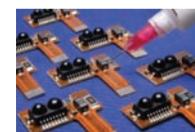
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## Insulative underfill epoxy is thermally conductive

**EP3UF** one component epoxy contains thermally conductive fillers with very small particle sizes imparting a low thermal resistance of  $5-7 \times 10^{-6} K \cdot m^2/W$ . The low viscosity system has good flow properties and can be applied in bond lines as thin as 10-15 microns. Product provides a thermal conductivity of 9-10  $BTU \cdot in / ft^2 \cdot hr \cdot ^\circ F$  [ $1.30-1.44 W / (m \cdot K)$ ] and a volume resistivity exceeding 1014 ohm-cm. Product passes NASA low outgassing tests and can be used for bonding and underfills in microelectronics packaging/assembly applications.

MASTER BOND

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## Electronic rotary locking solution is microprocessor controlled

**R4-EM 9 Series** of electronic rotary locking solutions delivers next generation electronic latching through microprocessor controlled actuation, providing intelligent, reliable electronic access. Product provides expanded intelligence with microprocessor control of all input and output commands, providing expanded programming capability and customization of latch functionality. The lightweight design incorporates an integrated door sensor and extended housing for tamper resistance, while an integrated trigger sensor provides indisputable lock/unlock status reporting. Products come with a 'kick out' option that enables lightweight doors and drawers to pop open when the latch is unlocked and a 'pull open' style that detents the cam in the fully closed or open position.

**SOUTHCO**

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## Software enables automated test creation without instrument programming

**BenchVue 3.5 software** is an intuitive, easy-to-use platform for the PC that provides multiple-instrument measurement applications, data capture and solution applications, without the need for instrument programming. Product provides a faster, simpler way to accomplish the most common tasks by further enhancing test automation for basic sequences. Product's Test Flow app allows users to create automated test sequences in minutes without traditional instrument programming.

**KEYSIGHT TECHNOLOGIES**

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## Ac-dc battery charging power supplies lower standby power consumption

**MBP Series** 165~264Vac input voltage ac-dc battery charging power supplies are specialized for distribution automation system provide ultra-low standby power consumption, active PFC and high efficiency up to 86%. Units have standby power consumption as low as 25VA for 14W output power and 40VA for 20W, and meet requirements of DL/T721-2013 standard. For FTU, DTU and RTU systems, most of time the whole monitoring system operates in no-load state. Therefore, low standby power consumption and high reliability of charging power supply are significant and critical to wholly reduce energy consumption and improve the reliability of the system.

**MORNSUN**

<http://ept.hotims.com/61400-67>

## Standoffs come in multiple thread styles

**Keystone** range of Hex Male/Female Threaded Standoffs are available in stainless steel, brass, aluminum and nylon. Available in 4-40, 6-32, 8-32 and metric threads, devices are precision made American standard, as well as Metric size. Aluminum spacers feature a clear iridite finish as per MIL-C-5541; while brass standoffs feature a Nickel finish as per QQ-N-290 and the insulated Nylon 6/6 Standoffs are in a natural color. Corrosion resistant Stainless Steel Standoffs are per ASTM-A581/582, Class 303. Also available in lengths for PC/104 and PC/104-Plus Modules as well as a single-board hardware mounting kit.

**EMX ENTERPRISES**

<http://ept.hotims.com/61400-68>



## Micro buzzer housed in small package

**CMT4023SSMT** and **CMT5023SSMT** magnetic transducer buzzers are housed in compact, surface mount packages as small as 4mm x 4mm. Devices come with profile depths as low as 1.9mm and sound pressure levels (SPL) ranging from 65dB up to 80dB at 10cm. Both devices provide a low profile of 2mm, a rated voltage of 3V and a rated frequency of 4kHz. **CMT4023SSMT** carries an SPL of 70dB and an operating temperature range of -20C to 70C. **CMT5023SSMT** provides an SPL of 80dB with an operating temperature range of 30C to 70C.

**CUI**

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**IIA Series**  
35A Non-isolated SMT Point of Load with PMBus™

- ◆ Only 0.45 in<sup>2</sup> Board Space
- ◆ 8 to 14V Input
- ◆ 0.6 - 3.3V Output
- ◆ Digital Adaptive Control
- ◆ Configurable Sequence and Fault Management

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**IIB Series**  
60A Non-isolated SMT Point of Load with PMBus™

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- ◆ 8 to 14V Input
- ◆ 0.6 - 2V Output
- ◆ Digital Adaptive Control
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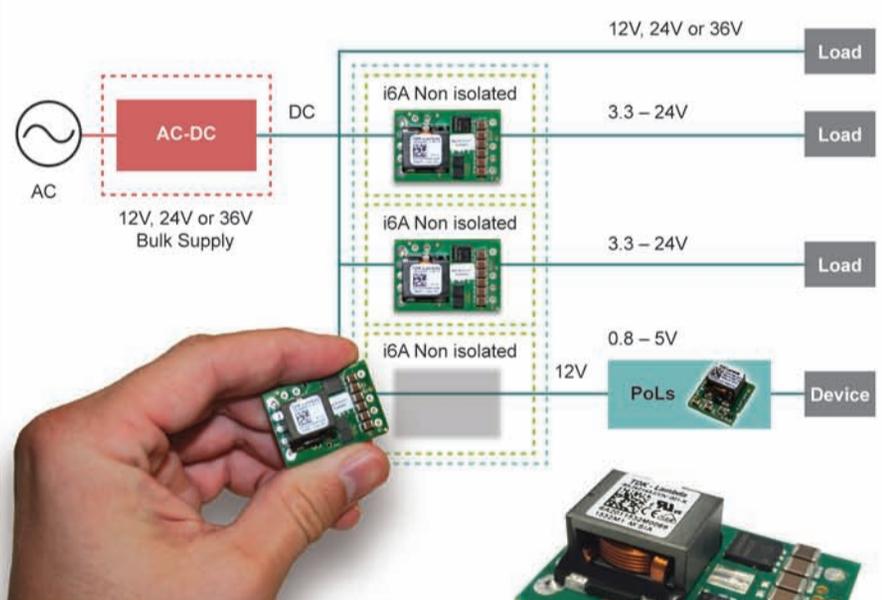


**IQG Series**  
300-504W Isolated 1/4 Brick Converters

- ◆ Quarter Brick Footprint
- ◆ 48V Nominal Input
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- ◆ Up to 95% Operating Efficiency
- ◆ High True Usable Power

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# Create your own!



**i6A SERIES -**  
**250W, 3.3 to 24V 14A Output Non-Isolated Converters**

The i6A is ideal for creating additional high power output voltages from a single output AC-DC supply. Rated at 250W, this 14A step-down converter can be adjusted across a 3.3V to 24V output, accepting a wide 9 to 40Vdc input.

Packaged in the industry standard 1/16th brick footprint, with an ultra high efficiency of 98%, the i6A can operate in even the most demanding thermal environments.

Contact TDK-Lambda for an evaluation board or check our website for distribution inventory

<http://us.tdk-lambda.com/lp/products/i6A-series.htm>

For more information on how TDK-Lambda can help you power your unique applications, visit our web site at [www.us.tdk-lambda.com/lp/](http://www.us.tdk-lambda.com/lp/) or call 1-800-LAMBDA-4

- ◆ Only 1.2 in<sup>2</sup> Board Space
- ◆ 9 to 40V Input
- ◆ 3.3 to 24V Output
- ◆ Up to 98% Efficiency
- ◆ Minimal External Components Required



**IAH Series**  
40A Non-isolated SMT Point of Load

- ◆ Only 0.69 in<sup>2</sup> Board Space
- ◆ 3.5 - 17V Input
- ◆ 0.7 - 5.5 Output
- ◆ No External Tuning Components Needed
- ◆ DOSA Compatible Footprint

<http://us.tdk-lambda.com/lp/products/dosa2-series.htm>



**IBH Series**  
20A Non-isolated SMT Point of Load

- ◆ Only 0.36 in<sup>2</sup> Board Space
- ◆ 3.5 - 14V Input
- ◆ 0.7 - 5.5 Output
- ◆ No External Tuning Components Needed
- ◆ DOSA Compatible Footprint

<http://us.tdk-lambda.com/lp/products/dosa2-series.htm>



**ICH Series**  
12A Non-isolated SMT Point of Load

- ◆ Only 0.23 in<sup>2</sup> Board Space
- ◆ 4.5 - 14V Input
- ◆ 0.7 - 8.5 Output
- ◆ No External Tuning Components Needed
- ◆ DOSA Compatible Footprint

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# Contract Electronics Manufacturing



## Sunsel Systems expands CEM footprint in Dartmouth NS

**More than doubling** in size, contract electronics manufacturing (CEM) solutions provider Sunsel Systems Manufacturing Corp., has moved into a 74,000-square-foot facility in Dartmouth NS.

Specialists in serving the Atlantic Region of Canada and led by the expertise of co-founders Julian Taylor and Jeff Levy, Sunsel Systems has risen in prominence in eastern Canada, recognized for its high levels of customer service.

"Our expertise and full service capabilities allow us to offer custom solutions from the concept and design stages through to the commercialization of any product," Taylor says. "Our flexibility means we can tailor pricing, timelines and solutions to meet the customer's objectives."

The medium-sized ISO 9001 registered CEM specializes in high mix and low to medium volume production runs, orders that range between 100 to often into the thousands. Typically targeting the niche oriented customer, OEMs in Atlantic Canada tend to serve the RF, energy or oceanographic sectors and projects that are research and development oriented, according to Taylor.

"One of our goals is to have diversity in our customer base, which includes high complexity along with others at that suit high volume production," he adds. Sunsel provides prototyping services, which Taylor says is often integral to developing relationships at the early stages.

"Technology wise, we are in a very good trajectory, as we feel we have taken the necessary steps to permit steady growth in the coming years. As a company experienced in complex jobs, we see firsthand the difference cutting edge technology makes every day for our clients and their products," Taylor adds. "In fact, we've experienced a major reduction in our defect rate thanks to the new technologies we've adopted."

### CEM aims to attract new sectors

Taylor says the expansion steps has Sunsel poised to attract new business coming from emerging sectors such as the virtual reality, IoT and wearables design sectors. The firm also hired Greg MacDonald as its new sales manager.

As for 'next steps', Sunsel is looking at introducing robotics this Fall, which includes building a cell of robots that will allow the CEM to 'box build', starting with smaller pilot projects. The concept paves the way for the move into higher volume business.

"If our efficiencies are strong we can become more competitive in more regions. These steps help us maintain our 'home field advantage' in Atlantic Canada, while continuing to expand outwardly," Taylor states.

The building itself is very highly efficient and can be considered LEED (Leadership in Energy and Environmental Design) quality, according to Taylor. The facility boasts a high efficient water-looped heat-pumped system, keeping operating costs as low as possible. The building also provides a lot of natural light into it, enhancing employees' daily experience and customer visits.

## CEM Commutron Industries marks 20th year in Saskatchewan

After two decades of evolving and surviving many transitions and challenges, Saskatchewan-based contract electronic manufacturer Commutron Industries Ltd. embraced its 20th anniversary in business this month.

Located in the beautiful and peaceful resort community of Elbow SK, Commutron serves high-tech industries and technical needs with the manufacturing of custom printed circuit board (pcb) and electronics assembly. Over the years the CEM has served many sectors: communications, mining, transportation, instrumentation, aviation, energy, agriculture, consumer goods and more. The business name originates from a play on the words, 'community' and 'electronics'.

With two SMT lines Commutron has the ability to scale to any volume, large or small, according to Jeff Scheller, supply chain & C.S. manager.

"With this flexibility we can offer a no minimum board policy but have ability scale to meet the customer's needs," he adds.

With lead-free wavesolder and SMT processes, Commutron helps customers meet environmental regulations, as its facility is ISO 9001:2008 certified (Currently awaiting 9001:2015 Certification).

The company is privately owned by local and international owners.



## Etratech seeks to boost productivity via FedDev investment

**Burlington ON-based** contract electronic manufacturer Etratech Enterprises Inc. is planning to acquire and install new state-of-the-art equipment and adopt new technologies, based on the injection of \$500,000 investment from FedDev Ontario.

"Companies need to embrace investments in technology like never before, including companies in traditional sectors using new technologies to reach their full potential," according to Karina Gould, Member of Parliament for Burlington, Minister of Innovation, Science and Economic Development and Minister responsible for FedDev Ontario. Etratech Enterprises specializes in the design, development and manufacture of advanced electronic controls and control systems for the automotive sector, along with other industries.

By integrating innovative production technologies and processes, including surface-mount technology equipment and a new component traceability system, Etratech Enterprises will aim to increase efficiencies, diversify product offerings, enhance product safety and boost productivity.

"Government of Canada support is helping Etratech expand into global markets to increase our export sales and add to our headcount at our Burlington-based facility. With this FedDev investment, we are well positioned to continue this sales growth both domestically and internationally," says Etratech president and CEO Michael Desnoyers.

This investment will help the company fulfill recently acquired production contracts with Stoneridge Inc. which will provide parts to General Motors. The project is also expected to strengthen southern Ontario's automotive supply chain by adding capacity to develop and produce electronic control components, as well as enhance southern Ontario's competitive position as a global supplier of electronics to the automotive sector.



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### opinion

## Canadian CEMs face volatility of foreign exchange

By George Henning, president, OCM Manufacturing, Ottawa

**As a Canadian contract manufacturer** that conducts business with clients and suppliers in many different places in the world, foreign exchange rates, especially the US dollar, pose an ongoing challenge for our business. The volatility of foreign exchange rates is an operational concern practically on a daily basis.

In fact, we watch rates closely and adjust our internal exchange rate with every change of 0.02 or greater. We also watch our profit margins and adjust prices frequently when volatility is high. That's due to the rather slim margins that exist within the contract electronics manufacturing industry. Contract manufacturing is not for the faint of heart, most especially in an under-performing economy.



### The effect of the foreign exchange rate

Distinguishing the effect of the foreign exchange rate from other changes in our costs is an added challenge, but is necessary to give us a clear understanding of the situation on an ongoing basis.

On the cost side, most of our direct costs are in electronic components that we purchase in US dollars. This accounts for roughly 75 percent of our costs. For a Canadian company, this can be an uncomfortable fact of business life. The balance of our costs – labour and materials – is purchased in Canadian dollars. Therefore, our costs increase with a weaker Canadian dollar.

American customers that pay us in US dollars can help to offset these imbalances. But, the ongoing management aspects of currency exchange in a business like ours always present extra administrative burden and cost pressures.

Fluctuating foreign exchange rates are a concern for companies of all sizes, but managing their impact on an ongoing basis gives one a more precise picture of operational costs and, at times, can contribute to a company's competitive advantage.



George Henning,  
president, OCM  
Manufacturing,  
Ottawa

# How digital manufacturing will shift production from the factory to your kitchen table

by Rush LaSelle, director of automation, Jabil Circuit Inc.

**With the rapid pace of technological innovation, the need for greater market responsiveness and the rising cost of labor in nearly all economies, many companies are revisiting age-old manufacturing strategies.**

**They recognize** there is a growing need to introduce innovative products faster to meet customer demands while maintaining aggressive cost and quality objectives. Traditional manufacturing approaches can no longer keep pace with this dynamic new consumer-driven age. Meeting these demands will instead require a complete reinvention to how we approach manufacturing, and this reinvention will need to unfold on a scale that amounts to a new industrial revolution.

Welcome to the era of digital manufacturing, which can be defined simply as the growing application and impact of digital connectivity linking automation, workers and decision-makers.

Several converging trends are driving this need for greater connectivity on the factory floor, starting with the parallel trend toward connectivity on the buy side. Digital technology today has empowered consumers to research, shop, compare and order products online, and increased pressure on brand owners to accelerate the pace of their new product development from concept through commercialization. Similarly, the concept of mass customization that allows consumers to select and 'build' their own, personalized products online – while still in its infancy – is also forcing manufacturers to step up their game when it comes to production speed and flexibility.

On the supply-side, rising labor costs and dwindling labor pools are driving adoption of increasingly sophisticated robotics and automation. In some cases, the extreme miniaturization of products – specifically computing components – has made automation the only viable option when it comes to assembling tiny and even microscopic systems. Lastly, collapsing product lifecycles are shrinking the time-to-market window, while increasing the need to reduce production-line downtime, accelerate changeovers, elevate production efficiencies and improve predictability.

Market dynamics, shifting employment pools and technology almost overnight have transformed manufacturing from being simply a producer of goods to a service business. Put simply, the overall aim of digital manufacturing is to shorten reaction and production times while maximizing quality and cost-effectiveness. It also paves the way for the 'democratization' of product design and development down the road. In the near future, digital manufacturing will enable other benefits, that include:

- **More agile manufacturing operations that can adjust quickly and automatically to production changeovers**
- **More effective root-cause corrective action, via the use of such tools as predictive analytics to minimize production downtime**
- **Improved overall equipment effectiveness (OEE), overall line effectiveness (OLE) and first-pass yield (FPY)**
- **Enhanced ability to address growing consumer expectations for mass**



## customization by offering build-to-demand products and, increasingly, next-day delivery

Despite the fast-growing demand for more agile production, the digital manufacturing revolution will not unfold overnight. It will require a four-phase approach beginning with the optimization of manufacturing infrastructure for efficiency, integrating and standardizing connectivity between machines and decision-makers, managing the subsequent increase in data flow and eventually applying this single-facility model to the entire enterprise.

## PHASE 1: Making the factory hyper-efficient

At its core, Phase 1 focuses on improving the factory's overall efficiency by benchmarking equipment performance and replicating best processes across all machines. This has traditionally been a time-consuming manual process rife with uncontrolled variables. Combined with the fact that disparate equipment and bespoke control systems using varying protocols may sit alongside one another on the factory floor, the traditional

approach can make for a veritable manufacturing soup.

True, manufacturers have always sought to optimize equipment. But, in the past, the singular products they produced had comparatively long life cycles, so benchmarking and reprogramming machines was not a frequent task. In comparison, digital manufacturing aims to gear the factory for frequent and nimble shifts from one product to another, with minimal trade-offs in cost or quality. Phase 1 then aims to do more than simply optimize the efficiency of the factory. It seeks to establish standard protocols for optimization that can be quickly ramped up for frequent product shifts.

Jabil's SIM (Standard Integration Module) program offers an example of such automation standardization initiatives. The program's goal is to create standard modules on a common platform that allows the replication of optimized machine programs across all work cells. This reduces the cost of deploying automated solutions while allowing a company's assets to be redeployed as rapidly as direct labor

SIM reuses automation solutions based on standardized hardware and a unified software architecture that significantly reduces the time, costs and risks associated with implementing automation as a key production tool.

Phase 1 is also the time to introduce new manufacturing technologies to help make the factory floor more efficient. Some of the cutting-edge tools emerging today include augmented reality, collaborative robotics, sensor-driven optical inspection tools, and 3-D printing/additive manufacturing. All will help to support the shift to high-efficiency precision manufacturing.

## PHASE 2: Digitizing the factory enterprise

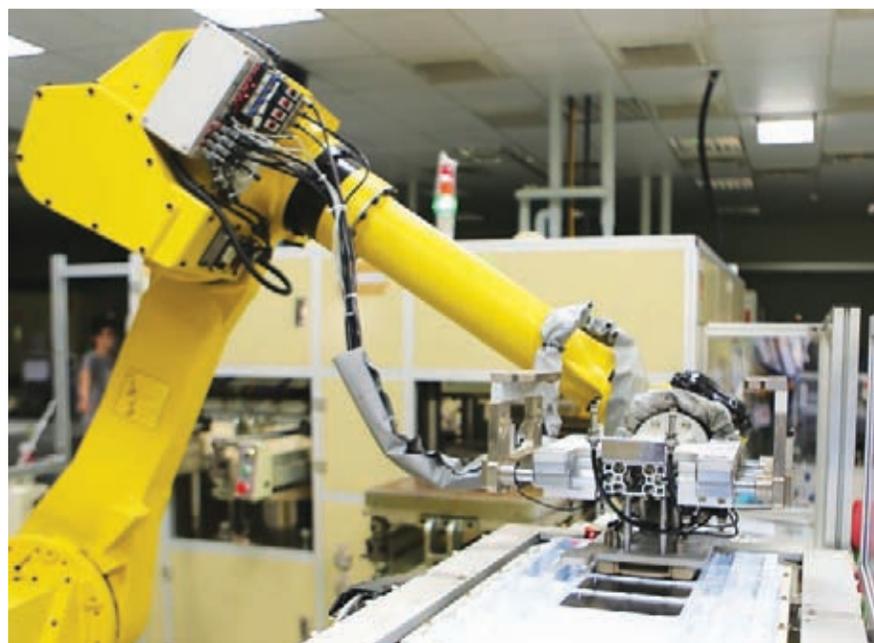
Phase 2, in a nutshell, is where manufacturers build that 'last mile' of proverbial fiber to the factory floor to allow two-way information flow from machines to decision-makers. It will coincide with the growing application of sensors, giving rise to the Industrial Internet of Things (IIoT) and the merging of the cyber and physical worlds.

The goal is to create digital traceability along the entire supply chain – from raw materials to finished products – and to develop more flexible automation solutions that enable nimble production. Such traceability can yield tremendous benefits in any production scenario, but it assumes even more value in high-stakes industries such as aerospace and medical.

As the sophistication of sensor technology – ranging from machine vision to temperature, pressure and other physical sensing modalities – has soared, the cost of such sensors has also dropped precipitously. So now, rather than being a barrier to Phase 2, sensors have become more of an enabler. Their proliferation is making it easier than ever to capture data about the conditions and actions of nearly any type of machine and increasingly enable different machines types to be linked with one another.

One major hurdle, however, is ensuring the interoperability of sensor networks and the data they carry. Different standards exist in North America, Europe and Asia, and sensor suppliers offer their own proprietary sets of solutions with differing middle-ware, plant-level controls and analytics software. A manufacturer or OEM also may need to further tailor its analytics in-house. Currently, the most common solution is a hybrid approach in which different networks from different suppliers are stitched together. However, standardization across sensor network platforms would go a long way to making Phase 2 simpler for manufacturers to implement.

In a perfect world, we'd be able to see down into every machine remotely to monitor and optimize it. By connecting machines at the local plant level, Phase 2 lays the groundwork for Phase 3, in which manufacturers must find a way to convert the rising tide of sensor data into actionable intelligence.



continued on page 18

# How digital manufacturing will shift production

continued from page 17

## PHASE 3: Converting factory data into factory intelligence

Phase 3 in the digital manufacturing revolution is all about dynamic process change. To offer a human analogy, once Phase 2's backbone is present, Phase 3 builds the brain that can send and receive signals throughout the nervous system. The biggest, singular challenge of Phase 3 involves managing Big Data.

Sensors solve the question of how data is collected across the enterprise. But, another fast-evolving technology – Cloud computing – is helping to address the question of where to store it all for easy, universal access. The Cloud offers an infinitely expandable network of remote Internet servers that allow enterprises to eliminate their expensive and increasingly inadequate in-house enterprise servers and adopt 'computing as a service.'

With quickly scalable storage capabilities and the ability to transmit massive amounts of digital data across geographies in real-time, cloud services already are shaping the enterprise of the future. The cloud also holds the tools that enterprises will need to quickly and efficiently structure, analyze and convert all of that data into actionable intelligence. Yet even after one has all the tools to absorb these data, analyze them in real time and even tweak the settings on a key piece of production equipment, further challenges remain before this concept of dynamic

process change can take place.

For example, consider that a manufacturer of an artificial heart valve or of a critical aircraft safety component may get one million data points off a machine on a given day. What safeguards exist to ensure that any dynamically made process tweak is a tolerable change to such a product? How does one ensure the product remains within the necessary, incredibly tight specifications?

Robots are able to more than they've been allowed to do, and this value gap will only shorten as they are networked. However, the problem is that once commands are issued from a server, it raises the very real specter of potential safety and quality issues.

This is where machine learning in neural networks begins to apply. A so-called 'smart' machine, by definition begins by taking data generated through its sensors and applies artificial intelligence (AI) to perform pattern-matching and predictive formulations from those reams of data, and apply them to help optimize processing. But for the reasons noted above, this AI solution will necessarily be applied first to the least-risky, high-tolerance operations, such as allowing process adjustments to move or reposition equipment in the factory.

As Phase 3 overcomes each of these challenges, the benefit will be an increasing ability to leverage advanced analytics,

predictive insights, and simulation to enable real-time actionable insights to prevent situations before they occur.

The aim of predictive analytics is to eliminate, or at least greatly minimize the impact of unplanned machine downtime, which can be a productivity killer. As embedded sensors become more pervasive and networked, the volume and depth of data aggregated in a central network will make it more accessible and, ultimately, actionable.

Similarly, networked sensors will help drive predictive maintenance, which assesses the condition of in-service equipment to calculate when maintenance should be performed. Since tasks are performed only when warranted, this approach can lower costs compared to routine or preventive maintenance. By allowing convenient scheduling of corrective maintenance, it also aims to prevent unexpected equipment failures and avoid productivity disruptions.

Machine learning, a subfield of artificial intelligence, gives computers the ability to learn without being explicitly programmed. Machine learning can be thought of as a set of tools and methods that attempt to infer patterns and extract insight from observations made of the physical world. Two key areas of this field include reinforcement learning and deep learning.

Reinforcement learning involves programming by demonstration, or "lead through teach." It is arguably the most tangible area of research for robotics today. Thus far, however, most of that research has focused on robots for services and humanoid robots rather than industrial robots used in factories. A widely publicized example of reinforcement learning is a robot named Baxter, from Rethink Robotics Inc., Boston MA, which largely targets small companies that may not maintain a robot programmer on staff.

Deep Learning, in turn, mimics the activity in layers of neurons in the neocortex, the area of the brain where analytical thinking occurs. The system learns to recognize patterns in digital representations of data and constitutes a digital neural network. Simply put, deep learning offers increasingly sophisticated methods of creating predictive models using pattern recognition to solve complex problems. In an industrial setting, for example, image processing can improve visual inspection systems for manufacturers.



Robot named Baxter from Rethink Robotics Inc. targets small companies that may not maintain a robot programmer on staff.

## PHASE 4: Linking intelligent factories into a distributed network

The forward-looking final phase of the digital manufacturing expands the intelligent factory concept to encompass multiple installations. Further out, this idea extends even beyond the OEM's flagship assets to include micro-factories for consumers. Imagine fixing your cell phone on an internet-connected machine in your living room.

Phase 4 is really where AI pays dividends by connecting local or global production with individual consumers. It represents the true democratization of design and production, as manufacturers and consumers collaborate to define the finished product. Small firms and individuals will gain access to powerful software programs and expensive machines that they could never afford on their own. Hobbyists theoretically could be able to leverage some of the same tools and resources as a multinational corporation. As a result, the consumer can be more of a direct participant in the design, development and delivery of their own product.

Inevitably, one of the biggest challenges related to this vision of a highly networked factory may very well be how to establish intellectual property in a new manufacturing paradigm of mass customization. How does one control or enforce IP rights in a world where products are conceived by the consumer?

Various national and international initiatives, such as Germany's Industrie 4.0, are working to address the real and potential challenges associated with this rise of cyber-physical systems and of global, borderless, networked, digital manufacturing. Real obstacles remain to be overcome, but the potential is thrilling.

For more information on automation and/or robotics from Jabil Circuits Inc., go to <http://ept.hotims.com/61400-72>

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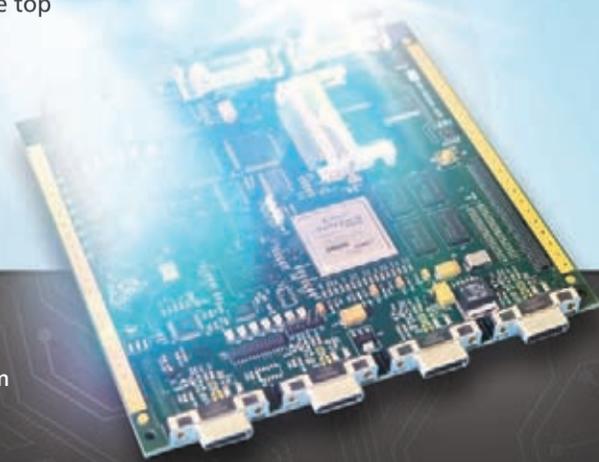
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## Wire processor handles micro-coaxial cables

CoaxCenter 6000 fully automatic machine processes micro-coaxial and coaxial cables, as well as single conductor wires. The machine's QCam 360 automatically monitors stripping quality, eliminating the need for time-consuming manual post-production monitoring processes. Unit boosts productivity, with an output of at least three times higher than with manual and semi-automatic equipment and requires considerably lower handling requirements.

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## EMA acquires Accelerated Designs for its part library

EMA Design Automation Inc., Rochester NY, a full-service provider of electronic design automation (EDA) solutions, has acquired Accelerated Designs, a company known for its dominance in EDA part library content and solutions including a 7.2-million-part database and its specialist library tool Ultra Librarian.

"One of the many challenges an electrical engineer faces during the design phase is getting accurate and usable symbols and footprints," says Manny Marcano, president of EMA Design Automation. "Accelerated Designs' library is the world's largest library for EDA symbols and footprints, offering over 7.2-million quality parts to choose from. Additionally, Accelerated Designs offers services to enable any IC vendor to quickly and easily create the EDA library content its customers need when choosing their components."

The acquisition includes all EDA content and software created by Accelerated Designs. "We also hired all of Accelerated Designs' existing personnel, both to retain their expertise and so that existing Accelerated Designs' customers will experience a business-as-usual transition through the change in ownership," Marcano adds.

"Becoming part of EMA allows me and my team to focus on our core expertise: EDA part creation, library tools, and services," says Frank Frank, president and CEO of Accelerated Designs. "With EMA's help in marketing and business development, we'll be able to expand our offerings and provide more value to our customers."

In addition to the existing library of parts, Accelerated Designs' Ultra Librarian tool speeds the creation of EDA content for new components. The tool uses the concept of templates to create parts, which increases accuracy, speed, and consistency of part creation and allows global changes to be made to a library. Automation is the key component to the Ultra Librarian tool, allowing a user to build their component accurately one time and then export it to the CAD tool(s) of their choice.

"Digi-Key partnered with Accelerated Designs in 2015 to provide the unique ability to generate symbols and footprints in the specific format for nearly any EDA tool," says Randall Restle, Digi-Key vice-president of applications engineering. "This allows our customers to quickly and easily design in new parts or even obtain customized libraries from a pool of hundreds of thousands of Digi-Key's parts, indexed with a Digi-Key part number and compatible with their EDA tool. Our successful history with both EMA and Accelerated Designs encourages me that the combination will be a positive change for Digi-Key and our customers."

## HiPEAC community boosts video processing speeds

Results for image processing will enhance embedded applications

Researchers at the Czech Institute of Information Theory and Automation (UTIA) have demonstrated video processing algorithms for the Sundance EMC2 platform using the Xilinx system-on-chip (SDSoC) 2015.4 design environment. Hardware accelerators used in the demonstration were found to achieve up to eight times faster edge detection and 50 times faster motion detection without a significant increase in power dissipation, hence significantly reducing energy consumption.



"The main innovation is in the SDSoC design framework," explains Jiri Kadlec, head of the signal processing department at UTIA. "Through this, developers can now estimate the acceleration for their algorithms, explore different avenues as necessary and export the best solutions as a stand-alone C application or Linux user space application."

Partly funded by the Artemis EMC2 project, the demonstration used a Dual-Core 32-bit ARM Cortex A9 processor of the Xilinx Zynq family to execute stand-alone C application programs, performing initialization and synchronization of the hardware-accelerated video processing chain. The C programs can be modified by the user and recompiled in Xilinx SDK 2015.4.

"While the framework has been presented on simple edge and motion detection, it is valid for fast I/O processing, industrial control – providing low latency – and connected items in the Internet of things," Kadlec says. "In real-time and image processing, it links the hardware accelerator to the rich database of C/C++ algorithms from OpenCV."

Flemming Christensen, managing director of HiPEAC member Sundance, adds: "This represents a step forward for embedded applications where edge and/or motion detection is important, such as those relating to security, medical uses, unmanned vehicles and image processing in general."

## Emulation platform helps Barefoot Networks verify fully programmable switch

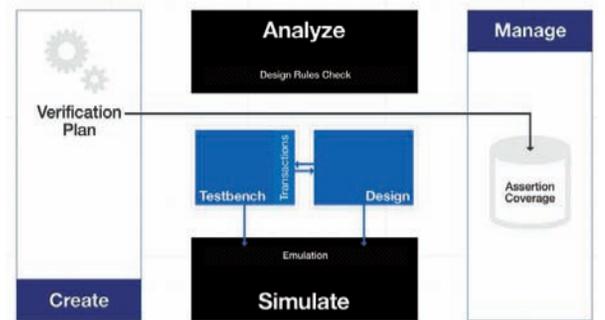
Barefoot Networks, a pioneer in building user-programmable and high-performance network switches, successfully used Veloce emulation platform from Mentor Graphics Inc. to verify its 6.5Tbps Tofino switch.

Barefoot chose the Veloce emulation platform for its high capacity, enhanced virtualization technology, remote access option and proven track record in networking design verification. After benchmarking several different emulators available, Barefoot decided the Veloce platform was the only emulator able to handle its large and complex design.

In the networking space, Ethernet designs are large and particularly intricate, and can tax emulation compile and run times. The Barefoot's Tofino switch design consists of complex interconnect, which typically creates a challenge for most emulation platforms to route. The Veloce emulation platform uses patented virtual wire technology and the proprietary Crystal2 chip, and had no issue handling the complexity of this interconnect-dominated design.

In addition, the Veloce VirtualLAB Ethernet used by Barefoot was critical for testing the core functionality of the design. VirtualLAB includes an Ethernet Packet Generator and Monitor (EPGM) that generates, transmits and monitors Ethernet packets with the Design under Test (DUT); Ethernet testers are modeled in software running under Linux on a workstation connected to the emulator.

"The Veloce emulation platform continues to dominate in the networking market," says Eric Selosse, vice-president and general manager of the Mentor Emulation Division. "We worked with Barefoot on access and implementation so they could focus immediately and exclusively on the verification task."



## About Veloce Emulation platform

The Veloce emulation platform uses software, running on powerful, qualified hardware and an extensible operating system, to target design risks faster than hardware-centric strategies. Considered as a versatile and powerful verification tool. Emulation greatly expands the ability of project teams to do hardware debugging, hardware/software co-verification or integration, system-level prototyping, low-power verification and power estimation and performance characterization.

The Veloce emulation platform is a core technology in the Mentor Enterprise Verification Platform (EVP) – a platform that boosts productivity in ASIC and SoC functional verification by combining advanced verification technologies in a comprehensive platform. The Mentor EVP combines Questa advanced verification solutions, the Veloce emulation platform, and the Visualizer debug environment into a globally accessible, high-performance, datacenter resource. The Mentor EVP features global resource management that supports project teams around the world, maximizing both user productivity and total verification return on investment.

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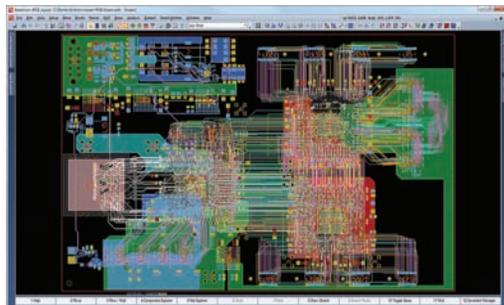
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## Pcb design software addresses rigid-flex, high-speed issues

**Xpedition** printed circuit design flow software addresses the increasing complexity of advanced systems designs. Product provides advanced technologies to enable design and verification of 3D rigid-flex structures and to automate layout of high-speed topologies with advanced constraints. Product enables a streamlined design process from initial stack-up creation through manufacturing. Engineers can design complex rigid and flex pcbs in a fully supported 3D environment, resulting in a correct-by-construction methodology for optimum reliability and product quality. Users can then export a 3D solid model to MCAD for efficient bi-directional pcb-enclosure co-design.

**MENTOR GRAPHICS**



<http://ept.hotims.com/61400-74>

## Configurable embedded vision system provides reliable image capture

**OptiSys-5101** rugged, high performance embedded vision system incorporates four configurable camera link ports and a front-removable, multi-terabyte storage bay with SATA III interface, essential for high speed imaging data offload and transfer. Powered by an Intel Quad Core i7 processor, product provides a high definition image frame grabber suitable for optical inspection and video capture. A miniPCIe expansion site facilitates easy I/O customization.

**ELMA ELECTRONIC**

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## HMI SCADA software delivers necessary tools

**Pro-face BLUE Open Studio** HMI development software family is a development and runtime software that incorporates all of the tools users need to create SCADA HMI applications, dashboards and OEE interfaces. Users can access graphical interfaces from any device, with groups of screens, popups, and dialogs through Support for Multiple Document Interface on Studio Mobile Access. Product protects data through OPC Redundancy Native redundancy for OPC UA and OPC XML/DA interfaces. Users can connect through comprehensive tag integration with a wide range of PLCs. Users can collaborate through revision control and application lifecycle management that is fully integrated with Microsoft Team Foundation Server.

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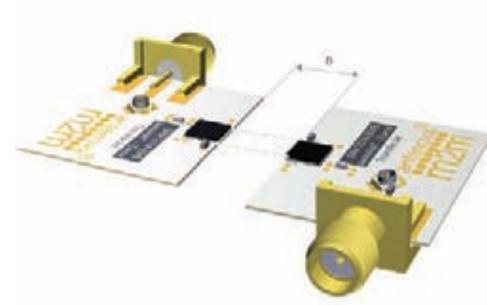
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## Wireless embedded couplers transfer multimedia

**Zoma TransferJet SR4T014** coupler measures 4mm x 4mm x 0.4mm, representing a close proximity wireless transfer technology that radiates very low power radio waves. Device is a simple, but fast way to transfer multimedia data, bridging the gap between a device that creates content and a separate device that plays content back. Device combines the speed of Ultra Wide Band networking with the ease of Near Field Communications, NFC. It operates over very short ranges, with low power consumption, and provides secure, high speed file exchange for content sharing between devices.

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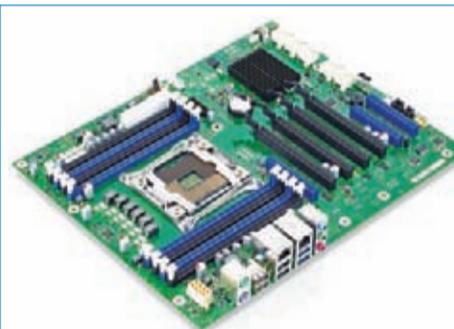
## Mainboard suitable for CAD workstations, medical servers

**Version D3348-B2** ATX Motherboard is suitable for use in CAD workstations, medical equipment and industrial servers in 19" rack format. In addition to Haswell processors XEON E5-16xx/26xx V3 and i7-59xx (Haswell-E), the future Broadwell processors XEON-E5 16xx/26xx V4 and i7 (Broadwell-E) can

now be used with the new D3348-B2. The board now supports DDR4-2400 memory. Trusted Platform Module chip is updated to TPM 2.0, expanding the safety functions. Product has four PCIe x16 and three PCIe x8 slots, four USB 3.0 and nine USB 2.0 ports as well as ten SATA (600) ports with RAID support (0, 1, 5, 10).

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## IP65-rated, maintenance-free computer provides data acquisition

**BC50R** rugged IP65-rated, maintenance-free box computer is suitable for data acquisition in extreme environments throughout a number of in-vehicle applications. All external interfaces, including USB, digital I/O, Gigabit Ethernet, CAN bus and legacy serial I/O, are implemented on rugged M12 connectors for reliable data transmission. Offering a protection class of IP65, product is certifiable to EN 50155 (railway) or EN 60945 (shipping) and conforms to ISO 7637-2 (E-mark for automotive). Product starts with a powerful, energy-efficient T48N AMD Embedded G-Series APU running at 1.4GHz. Various CPU/GPU options combine with a wide selection of external interfaces, connected via separate graphics and I/O interface boards within the system, to provide an extremely flexible system quickly tailored to a vast number of applications.

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## COM express modules boost speed, performance



year CPU lifecycle support and system integration capabilities, while modules come in Mini, Compact, Qseven, and Basic formats.

**DFI TECH**

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**SU698 COM Express Compact** module with Intel 6th Gen Core i7 processor provides up to 3.4GHz dual core performance (max turbo frequency), dual DDR3L 16GB memory, with support for eight x1 PCIe expansion and various other interfaces. Compliant to COM Express Compact R2.1, Type 6, module provides display interface options of 1 VGA/DDI, 1 LVDS/eDP, and 1 DDI. Firm delivers seven

## Embedded hardware security solution protects capabilities off-the-shelf

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## New Release - OrCAD 17.2-2016

The OrCAD 17.2-2016 release introduces new capabilities for OrCAD Capture, PSpice, and PCB Designer that address challenges with flex and rigid-flex design as well as mixed-signal simulation complexities in IoT, wearables, and wireless mobile devices. Also included are new routing capabilities to help achieve routing closure as fast as possible with high accuracy and no errors. OrCAD 17.2-2016 is available to download today.



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## products on review

### Non-corrosive electrical cabinets withstand harsh environments

**ARCA non-corrosive** electrical cabinets are available in 14 different sizes from 300x200x150mm to 600x800x300mm and are simple to customize during system manufacture or on site, with no specialist tools required, leaving no possibility of rust on the worked surface afterward. Manufactured in high grade polycarbonate material, products are non-corrosive, suitable for use in extremely harsh and demanding environments and provide a long lifetime and excellent security. The UV stabilized polycarbonate material ensures high performance in outdoor installations, is chemical resistant and has a raw material flammability rating to UL 94-5VA.

**FIBOX**



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### IRU cage nut assembly for enclosures requires no tools

**19" IRU cage nut** fastener assembly for enclosures is simple to install as an alternative to time consuming capture nuts. Product consists of an innovative three-in-one expanding nut that is easily attached using the center nut for the square attachment hole, then secured by hand with the fastener screw. The tightened screws expand the cage nuts to secure the required components. Six cage nut assemblies can be installed in the time it takes to place two capture nuts. And it can be done without tools. Manufactured from sheet steel with a zinc coating to ensure electrical grounding continuity throughout the structural members of racks and cabinets.

**RITTAL**



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### All-in-one printer marking system meets full range of needs

**MultiMark** thermal transfer printer marking system meets a full range of labeling requirements for control cabinets or equipment build settings. The all-in-one system incorporates a range of marking solutions that would normally require several different printing devices. System consists of compact and modular THM MultiMark thermal transfer printer and a line of reel formatted MultiMark markers to fit onto modular terminal blocks, wire and cable and equipment. Used with firm's M-Print PRO printing software, the THM MultiMark Printer gives the user the capability to produce virtually any type of alpha-numeric and symbol identification. Unit prints markers and labels, as well as continuous materials such as textile/polyester adhesive labels, heat-shrink wire/cable sleeves and PLC-field panel adapter labels.

**WEIDMULLER**

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### Miniature pcb connectors suit LED applications

**PTSM miniature** pcb connectors for LED applications provides positive latches on the side, which ensure stable latching with the counterpart. When used in combination with inverted pcb connectors from the same series, the miniature connectors are particularly suitable as a compact wire-to-wire connection. White devices are available with 2.5 mm pitch. They are designed for currents up to 5 A and voltages up to 150 V.

**PHOENIX CONTACT**

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### Connector delivers IP rating for high temp, harsh environments

**Panther** line of rugged electronic connectors provides IP65/IP67 sealing capability; conformance to EN45525-2 HL3, a globally recognized standard for smoke and toxicity requirements; and the ability to operate reliably at temperatures up to 200C. Devices provide up to 35 amps per contact, shock and vibration performance to EIA-364-28F test condition IV, and has an LCP insulator.

**POSITRONIC**

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### Ceramic surface pushbuttons deliver 16A at 250Vac

**MSM LA** and **MSM LA CS** latching-action stainless steel and ceramic surface pushbutton switches are now available with a maximum rated switching current of 16A at 250Vac, uprated from 12A. Designed for primary ON/OFF switching, device's up-rating expands on suitability for use in appliances with higher loads. Metal line switches are especially well suited for use in equipment operated in harsh environments, or applications that require protection against vandalism. Devices come with a rated temperature range of -20C to +85C, impact resistance rating of IK 07 and an ingress protection rating of IP 64 from the front contact area.

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