

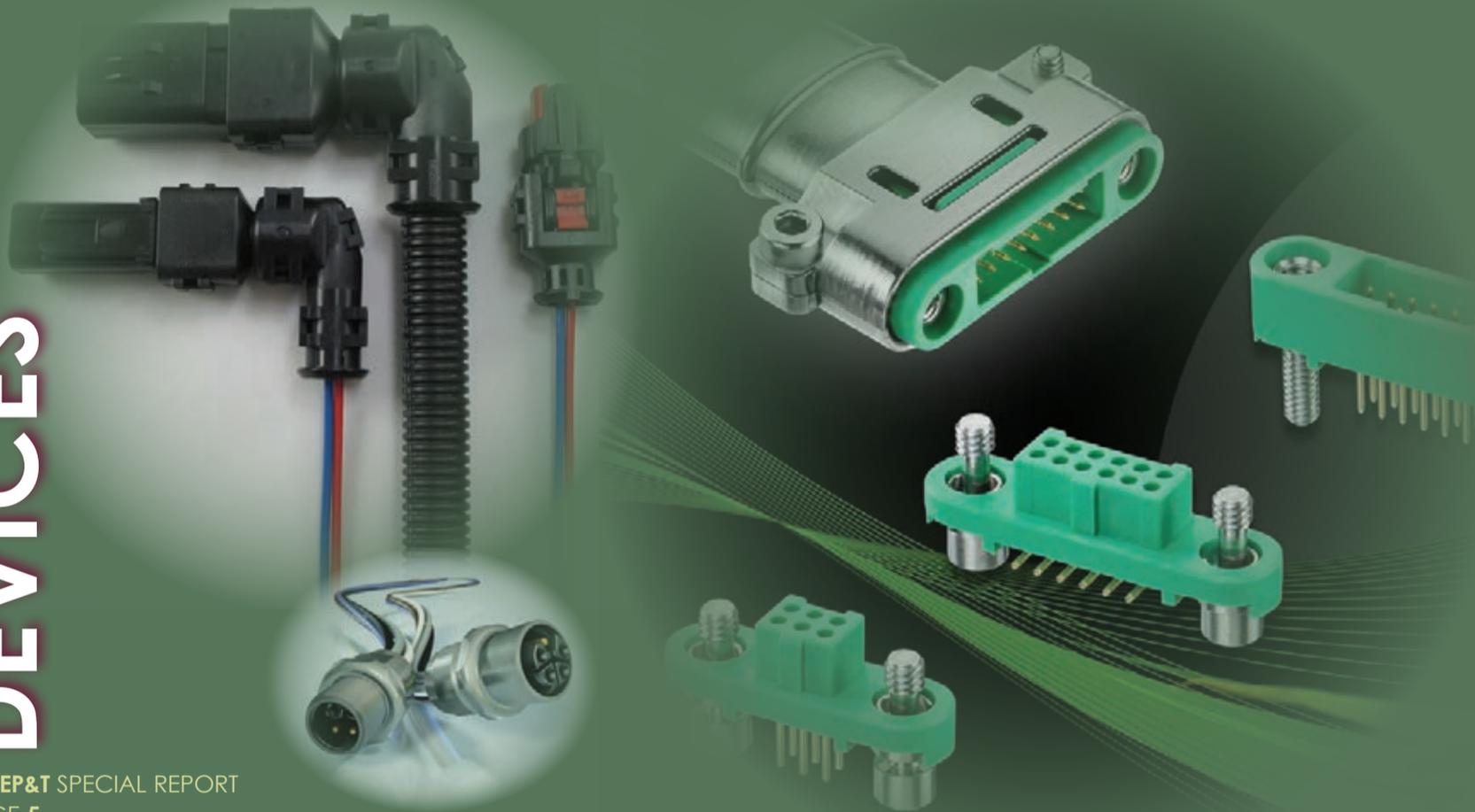
# ep&t

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electronic products and technology - JANUARY-FEBRUARY 2017

## INTERCONNECT DEVICES

AN EP&T SPECIAL REPORT  
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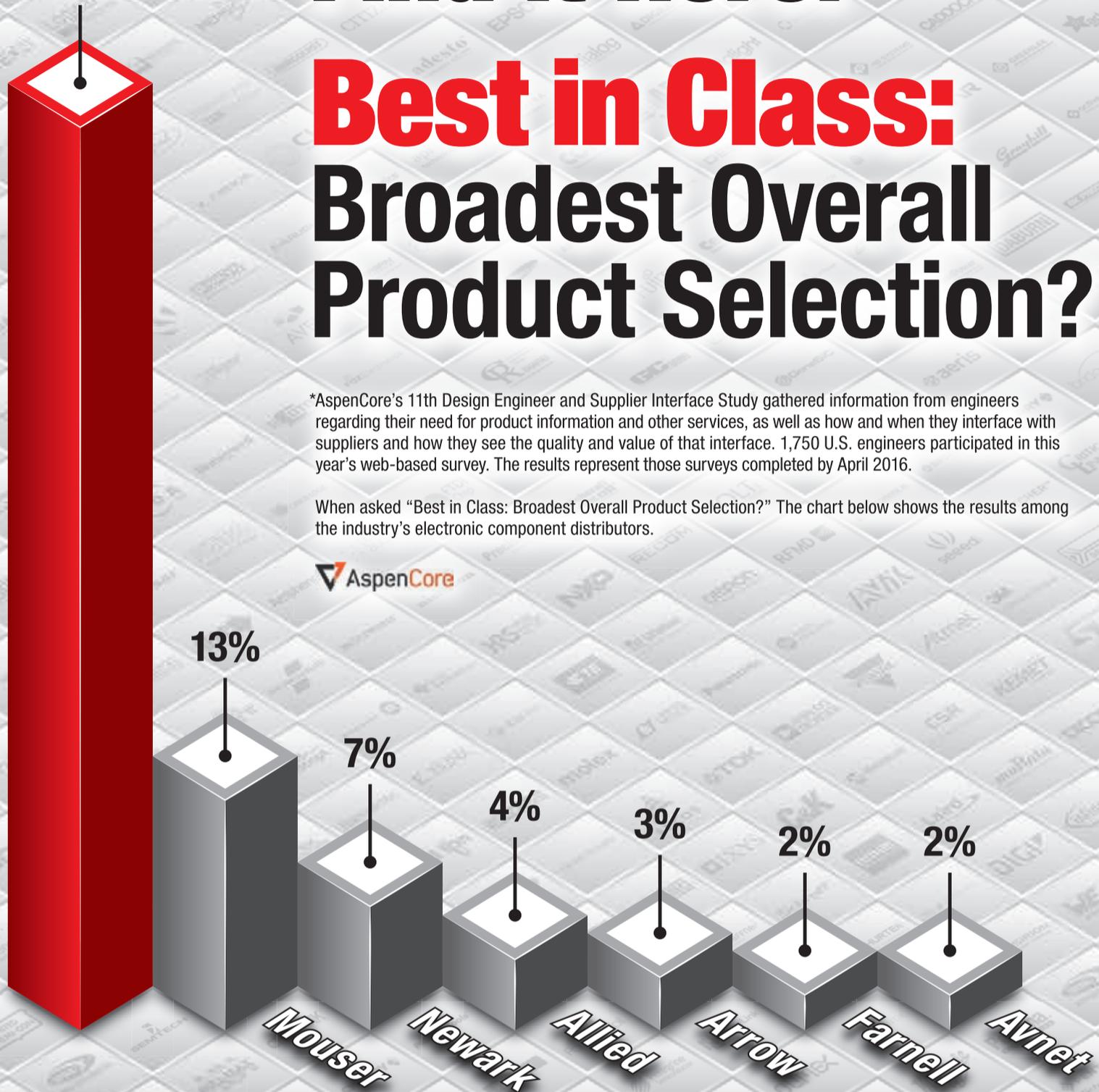
# Find It Here!

## Best in Class: Broadest Overall Product Selection?\*

\*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: Broadest Overall Product Selection?" The chart below shows the results among the industry's electronic component distributors.

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## Canada holds different type of Trump card in tech recruitment

This past November, after America's electoral process determined that Donald Trump would be the next president of the United States, nervousness swept through tech villages across America. None bigger than Silicon Valley, stationed and acutely aware of the in-coming president's ideals.

On the flipside, north of the 49th parallel, Canada's technology sector sees this as a potential competitive edge in the ongoing battle for high-skilled talent. Ultimately, time will tell, but some senior executives at some of America's top tech company's earmarked Trump selection as 'a disaster for innovation.'

About 250,000 Canadians work in Silicon Valley. Meanwhile, Southern Ontario has by now developed a critical mass of talent and funding for tech start-ups. The Trump election has emboldened tech recruiters in Toronto, Calgary, Vancouver and Kitchener-Waterloo to start reversing the brain drain to California by luring Canucks to come home.

Analysts are not predicting a mass exodus from the U.S. by Canadians in tech jobs returning home, but some feel that U.S. policy changes could prompt Canadian startups to think twice about chasing their dreams down south. At the very least that trend shouldn't stop and it may accelerate for Canada, given that we're one of the few countries in the world where you can bring talent and openness and

inclusivity and diversity in the workplace.

The Brookfield Institute's report on the state of our own tech sector shows that Canada's 71,000 tech companies are responsible for more than 7% of the economic output and 5.6% of Canada's total employment—even more than the US. This only emphasizes the importance of tech here and proves that we are truly a nation of innovators.

Based on the pragmatic nature of Canadians, maybe it is wise for us to take a wait-and-see approach and let's see what Trump actually does in the first six months in office. The main concern seems to be the instability and unpredictability of it all. At the same time, it serves as an opportunity for Canada to really and truly showcase what is going on here.

So, as America's tech sector sits nervously awaiting the impact of its presidential result, Canada clearly appears to sit in the driver's seat when it comes to procuring high tech talent from some of the most relevant resources in the world – including Silicon Valley to Bangalore – Canada is clearly holding a different kind of 'Trump' card.

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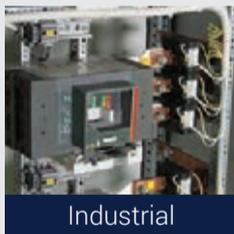


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# NEWSWATCH

## Program launched to build Canada's AI ecosystem

**NEXT Canada**, a national non-profit organization committed to advancing Canadian entrepreneurship, announced the launch of NextAI, a program designed to bring together Canadian and international talent in the field of Artificial Intelligence (AI). By providing seed capital, expert advice, and sector-specific tools, program participants will be prepared to launch AI solutions in growing technology markets around the world.

The first of its kind program brings AI talent and entrepreneurs together with academic, corporate and government partners to further position Canada as a leader in the global race to establish centres of excellence in the commercial application of AI. NextAI launches with partners in government and the private sector, including NEXT Canada's national partners EY, MasterCard, TD Group, and Osler, Hoskin & Harcourt.

The program will provide access to technology platforms and organizational experts from a growing number of companies, including Google, Microsoft, and IBM. Teams will receive up to \$200,000 in seed financing to develop their technology, and will also receive hands-on instruction from faculty at the University of Toronto, Georgetown University, University of Guelph, Massachusetts Institute of Technology, New York University and Harvard University.

### Creating industry-leading AI technology

"Canada has been at the forefront of artificial intelligence research for decades, and NEXT Canada has supported several AI-focused startups in past programs," said Graham Taylor, academic director at NextAI. "The launch of NextAI means we'll see the brightest minds from around the world creating industry-leading AI technology in Canada, cementing our place as a world leader in machine learning innovation."

NextAI will run annually from February to September, recruiting up to 20 teams from graduate and undergraduate programs at top Canadian and international universities as well as industry professionals.

"Canada is the perfect place to shine a light on AI technology since we have the right combination of researchers, companies, and entrepreneurs who are already investing heavily in the space," said Sam Sebastian, Vice President and Country Director for Google Canada. "This is a win-win for anyone who believes in the potential of AI - it means state-of-the-art AI technology will be developed in our backyard and deployed to solve commercially and socially important problems."

## Quebec-based firms Sysacom and Cysca merge

**Sysacom R&D Plus Inc.**, Repentigny QC, a leader in software development and analog and digital electronic circuit design, will merge with Montreal-based engineering and software consultants, Cysca.

The combined concern, Cysca-Sysacom, now includes 50 engineers and technicians providing engineering and design services in electronics, systems and software. Cysca specializes in software development and Sysacom in the development of electronic products and systems; the merger combines those skill sets, creating a new center of excellence in development of high technology systems, according to Denis Lachapelle, vice-president of Cysca-Sysacom (former president of Sysacom).



## LMI Technologies moves into new HQ

**Vancouver-based LMI Technologies (LMI)**, a leading developer of smart 3D inspection and scanning solutions for material optimization and factory automation has moved its corporate headquarters to 9200 Glenlyon Parkway in Burnaby, BC.

The move marks a significant upgrade from LMI's former location on Delta's Annacis Island, to an expansive new 62,400-sq-ft office, complete with state-of-the-art infrastructure and amenities. The new facility doubles the firm's manufacturing space to meet rising demand for sensor production, while providing added floorspace to accommodate a rapidly growing staff.

## Sager launches online power supply configurator

**Sager Electronics** has introduced Artesyn's Online Power Supply Configurator, which uses a powerful algorithm that factors in dual and triple output modules to guide design engineers to their optimal solution.

Available via Sager.com, the Configurator makes it easier to specify and use configurable power supplies, often eliminating the need for expensive custom solutions.

"With over three million configurable power supply combinations, this web-based tool is invaluable for design engineers," according to Paul Kopp, Sager's director of supplier marketing for power. "The tool features a link that connects to Sager's shopping cart, from which we can provide up to 10 prototype pieces in as little as five days out of our Carrollton, Texas Power Solutions Center."

## UBC Ventures launches incubator lab for tech

**The University of British Columbia (UBC)** recently opened a new space for technology startups to build and test their inventions, grow their businesses and transform ideas into commercial products. The new incubator space, named HATCH, is home to 11 ventures that are getting ready to launch their products on the market.

"As part of e@UBC, HATCH will play a key role in translating our research into businesses and job creation in our province," says Phil Barker, associate vice president, research.

HATCH was created to provide the first collaborative innovation space on campus for new businesses to build and test prototypes. Admission to the program is through a competitive selection process and is open to technology startups and social ventures. With the program, ventures will also have access to mentoring from resident HATCH entrepreneurs and office space.

"The companies that are sharing this facility are past the research and development phase and are ready to push their products to market," adds Adrian Banica, executive chair of Illusense, a company that has created a laser sensor mounted on a robot that detects small cracks and leaks in pipelines to improve safety. "The whole process of going to market is fraught with challenges and HATCH is helping us navigate those tough waters."

## Tech industry boosts Canadian economy in 2016

**Employment** within the technology industry in Canada has reached an all-time high, employing over 503,000 people nationwide. The technology sector has outpaced the growth seen in finance and insurance, as well as real estate and leasing, increasing at an impressive rate of 20.3 percent since 2005.

In Kitchener-Cambridge-Waterloo, technology firms are responsible for 5.9 percent of the area's total employment - the highest in the country. Toronto comes in second place with 4.6 percent while Vancouver and Montreal are tied at 4.5 percent. All markets have a strong variation of well-established U.S. based and global technology firms, as well as smaller start-up companies. Kitchener-Cambridge-Waterloo in particular has an impressive mix of homegrown technology companies, including BlackBerry, Open Text and D2L, in addition to the global tech giants, such as Google, Intel, SAP and Electronic Arts.

### Dependence on technology has accelerated

"It has been 15 years since we have seen this much activity within the technology industry" says Brett Miller, president, JLL Canada. "Our dependence on technology has accelerated its growth at an unprecedented pace, and most industries are profiting. Should this trend persist, the second half of 2016 is looking to break the \$20 billion level in investments, which will significantly impact the overall economy."

Technology investments saw an increase of 58.5 percent in the first half of 2016 compared to the same period last year, with a total of \$1.05B in investments, spread over 168 transactions. With the exception of Calgary and Ottawa, funding continues to increase in the majority of technology markets. This indicates a healthy appetite for technology start-up companies in Canada, and the sector's overall revenue potential.

## SMT Industrial Supply appoints AOI field technician

**Fast growing** manufacturing representative SMT Industrial Supply Inc., Orillia ON, has added an additional local software field service technician, Jason Bye, to support Canadian customers with AOI and AXI programming on test and inspection systems made by Test Research Inc. (TRI).

"Customers will appreciate Jason's software and computer savvy, as he is also an IT expert," says Geoff Zacour of SMT Industrial Supply Inc. "We recognize that AOI and AXI machines need good local, low cost programming support and we want to make sure our customer's transition of TRI AOI and AXI machines is as fluid and efficient as possible."

Zacour says Bye will also be cross-trained on other platforms which SMT Industrial Supply represents from a software perspective, such as Pillarhouse selective solder machines and Samsung SMT.

## Future adds four new principals

**Montreal-based** distributor of electronic components, Future Electronics, has announced distribution relationships with four new principals.

The firm expanded its worldwide franchise agreement with Delta Products Corp. industrial, medical and lighting power supply group. Future also reached a global distribution deal with Eclipsek Corp., Costa Mesa CA, manufacturer of frequency control products, such as MEMS and quartz oscillators and quartz crystal resonator devices.

Future added Amsterdam-based Gemalto, global leader in digital security, delivering easy-to-use technologies that authenticate identities, encrypt and protect data in personal devices, connected objects, the cloud. Making it first venture into RFID technology, Future Electronics signed a partnership with Amsterdam-based RFID and IoT solutions pacesetter SMARTRAC.

## Diverse reaches franchise deal with Altran Magnetics

**Montreal-based** component stocking distributor Diverse Electronics has reached a franchise agreement with Altran Magnetics Inc., a global supplier of specialized electro-mechanical product solutions focusing on EMI filters and photo electric controls.

"Altran is a great addition to our product lineup," says Rick Masciotra, president of Diverse Electronics. "The company is known for its quality and technical support, they offer a vast range of standard products and they are able to provide custom solutions for specific customer needs."

With US-based headquarters and warehousing and offshore manufacturing facilities, Altran is both able to provide stock quickly and maintain reduced material acquisition costs.



## Interconnect Devices

### Pogo pin, gold contacts prolong device life

Range of surface-mount vertical Pogo Pin spring contacts can be used with new range of multi-purpose S70 Surface Mount flat contact pads, as well as other spring contacts and spring contact assemblies. Devices are surface mountable vertical spring-loaded contact pins that can mate with any surface. Device's rounded contact heads with a gold finish maximizes device life and provides a free height from 2.4mm to 8.2mm. Product is also available as a selection of multi-contact connectors in 2, 3, 4 or 5 contact configurations and as individual pins in two barrel sizes, 1.03mm diameter or 1.50mm diameter.

HARWIN

<http://ept.hotims.com/65985-24>



### Modular RJ45 connectors are waterproof

KEYSTONE series of waterproof connectors are suitable for 100Base-T (Fast Ethernet) applications. The RJ45 jacks and sockets are IP68 rated for underwater, dust and other harsh environments. Manufactured for increased durability, devices can endure a minimum of 500 insertion cycles. Rated for 125Vac RMS, devices are fully compliant with IEEE and IEC standards. A variety of styles are available to accommodate design applications with numerous mounting and port size options.

EMX ENTERPRISES

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### Power connector provides a small footprint

M12 L-coded power connector provides a small footprint, achieved by standardization and new encoding, saving users space and interfaces. Suitable for high power applications, device meets new manufacturer-neutral mating IEC 61067-2-111 standard. Product's universal mat-



ing face with L-coding has also emerged from this adopted standard. At 63V/16A, the 5-pin L-coding achieves 0.75kW of power, making it suitable for small servo motors, field distribution boxes, field-bus-controlled I/O boxes, power supply devices and valve applications.

HARTING

<http://ept.hotims.com/65985-25>



### Connector serves as hybrid manual mating solution

ODU-MAC Blue-Line connector line serves as hybrid manual mating solution, as devices are efficient, flexible and easy to handle. Products can be configured quickly and effectively even at the smallest construction space and is exceptionally user-friendly in its handling. The assembling and disassembling of the modules can be done without any tools or special knowledge. The crimp-clip contacts also ensure a simple disassembling. Device comes with a standard plastic housing with spindle locking.

ODU-USA

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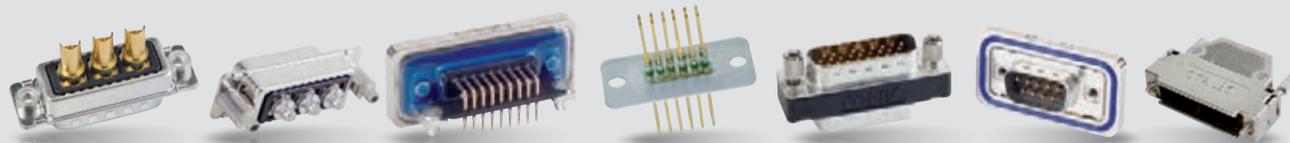
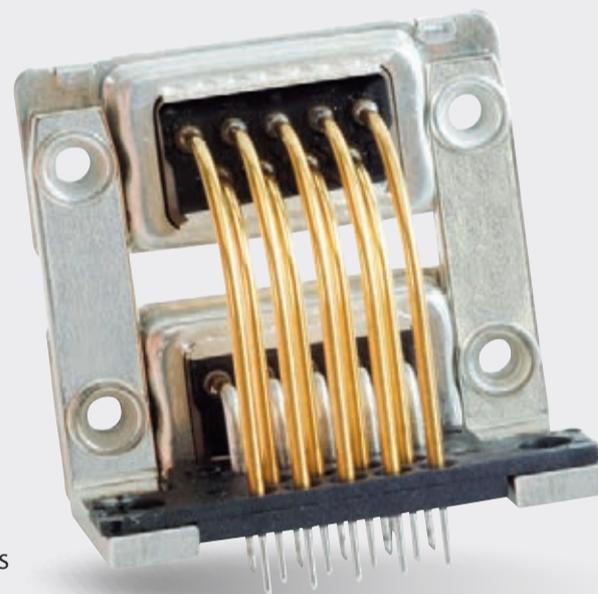
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# The impact of LV 214-4

## The German automotive OEM connector test specification

By Rob Boyd, senior product manager, Schleuniger Inc.

It goes without saying that every manufacturer wants to ensure they are producing a quality product. Standards and specifications from various organizations provide a guideline from which manufacturers can measure different areas of quality, while also providing the end user with the reassurance that they are purchasing a trustworthy, long-lasting product.

Within the wire processing industry there are many standards that manu-

facturers may choose or be required to adhere to. These standards and specifications are constantly evolving and increasing in detail, especially as monitoring technology improves.

### What is LV 214-4?

LV 214-4 is an automotive standard that was developed by representatives of the German car manufacturers Audi AG, BMW AG, Daimler AG, Porsche AG and Volkswagen AG. The standard outlines terminal requirements specifically for the automotive industry. The standard addresses the ability of terminals to be effectively evaluated by crimp force monitors. To be used in an automotive wire harness, terminal must exhibit certain crimp force characteristics so that typical crimp force monitors can effectively detect critical error modes. Though it is currently in draft form and many points are still largely theoretical, the standard has been in progress for many years.

### Concepts: Old and new

The standard focuses on relative deviation of force curves and headroom, both common concepts with regard to crimp force monitoring. Relative deviation is the variation of peak force expressed as a percentage. Headroom is the difference between the peak forces of the average good crimp and empty crimp curves, also expressed as a percentage.

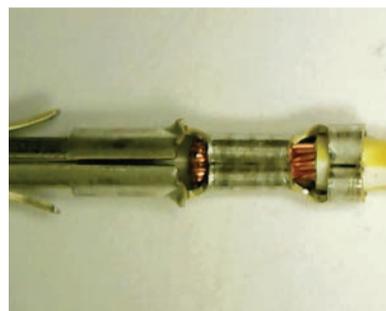
LV 214-4 defines what an empty crimp is; something that is not clear to all. In a good crimp the conductor crimp is filled with all conductor strands and the insulation crimp with all undamaged insulation material. Crimp parameters are at the nominal values as specified by the manufacturer. An empty crimp has a full insulation crimp, but the conductor crimp is empty.

For many years, crimp force monitors have analyzed the total area under the crimp curve. However, LV 214-4 defines four area segments; one for good crimps and one for each error mode, specifically, empty crimp, missing strands and insulation-in-the-crimp. The good crimp area is the area between the good crimp curve and the empty crimp curve. Similarly, the missing strand area is the space between the missing strand curve and the empty crimp curve. Alternatively, the area for insulation-in-the-crimp is the area between the insulation-in-the-crimp and the good crimp curves. Differences in each of these areas must be detectable for the corresponding error mode.

The LV looks closely at the 'roll-in' portion of the crimp. The roll-in area is



Empty crimp.



Full crimp.

the beginning of a crimp force curve where the terminal wings begin to roll in and close around the wire. Most monitors ignore this portion because forces are usually inconsistent and this part of the crimp process is not very important. However, LV 214-4 analyzes relative deviation and defines the positions X0 and X1.

X0 is generally where the good crimp and the insulation-in-the-crimp curves begin to diverge. X1 is generally where the good crimp and empty crimp curves begin to diverge. The LV provides a formula to determine specific locations for X0 and X1.

At this time, however, no crimp force monitor analyzes the area under the crimp curve as described in the LV. Similarly, the force curve data in the roll-in area is typically ignored during monitoring with filters. Therefore, the different area regions, X0 and X1 are theoretical and will only be considered during initial validation of the terminal.

Today's crimp force monitors detect area differences as a result of crimp defects but analysis does not go to this detail. But, the LV is not a specification on crimp monitors; it is a specification on terminal characteristics. Regardless of how the area results are calculated, when crimped, the LV mandates that a terminal must exhibit significant differences in these areas so that a crimp force monitor can accurately detect all scenarios. If not, it will not be approved for use in an automotive harness. Furthermore, typical crimp monitors are used on the production floor. Therefore, if the terminal is already on the production floor, it has

already been approved so this level of detail in the analysis is not required.

### Feasibility study

The feasibility study is the testing methodology for terminals as defined under LV 214-4. It is to verify that defect modes can be detected for a terminal/wire combination. The output identifies the separation between good crimps and defect crimps. Tests must be performed using the smallest wire allowed for that terminal. For example, if the terminal is rated for 18 -22 AWG wire, 22 AWG wire should be used for testing. Although the procedure is written for initial validation of terminals, this process can be used on the production floor to determine the feasibility of any application.

After the application is set up, crimp parameters have been verified and the teach crimps are completed, 300 good crimps and five empty crimps are processed. The relative deviation of the good crimp peak forces is calculated. The LV specifies a maximum relative deviation of 1%. If the relative deviation is greater than 1%, the terminal fails for this criteria and the testing stops. If the relative deviation is less than 1%, the terminal passes and the test continues.

The next step is to test crimps with strands missing. The LV states that 9% missing strands must be detectable. Examples are given for calculating the 9% and rounding up for various wire sizes. For example, in a 7 strand wire, 9% missing strands equals 0.63, which round up to one missing strand that must be detected. For a 32 strand wire, a defect must be detected with three strands missing. 9% of 32 equals 2.88, which rounds up to three.

Ten crimp samples are processed with the required number of missing strands and all must be detected as defects. If not, all are detected as defects, the terminal fails and the test stops. If all 10 are detected as defects, the test proceeds.

The next step is to detect insulation in the crimp. Like with missing strand detection, 10 wires must be processed with insulation in the crimp area and all must be detected as defects. LV 214-4 mandates 30% insulation inside the crimp for these tests and provides a clear method of measurement. If all are not detected as defects, the terminal fails and the test stops. If all are detected successfully, the test continues.

At this point, the operator considers the headroom. LV 214-4 states that headroom should be greater than 35%. Headroom can actually be determined much earlier on in the feasibility test, however, it is best left for last. If the terminal fails any test up until this point, the terminal does not meet the criteria of the specification and thus cannot be used in an automotive wire harness. However, if all defects are successfully detected but the headroom value is less than 35%, then perhaps special parameters are required.

### Documentation

The final area discussed in LV 214-4 is documentation. In order to meet LV 214-4 criteria, proper documentation must be kept of all assembly data, machine



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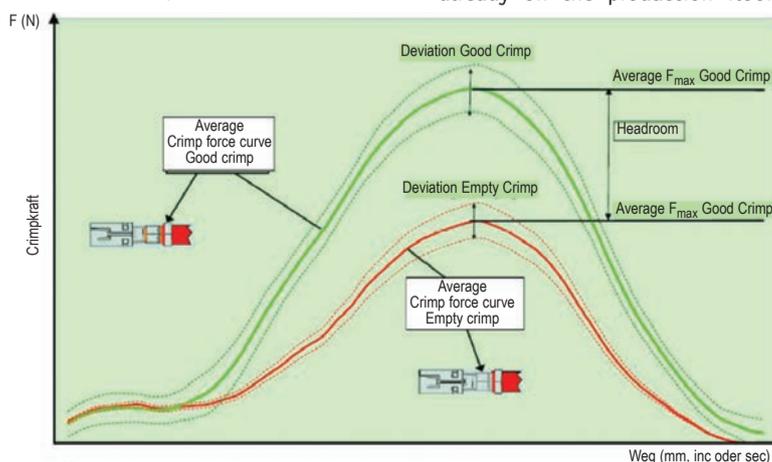


Chart shows relative deviation headroom.

continued on next page

## Next gen heavy-duty backshell solution withstands harsh environments

**AMPSEAL 16** backshells provide strain relief, environmental protection and deliver enhanced aesthetics for firm's rugged AMPSEAL 16 connectors. The heavy-duty backshells are constructed of robust thermoplastic and install easily. Devices are available in 180° and 90° versions for all of firm's 16 plug and cap arrangements (2, 3, 4, 6, 8, and 12). The two-piece 180° version channels the wires directly out of the back of the connector, providing a high level of protection and providing strain relief. The four-piece 90° version features an innovative elbow that allows for 360° rotation, enabling the wires to be routed in various angles.

**TE CONNECTIVITY**

<http://ept.hotims.com/65985-28>



## Micro-D, micro circular connectors are low-profile

**MIL-STD-83513** Micro-D product family includes low-profile Micro-Ds for harsh-environment applications. The circular device provides lightweight aluminum ratchet-coupling shells. Products deliver rugged performance for shock, vibration and current carrying capacity and reduce the amount of space requirements. The lightweight aluminum housing option uses a ratchet locking system that provides quick and secure coupling, is watertight to IP68 and is vibration resistant.

**OMNETICS**

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## Connectors, adapters ease pcb-to-pcb connections

**MMBX style** small form factor connectors and adapters provide a versatile and easy pcb-to-pcb connection, as well as coax-to-pcb connections. Devices also work well in backplane applications. Products provide a maximum operating frequency of 12.4GHz, VSWR of 1.06:1, mechanical misalignment tolerance of 4.5° (or 0.7mm) max and feature gold plated beryllium copper contacts.

**PASTERNAK**

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## LV 214-4

continued from previous page

data and the results of all testing. This includes: terminal ID, crimp data, wire cross section, wire type, machine, applicator and crimp force monitor used, relative deviations, headroom, and feasibility study results. This data is used not only for internal purposes, but can also be shared with customers or manufacturers to help them understand why a specific terminal is or is not appropriate for their application.

## Conclusion

It is important to remember that LV 214-4 is intended for terminal validation in automotive harnesses. This means that when an OEM receives a terminal that has been approved for automotive manufacturing, all of this testing has already been completed. However, the LV 214-4 is a culmination of knowledge from top automotive manufacturers and provides consistency among expectations and processes in terminal requirements for automotive use. Thus, it is important for OEM manufacturers to have at least a basic knowledge of what the LV 214-4 is and how it may impact their manufacturing.

For more information on automotive connectors from Schleuniger, go to <http://ept.hotims.com/65985-31>

<http://ept.hotims.com/65985-5> ->



## Wire stripping unit simplifies pneumatic process

**UniStrip 2050** wire stripping machine provides a simple, low-cost pneumatic stripping unit for medium sized cables and wires. The fully pneumatic machine is simple to set up and operate and excels with its compact design and ample stripping power.

**SCHLEUNIGER**

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## Crimp terminated connectors are field attachable

**M12** field attachable connector with crimp connection are available in codings A, B, D, and X. Product's compact and light design make it suitable for applications with low space and weight. M12 Crimp X-coded is designed for Ethernet applications with data rates up to 10 Gigabit/s, allowing applications with high data rates to be implemented in an industrial environment. The turned crimp contacts can take stranded wire cross-sections from AWG 28 to AWG 22 (for X-coding) and from AWG 24 to AWG 18 (for A-, B- and D-coding) and are thus suitable for a wide range of commercial industrial data cables.

**CONEC**

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# ALL THE ANGLES



Interpower® offers four different angled configurations for the IEC 60320 C-13 and C-19 connectors for North American and international use. The connectors can cover 360° of possible rotation with the right angle, down angle, left angle, and up angle. A variety of angles to choose from allows for connections to be made to equipment without worrying about the possibility of strained or tangled cords. They are ideal for areas where space is limited.

We carry a full range of power system components for your electrical and electronic equipment. Value-added options are available upon request such as custom length cords, packaging, and labeling. All Interpower manufactured cords are 100% tested.

- No minimum order requirements
- 1-week U.S. manufacturing lead-time on non-stock Interpower products
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- Free evaluation samples

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## Conductor-sized SMD connector connects LEDs

ADELS SMDflat545 SMD connector is a large conductor size and high current capacity, considered the 'big brother' of proven LED connector type. Device provides a reduced profile of 3.45mm and is suitable when connecting LED modules. With a 6mm pin spacing and a cross section of 0.5 to 2.5mm<sup>2</sup>, device provides a large connection capacity. Product is available in 1, 2 or 3 pole versions and it can be used with both solid and flexible conductors. Device's synthetic material withstands the highest stresses and shows only minimal discoloration during reflow soldering or with high ambient temperatures.

TCH

<http://ept.hotims.com/65985-34>



## Positronic appoints Sigma Component as Canadian sales agent

Positronic, Springfield MO, global supplier of electronic connectors, has appointed Sigma Component Design Ltd., Mississauga ON, as its new sales agent for all Canadian territories.

Founded in 1966, Positronic is a global manufacturer of highly reliable electronic connectors known for distinctive core capabilities, including solid machined contacts with low resistance/high conductivity for use in standard and quick-turn custom connectors. Key products include high power, D-sub, rectangular, modular and circular connectors. Customized solutions are available as well.

Founded in 2002, Sigma Component has emerged as a leading representative in Canada's electronics industry and remains committed to continuing its unparalleled technical sales and service in the Canadian marketplace, says Scott Crawford, regional sales manager at Positronic.

"Sigma is to rep firms as Positronic is to the electronic components industry - a niche market player that focuses on the design needs of the high tech customer. With Sigma as our Canadian sales agent, Positronic is poised for excellent growth in the Canadian market", adds Crawford.

### Positronic appoints Powell as authorized disty

Positronic also recently appointed Powell Electronics Inc. as an authorized distributor for its full line of interconnect products in the North America market.

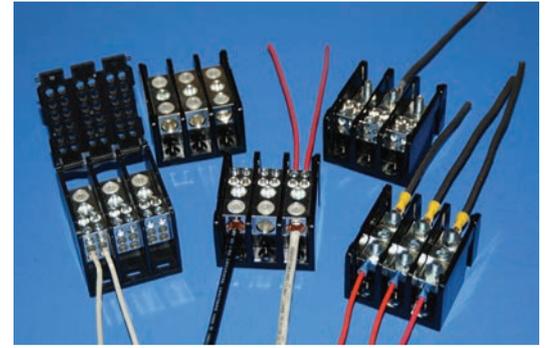
"We are pleased to establish a formal partnership with Powell Electronics, knowing their long-standing reputation and expertise for service and distribution in our industry", states Positronic president and CEO, John Gentry. "Powell is an excellent fit for us and a significant part of our channel to market strategy going forward".

## High power terminal blocks suit electrical distribution panels

HP Series high power terminal blocks are rated 175 Amp and 600 Volt for electrical applications in power panel distribution. Devices can also be used for lighter power applications and therefore has extended utility as a 'one size fits all' product line. Devices are suitable for high power distribution in electrical panels, to transition larger wire gauge, high power mains to smaller gauge lower power branch circuits.

BLOCKMASTER ELECTRONICS

<http://ept.hotims.com/65985-35>



## Product line includes Brazil surface-mount sockets

Firm's current product line of sockets expands to include Brazil surface-mount sockets. The single-phase socket types are NBR 14136 and provide a voltage rating of 250Vac and a current rating of either 10A or 20A. Products have the Inmetro approval. The part number for the 10A Brazil surface-mount socket is 88040330, while the part number for the 20A Brazil surface-mount socket is 88010340. Firm has no minimum orders and offers a 1-week U.S. manufacturing lead-time on non-stock devices.

INTERPOWER

<http://ept.hotims.com/65985-36>



## Hinged micro connector delivers versatility



SIM7200 SIM connector is a hinged micro device that delivers versatility and an active lock that provide shock and vibration resistance versus other SIM connector styles. Product has been through rigorous testing to EIA industry standards, making it suitable for industrial and harsh environment applications where a consistent, robust connection is paramount. Device improves flexibility in terms of positioning and placement.

GCT

<http://ept.hotims.com/65985-37>

## Schleuniger



## MultiStrip 9480

### The Benchmark in Coaxial and Shielded Cable Processing

The MultiStrip 9480 family offers six machine versions to cover a wide range of applications and budgets. Its high speed indexing cutter head and programmable rotary incision capability set the benchmark for high precision processing of coaxial and other shielded cables while SmartBlade™ technology and magnetically held guides reduce changeover times. Each machine can be easily interfaced with Schleuniger's vast line of integrated accessories to create a fully automatic wire processing production line.

[schleuniger-na.com/ms9480\\_ept](http://schleuniger-na.com/ms9480_ept)



"I wanted a higher standard of quality throughout the entire assembly process. The high quality and precision of Schleuniger products is the reason we chose to go with them." Zane Kadro, JumperZ Audio & MetalZ

To Be Precise.

<http://ept.hotims.com/65985-6>

## Harwin sponsors Concordia's space team

### Firm's connectors help student-designed rocket and cube satellite

Harwin, manufacturer of hi-rel connector and SMT board hardware, has announced its sponsorship of Space Concordia, a student-run astronomical engineering society at Concordia University in Montreal.

Space Concordia has achieved some notable project successes this year, recently winning second place in the 2016 Intercollegiate Rocket Engineering Competition (IREC), which attracted a record 52 international student teams. Space Concordia's Rocketry Division designed and built a rocket carrying a 10lb payload, successfully launching it at the event where it reached over 10,000 feet above ground level. The team achieved a score of 1261 points in the competition, beating 42 other university teams and only narrowly ceding first place in the Basic Category to the École de Technologie Supérieure.

Harwin provides both financial sponsorship and high-rel interconnects to Space Concordia. For next year's IREC competition, Space Concordia will be designing Harwin's Mix-Tek connectors into its rocket, aiming to launch higher and travel faster. The satellite team also recently won first place in the Canadian Satellite Design Challenge, when its Cube Sat, Alexandr, competed against other Canadian universities' entries in qualification tests. These involved random vibration and functional tests and demonstration of compliance and design excellence to the panel of judges.

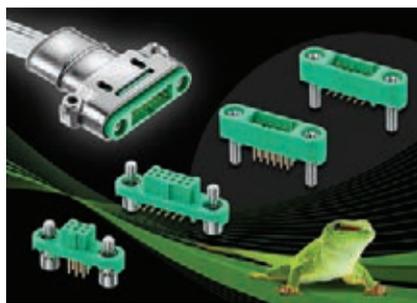
Neil Woodcock, president, Space Concordia comments: "The harsh and unforgiving conditions found in space require components able to cope with high levels of shock, vibration and extreme temperatures. We approached Harwin due to the excellent and proven reputation of its products in space applications and were delighted when they agreed to become our sponsor. We are confident that Harwin products and expertise together with our talented student engineers will enable Space Concordia to achieve even greater success in 2017."

Harwin's Datamate hi-rel, high performance 2mm connector family incorporates proprietary 4-finger Beryllium copper contacts for complete connection integrity under the severest conditions. Datamate Mix-Tek connectors are a mixed-technology connector series that includes signal, coax and power to 40A. Jackscrews are also now available with all Harwin's Datamate and Mix-Tek connectors, offering further space and weight savings so important in space applications.



## 1.25mm pitch connectors save space

**Gecko G125** Screw-Lok Series 1.25mm pitch connectors are low-profile, dual row cable-to-board and board-to-board interconnects that save pcb real estate and weight in high reliability applications. Devices provide ruggedized screw fixings for increased security and can withstand repeated mating cycles without damage. Up to 45% smaller than Micro-D connectors and up to 75% lighter, devices deliver high reliability with a smaller footprint and increased flexibility for design engineers.



HARWIN

<http://ept.hotims.com/65985-38>

## Compact power connector comes with hex nut



**RD24** panel-mounted connector with plastic hex nut reduces the need for mounting screw holes and is a suitable solution for applications with a thick panel box. Device provides a compact, easy to install mounting design and multiple fields of use. Available in 4 and 7 pin configurations, devices are rated at a maximum of 16A per contact and can transfer up to 400V. Products are fitted with gold plated contacts and are designed to withstand harsh industrial environments with an IP67 rating. An added feature allows an optional protection

cap lanyard to attach directly to the housing body of the connector.

BINDER-USA

<http://ept.hotims.com/65985-39>



## Connector reduces breakage from improper insertion

**6811-Series** flexible printed circuit / flexible flat cable (FPC/FFC) connector with 0.5mm-pitch reduces breakage from improper insertion and is suitable for mobile devices. With a profile height of 1.28mm, the device enhances productivity in robust assembly operations and is available in 4 to 16 pins. Device has bottom contacts, a front locking mechanism and connects applicable FPC/FFC with a thickness of 0.3mm.

KYOCERA

<http://ept.hotims.com/65985-40>

## Connectors pack power in small form factor

**ELCON Mini** family of power connectors increases power demands, delivers a 400 Volt rating and up to 40 Amps per contact in a 2-position, 8mm high form factor that is roughly the size of a popular HDMI connector. Devices address many power and space requirements with 2, 3, 4 and 6(2x3)-position configurations, while providing a positive metal latch connection, low resistance and highly reliable interface. Cable assembly solutions from TE also offer high-flex and customizable break-out options for easy routing and installation.

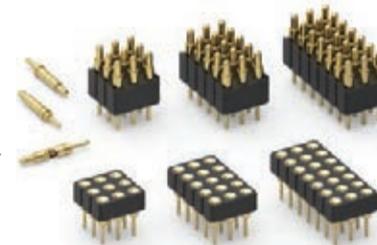


TE CONNECTIVITY

<http://ept.hotims.com/65985-41>

## Spring-pin, mating target connectors come in 9-96 configurations

**804 series** Triple Row Connectors includes long stroke, through-hole mount spring-loaded pins and mating target connectors, which are on 2.54mm grid and available in 9 - 96 position configurations. The spring-loaded header pins provide 1.14mm of stroke at working travel and 2.29mm maximum stroke. Each contact has a current rating of 2 amps continuous, 3 amps peak. The precision-machined piston / base and gold-plated components assure a 1,000,000-cycle life durability.



MILL-MAX

<http://ept.hotims.com/65985-42>

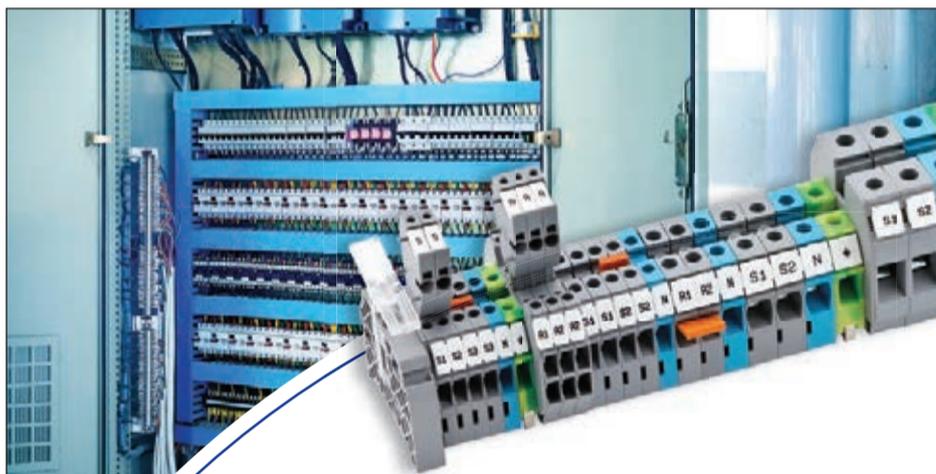
## Wire stripper unit cuts up to 10mm<sup>2</sup>

**Kappa 315** wire cut and strip unit is powerful up to 10mm<sup>2</sup>. Fitted with a powerful and robust blade head, unit has a processing range that comprises cross-sections of 0.05 mm<sup>2</sup> to 10 mm<sup>2</sup>. Product provides a precise and robust blade axis, as well as different blade shapes for the improved stripping quality. Wire feed parts can be changed without tools and it requires minimal setup time thanks to a conductor detector. Unit provides memory for process parameters, including programmable wire applied pressure valves.



KOMAX

<http://ept.hotims.com/65985-43>



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## Firm carries Argentina plug, connector and socket

Firm carries Argentina plug, in-line connectors and panel-mount sockets. The single-phase plug type is IRAM 2073 and the socket type is IRAM 2086 with a current rating of 10A and a voltage rating of 250Vac. The 10A Argentina plug (part # 88040270); the 10A Argentina in-line connector (part# 88040280); and the 10A Argentina panel-mount socket (part# 88040290) all have the IRAM (Instituto Argentino de Normalización y Certificación) approvals. Firm has no minimum order limitation and provides a 1-week U.S. manufacturing lead-time on non-stock products and same day shipping on in-stock products.



INTERPOWER

<http://ept.hotims.com/65985-44>

## Connectors compatible with cable widths up to M25

Han 3A size connectors can be assembled with cable diameters as large as M25 instead of the previous limit of M20. The increase allows the connectors to be configured with any contact insert in the series, including those with higher rated current and bigger cross sections. Device hoods meet the requirements of protection classes IP 65/67. Product provides a narrow external geometry overall, terminating in the cable holding area.

HARTING

<http://ept.hotims.com/65985-45>



## SMT connector provides 3.4mm stack height



DHAL model of Mezza-pede family of SMT connectors provides a lower profile header that reduces board stack height by 15%. Device includes an ultrathin insulator, at 0.63mm, half the thickness of the original header design. When paired with mating socket model DHS, a z-axis stack height of 3.4mm is achievable. Device facilitates a reduction in package height and a shorter signal path in applications ranging from tunable laser

power connectors in optical transceivers to hand-held medical electronic devices.

ADVANCED INTERCONNECTIONS

<http://ept.hotims.com/65985-46>

## Interconnects boost performance in sub-miniature package

SMPM line of high performance interconnect products provide high performance in a sub-miniature package, with versatile connectivity options. Cable connectors are available in straight and right-angle configurations, for 0.047- and 0.086-inch diameter semi-rigid and conformable cables, as well as RG-178 flexible coax. Pcb connectors are made from beryllium copper or brass with gold plating, for durability of use and maximum electrical performance.

AMPHENOL RF

<http://ept.hotims.com/65985-47>

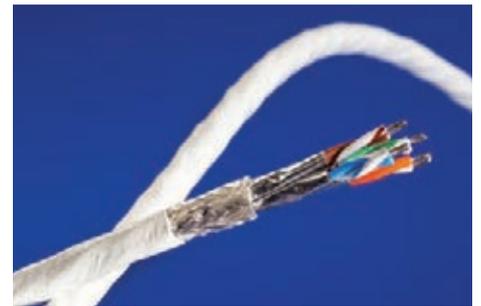


## Ethernet cables approved on SAE 6070 QPL

Aerospace Ethernet Cables are now qualified according to the Society for Automotive and Aerospace Engineers (SAE) AS6070/5 and 6 recently released for civil and military applications. This industry standard supports the AS50881 EWIS (electrical wiring interconnection systems) specification for high-speed data cables. The 10-gigabit Ethernet cables exceed Cat6a electrical requirements and are proven to deliver reliable signal integrity with sufficient margin for high-speed data transmission over longer distances.

GORE

<http://ept.hotims.com/65985-48>



## True mains voltage connectors delivers IEC 60320 breaking capacity

TRUE1 Connector expands powerCON series as a true mains voltage device with IEC 60320 breaking capacity. Product is a lockable 16A single-phase connector providing an inlet and outlet coupler design, along with firm's chuck-type strain relief. Rugged and reliable devices are VDE certified according to IEC 60320, UL recognized and deliver up to an IP65 rating. Device replaces appliance couplers wherever a very rugged solution in combination with a locking device is needed.

NEUTRIK

<http://ept.hotims.com/65985-49>



## Waveguide-to-coax-adapters operate up to 65GHz



Line of right-angle waveguide to coax adapters operate up to 65GHz and provide 1.85mm, 2.4mm and 2.92mm connectors, with operating ranges up to 65GHz. Products are suitable for numerous applications requiring a transition from coax to waveguide or vice versa. Ten devices extend firm's portfolio to include millimeter wave frequency ranges with models in the K-band (18 to 26.5 GHz) up to the V-band (50 to 65 GHz). Products provide VSWR as low as 1.29:1, while also providing insertion loss performance of 0.3dB.

FAIRVIEW MICROWAVE

<http://ept.hotims.com/65985-50>

## Press-fit stacking connector delivers signal integrity

Press-fit board stacking connector is a 56-position VPX footprint-compatible device designed for rugged, high speed applications. Products satisfy the need for 10Gb/s digital signals in high density packaging. Suited for space saving in military electronics

and commercial aerospace systems, devices are well suited for mezzanine and rigid flex board-to-board attachment and provide reliable signal integrity. Device's footprint matches VPX daughtercard layouts for low-noise, gas tight connections.

TE CONNECTIVITY

<http://ept.hotims.com/65985-51>



# CLEAR, CUT, PRECISE ROTARY STRIP WITH KOMAX WIRE

40  
YEARS  
CUTTING  
EDGE

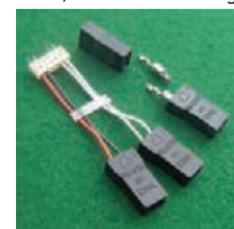
Rotary Strip with the Komax Wire precision expert Cosmic 48R. The Cosmic 48R is a wire stripping machine used to strip coaxial, triaxial, and multi-layers cables from AWG 36 to AWG 6. With its two blade rotary head and centering units, cuts made into the insulation are clear and precise. Gain a lasting edge with the Cosmic 48R.

**komax WIRE**  
komaxwire.com

<http://ept.hotims.com/65985-9>

## IGBT connector mounts pcbs directly to module

2 Pin IGBT connectors mount pcbs directly to IGBT modules and cable assemblies, which are designed specifically for



attaching to the spade terminals on IGBT modules. Device connects the IGBT power modules to a printed circuit board (pcb). Suitable for 2

spade tabs 2.8x 0.5mm, the connectors are made with integrated automatic locking clips built in. Three grid spacings for tabs are available. (4.0, 4.7 and 6.0mm).

2E SYSCOM

<http://ept.hotims.com/65985-52>

# Conductive coatings simplify the EMI/RFI suppression process

By MG Chemicals

EMI/RFI is a growing issue in electronics and engineers must design solutions to manage it. Conductive coatings can commonly be an effective part of the solution. MG Chemicals recently launched a new line of conductive coatings for EMI/RFI suppression, which provides a choice of three chemistries and four pigments.

Electromagnetic Interference (EMI) and Radio Frequency Interference (RFI) are two sides of the phenomena where electronic devices create and are affected by electromagnetic radiation. Often, the terms RFI and EMI are used interchangeably because radio waves are simply a subset of the electromagnetic spectrum. However, in practice, EMI generally refers to short range interference caused by high frequency emissions within the device itself, while RFI refers to longer wavelength interference from sources external to the device. EMI and RFI affect devices differently, but they are a related phenomenon and a common issue for today's electronics.



Epoxy-based coating systems are durable.

## Today's environment is filled with EMI/RFI

EMI/RFI is a growing problem in the modern world. Today's environment is filled with EMI/RFI. Radio, cell phone and WIFI transmitters permeate space with signals. Solar activity and other sources from outer space also create significant radio wave noise. Additionally, as devices become smaller, they are increasingly vulnerable to EMI/RFI, especially when the distance between circuits are less than one wavelength. This creates a challenging environment for electrical engineers.

Electro-Magnetic Compliance (EMC) is

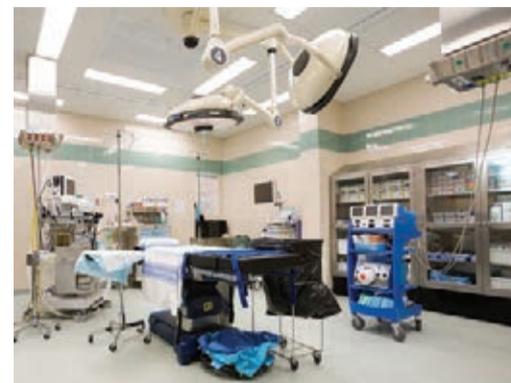
now a critical part of electronic design, achieved when a device is designed to be protected from external EMI/RFI, and does not significantly generate its own. Government bodies and industry organizations such as the Federal Communications Commission (the FCC) and Society of Automotive Engineers have written comprehensive laws and guidelines for EMC that electronic devices must meet before being sold. Achieving EMC is no small task.

## EMC is achieved through good circuit design

Most EMC is achieved through good circuit design. Opposing magnetic fields cancel each other out, therefore circuits are designed so that the field from one part nullifies the field of another part. However, this does not eliminate all emissions. EMI/RFI shielding is commonly necessary to capture residuals. A basic example is shielded twisted pair wiring, where two wires run in opposite directions and are twisted together so that their electromagnetic fields cancel each other out. The twisted pair is then put into a metal tube that essentially eliminates residual EMI/RFI. The metal tube eliminates the EMI/RFI because it is conductive.

EMI/RFI shielding is a layer of conductive material. It may protect a device

from its environment or components within a device from each other. For example, the inner surface of plastic electronic enclosures is commonly coated with conductive paint so that the enclosed device does not interfere with its environment. In another case, components are protected from each other by applying a thin layer of conductive coating over a thin layer of insulating coating. In both cases, conductive paints provide effective solutions.



Water-based coating systems are ideal for architectural, medical and communications applications.

## Conductive paints for EMI/RFI shielding

MG Chemicals supplies a range of conductive paints for EMI/RFI shielding and related applications. Customers can choose between three coating chemistries and four pigments.

The coating chemistries are acrylic, water based urethane and epoxy. Of the three, acrylic is the most commonly used. It is applied to electronic enclosures, satellite dishes, and some board level applications. Water based urethane is mainly used in architectural applications where its low VOC content is required to meet environmental regulations. It is used on electronic enclosures as well, however. Some users prefer it over acrylic because it is non-flammable, has no nox-

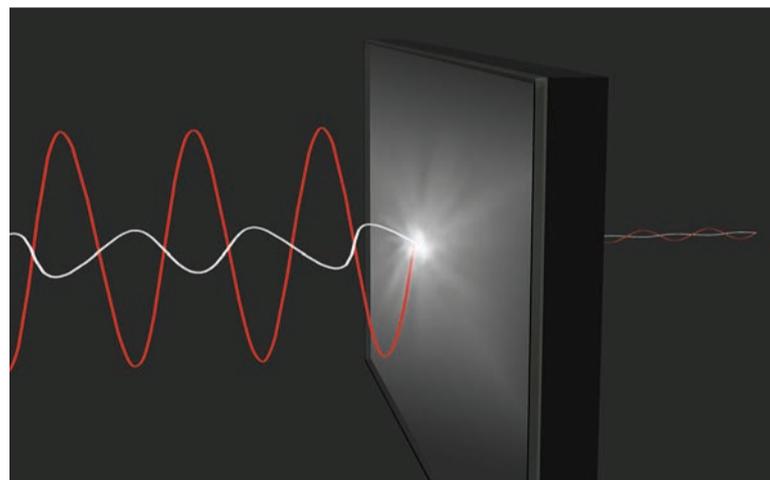
ious vapors and it is not a dangerous good when shipped by air. Epoxy is used when extreme durability is needed. It offers mar and scratch resistance, very strong adhesion, extreme abrasion resistance, impact resistance and strong chemical resistance. The three coating chemistries serve similar purposes, but each has unique properties.

## Carbon is best for low frequency shielding

Likewise, each pigment brings its own set of properties. The four available are carbon, nickel, silver-coated copper and silver. Carbon is best for low frequency shielding, musical instruments and grounding. Nickel is suitable for most device level shielding applications, offering good shielding and excellent corrosion resistance. Silver coated copper provides superior shielding. Silver offers the highest shielding and best corrosion resistance. Carbon is the least costly material, while silver is the most expensive solution. Engineers can thus select the most cost effective solution for their application.

This choice of coating chemistry and pigment creates a matrix of products that essentially adapts to the requirements of the application. This gives engineers a flexible tool for achieving EMC in a wide range of applications in today's demanding environment.

For more information on EMI/RFI shielding coatings from MG Chemicals, go to <http://ept.hotims.com/65985-53>



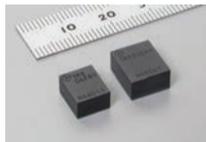
Conductive coatings deliver effective EMI/RFI shielding of electronic enclosures, pcb components and architectural structures, across a broad range of frequencies.

## Dc-dc converter boosts power density

**MYMGK series** of miniature 'Mono Block' type surface mount point-of-load (PoL) dc-dc converters are non-isolated and available in two models, a 6 Amp (MYMGK1R806FRSR) and a 20 Amp. Each version is available with two output voltage range options. Devices measure 9.0 x 7.5 x 5.0mm, the 6 Amp has a programmable output voltage in the range 0.7 to 1.8Vdc from a +5Vdc input. Device can deliver up to 6 Amp output in the range 0.7 to 5.0Vdc from a +12Vdc nominal input.

**MURATA**

<http://ept.hotims.com/65985-54>

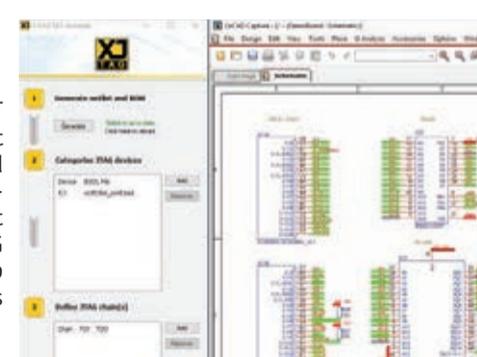


## Software enables early pcb detection, repair

**OrCAD Capture** now includes XJTAG DFT Assistant, an easy-to-use interface that increases the design for test (DFT) and debug capabilities of the schematic capture and pcb design system. Product allows users to detect and correct JTAG errors at the design stage before the pcb is produced, preventing costly re-spins and project delays.

**CADENCE DESIGN SYSTEMS**

<http://ept.hotims.com/65985-56>



## Threaded standoffs for pcbs are surface mountable



**Keystone Series of threaded** standoffs are specifically designed and packaged for use on printed circuit boards (pcbs) in the same manner as other surface mount components. Manufactured from steel with a tin plate, devices can be populated using the same SMT equipment used for other components, reducing scrap and handling time. Devices are available in 2-56, 4-40 and 6-32 threads in lengths from 1/16" up to 3/8" and are supplied on tape and reel with Kapton tape on top surface for easy pickup.

**EMX ENTERPRISES**

<http://ept.hotims.com/65985-55>

## Switching regulator is pinout compatible



**AMSRI-78-NZ series** switching regulator is pinout compatible with LM78xx linear regulators (SIP3). Highly efficient at up to 93%, device provides an input range of up to 36Vdc and produces output currents up to 500mA. Power is available up to 7.5 Watts. Device supports thermal shutdown, continuous short circuit protection and very low no load consumption of  $\leq 0.05W$ .

**AIMTEC**

<http://ept.hotims.com/65985-57>



## Wearable Technology

# Interscatter communication enables advanced smart wearables

Includes first-ever implanted devices, smart contact lenses, credit cards that 'talk' Wi-Fi

By Jennifer Langston, University of Washington

**University of Washington** researchers have introduced a new way of communicating that allows devices such as brain implants, contact lenses, credit cards and smaller wearable electronics to talk to everyday devices such as smartphones and watches.

This new 'interscatter communication' works by converting Bluetooth signals into Wi-Fi transmissions over the air. Using only reflections, an interscatter device such as a smart contact lens converts Bluetooth signals from a smartwatch, for example, into Wi-Fi transmissions that can be picked up by a smartphone.

"Wireless connectivity for implanted devices can transform how we manage chronic diseases," says co-author Vikram Iyer, a UW electrical engineering doctoral student. "For example, a contact lens could monitor a diabetic's blood sugar level in tears and send notifications to the phone when the blood sugar level goes down."



'Interscatter' communication generates low-power Wi-Fi transmissions using everyday mobile devices. I.E., Bluetooth signals from a smartwatch (left) transmit data from a neural device that can be implanted in a patient's brain (right) to a smartphone via Wi-Fi. (Photo credits: Mark Stone/University of Washington)

Due to their size and location within the body, these smart contact lenses are too constrained by power demands to send data using conventional wireless transmissions. That means they so far have not been able to send data using Wi-Fi to smartphones and other mobile devices.

Those same requirements also limit emerging technologies such as brain implants that treat Parkinson's disease, stimulate organs and may one day even reanimate limbs.

The team of UW electrical engineers and computer scientists has demonstrated for the first time that these types of power-limited devices can "talk" to others using standard Wi-Fi communication. Their system requires no specialized equipment, relying solely on mobile devices commonly found with users to

generate Wi-Fi signals using 10,000 times less energy than conventional methods.

"Instead of generating Wi-Fi signals on your own, our technology creates Wi-Fi by using Bluetooth transmissions from nearby mobile devices such as smartwatches," says co-author Vamsi Talla, a recent UW doctoral graduate in electrical engineering who is now a research associate in the Department of Computer Science & Engineering.

### Communication technique called backscatter

The team's process relies on a communication technique called backscatter, which allows devices to exchange information simply by reflecting existing signals. Because the new technique enables inter-technology communication by using Bluetooth signals to create Wi-Fi transmissions, the team calls it "interscattering."

Interscatter communication uses the Bluetooth, Wi-Fi or ZigBee radios embedded in common mobile devices like smartphones, watches, laptops, tablets and headsets, to serve as both sources and receivers for these reflected signals.

In one example the team demonstrated, a smartwatch transmits a Bluetooth signal to a smart contact lens outfitted with an antenna. To create a blank slate on which new information can be written, the UW team developed an innovative way to transform the Bluetooth transmission into a "single tone" signal that can be further manipulated and transformed. By backscattering that single tone signal, the contact lens can encode data — such as health information it may be collecting — into a standard Wi-Fi packet that can then be read by a smartphone, tablet or laptop.

"Bluetooth devices randomize data transmissions using a process called scrambling," said lead faculty Shyam Gollakota, assistant professor of computer science and engineering. "We figured out a way to reverse engineer this scrambling process to send out a single tone signal from Bluetooth-enabled devices such as smartphones and watches using a software app."

### Single sideband backscatter eliminates byproduct

The challenge, however, is that the backscattering process creates an unwanted mirror image copy of the signal, which consumes more bandwidth as well as interferes with networks on the mirror copy Wi-Fi channel. But the UW team developed a technique called 'single sideband backscatter' to eliminate the unintended byproduct.

"That means that we can use just as much bandwidth as a Wi-Fi network and



Examples of interscatter communication include a) a smart contact lens using Bluetooth signals from a watch to send data to a phone b) an implantable brain interface communicating via a Bluetooth headset and smartphone and c) credit cards communicating by backscattering Bluetooth transmissions from a phone.

you can still have other Wi-Fi networks operate without interference," said co-author and electrical engineering doctoral student Bryce Kellogg.

The researchers — who work in the UW's Networks and Mobile Systems Lab and Sensor Systems Lab — built three proof-of-concept demonstrations for previously infeasible applications, including a smart contact lens and an implantable neural recording device that can communicate directly with smartphones and watches.

"Preserving battery life is very important in implanted medical devices, since replacing the battery in a pacemaker or brain stimulator requires surgery and puts patients at potential risk from those complications," said co-author Joshua Smith, associate professor of electrical

engineering and of computer science and engineering.

"Interscatter can enable Wi-Fi for these implanted devices while consuming only tens of microwatts of power."

Beyond implanted devices, the researchers have also shown that their technology can apply to other applications such as smart credit cards. The team built credit card prototypes that can communicate directly with each other by reflecting Bluetooth signals coming from a smartphone. This opens up possibilities for smart credit cards that can communicate directly with other cards and enable applications where users can split the bill by just tapping their credit cards together.

"Providing the ability for these everyday objects like credit cards — in addition to implanted devices — to communicate with mobile devices can unleash the power of ubiquitous connectivity," Gollakota said.

The research was funded by the National Science Foundation and Google Faculty Research Awards.

For more information on Interscatter Communication from the research team at University of Washington, go to <http://ept.hotims.com/65985-58>



In interscatter communication, a backscattering device such as a smart contact lens converts Bluetooth transmissions from a device such as a smartwatch to generate Wi-Fi signals that can be read by a phone or tablet.

## How wearables will revolutionize the future of medicine, IoT

The change from 'Fee for Service' to 'Value Based' healthcare is driving the market toward monitoring devices with a wide range of capability and purpose, according to brand new research on health and fitness IoT devices from Mobile Experts.

In the first half of 2016, 45-million of these wearable devices were shipped, says the report, which provides a thorough look into the application of IoT devices in healthcare, zeroing in on wearables for fitness and medical use. Future applications for these wearables include smart pill bottles, 'telemedicine', remote diagnostics and remote surgery.

"The global healthcare market has started a slow, sweeping change in philosophy," remarks principal analyst Joe Madden. "Multiple forces are now changing the business model, so that healthcare providers are compensated based on health, not based on transactions. Technology is a major enabler in this trend. We expect to see strong growth in fitness and medical wearable devices that are more integrated with clothing. We anticipate heavy adoption of smart pill bottles and other devices to precisely monitor the drugs taken by patients. Overall, information is required to make 21st century healthcare profitable."

"Wellness program incentives blur the line between fitness tracking and medical insurance," says Madden. "There are interesting products out there such as 'smart socks' that can help an athlete to improve performance, or help an injured person to rehab."

## Wearable devices need to be more useful: Survey

The abandonment rate of smartwatches is 29% and 30% for fitness trackers, because people do not find them useful, they get bored of them or they break, according to a survey by research group Gartner Inc.

"Dropout from device usage is a serious problem for the industry," says Angela McIntyre, research director at Gartner. "The abandonment rate is quite high relative to the usage rate. To offer a compelling enough value proposition, the uses for wearable devices need to be distinct from what smartphones typically provide. Wearables makers need to engage users with incentives and gamification."

According to the survey, smartwatch adoption is still in the early adopter stage (10 percent), while fitness trackers have reached early mainstream (19 percent). Only 8 percent of consumers have used VR glasses/head-mounted displays (excluding cardboard types).

The survey found that people typically purchase smartwatches and fitness trackers for their own use, with 34 percent of fitness trackers and 26 percent of smartwatches given as gifts.

"Continued growth in the adoption of smartwatches and fitness trackers will now be from mainstream consumers instead of early technology adopters," McIntyre adds. "The greatest hurdle for fitness tracker and smartwatch providers to overcome is the consumer perception that the devices do not offer a compelling enough value proposition."

Survey respondents indicated that wearable devices are priced too high, given their perceived usefulness. Gartner believes that wearable providers that do not have a strong brand name will find it more difficult to grow market share, competing directly with popular brands. Instead, they should accept lower margins and provide an alternative that is priced significantly lower than top brands, but still has good quality for price-sensitive consumers.

The survey also revealed that the designs of smartwatches and fitness

trackers are not appealing to consumers. To overcome this concern, Gartner recommends wearable providers partner with companies that design, brand, market and distribute watches and fashion accessories because they have experience setting style trends, marketing lifestyle devices and have established retail channels.

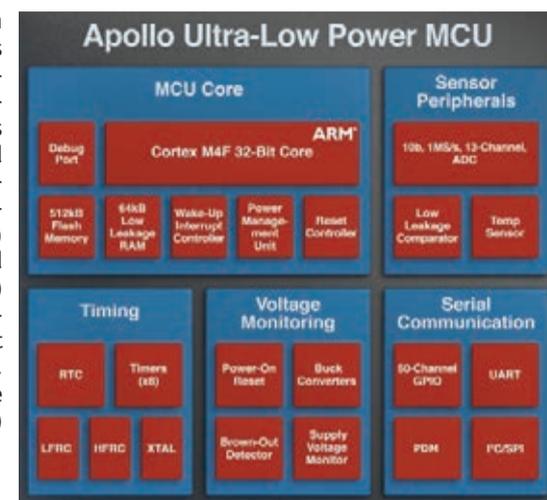
According to 29 percent of survey respondents, fitness trackers are unappealing devices. They said they would not wear them or that the designs are neither fashionable nor attractive. "Fitness tracker cases and wristbands designed by fashion brands are sold as higher-priced upgrades," says Mikako Kitagawa, principal research analyst at Gartner.

## Wearables, IoT platform lowers power-consumption performance at <10µA/MHz

Apollo 2 Wearables and IoT Platform reduces power consumption to less than 10µA/MHz, which allows for double the battery life in wearable devices. Product's performance extends battery life and leads to enhanced intelligence and improved functionality. Product provides dramatic reductions in energy consumption (5x) through its patented Subthreshold Power Optimized Technology (SPOT) technology. Product's set of peripherals includes high-precision 14-bit analog-to-digital converters (ADC), plus a digital microphone interface with pulse density modulation (PDM) for voice applications.

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## Spring conference focuses on printable electronics

The Canadian Printable Electronics Industry Association (CPEIA) has announced it will host its second annual conference for printable, flexible and wearable electronics (PE) on May 24-25 at Centennial College's new conference centre in Toronto.

More than 100 organizations and 200 attendees are expected to participate in CPES2017, with industry-leading speakers and keynotes from around the world. This will of course include many of our 80 CPEIA member organizations that are working on a wide range of solutions to power your innovation.

In addition to two days of technical programming targeted at academics, PE industrial companies and end-use companies alike, CPES2017 will feature on May 26, a third day of master classes in various technical subjects, as well as mentoring sessions for startup companies.

"CPES2017 will continue to build on the success and positive energy of last year's event," says Peter Kallai, president and CEO of the CPEIA. "CPES2017 is the place for PE industrial companies and end-users to meet and discuss how they can work together to commercialize new products and applications. We also hope to see a strong turnout from the academic community – this is the place to learn how they can link their research to market needs and opportunities."



## Optimizing & customizing electromechanical components for automotive apps

By Eric Grange, industry marketing manager – automotive, C&K



HDT detect switch.

**User interface** is an extremely important aspect of any vehicle 'experience.' Obviously, electromechanical components, including switches, in automotive applications must provide high reliability and long operating life but their utility can't end there. Switches must also add to the look (design), a feel (feedback) and architecture (electrical ratings and arrangement, fit to function) of a vehicle's keyfob, center console, steering wheel or any other in-cabin interfaces.

Known in the industry as 'haptics,' the touch, feel and sound of a switch's actuation greatly contribute to a user's experience of a vehicle. Influenced also by perceived quality from consumer electronics, automotive design engineers want user interfaces to respond and provide feedback in specific ways that are unique to the automobile. Haptic features are often customized for specific vehicles and manufacturers, and are often accomplished through advanced switch configurations.

These advanced switch configurations must combine ruggedness with design flexibility to meet automotive requirements.

### Sealing

A commonality of every harsh environment application is the need for ruggedized components that can withstand brutal environments, especially outside the vehicle or under the bonnet. Switches sealed to IP40, IP65, IP67 and IP68 specifications that are resistant to contamination by dust, dirt, salt and water are necessary in most automotive applications. Combating environmental elements is often accomplished with switch designs featuring an internal seal to protect the switching mechanism, as well as an external panel seal to keep liquids from entering the panel or enclosure. Silicon rubber caps are also employed to prevent the ingress of fluids that could adversely affect the function of standard switches.

Rugged switch designs for automotive vehicles also need to be resistant to extreme temperatures, vibration and shock. Depending on the specific, advanced snap-acting, tactile, push button and toggle switches are available with IP67/IP68 ratings that provide high levels of reliability and predictability. Reliability and predictable behavior is directly linked to the compatibility of the switch based on the mechanical environment of the unit and the final OEM specification. Such specifications are becoming more important for OEMs as they have to manage strategies for safe mechatronics systems, led by ISO 26262 standards. Switch manufacturers must simulate the potential environmental conditions a switch will encounter over its operating life to ensure their design achieves the specified robustness.

### Haptics

As the gateway to a user interface, a switch solution must have a desirable appearance, feel and sound. Switch manufacturers must work closely with automotive makers to optimize aesthet-

ics, ergonomics and performance.

Typical switching functions in automotive applications, such as front-panels and dashboards, require robust push button switches. Sealed up to IP68-ratings, push button switches can be designed to provide excellent tactile feedback with specific travel and actuation forces. Push button switches also provide an operating life of more than one million cycles which makes them well-suited for use in automotive vehicles and increase the reliability confidence factor.

Ultra-miniature tactile switches are ideal for keyfobs, as they combine a high-operating life with long-term reliability and low current compatibility, while a snap-switch would most likely be used in a vehicle's FOB reader. Both switches can be customized to provide precise feedback.

The audible response of a switch is another important way for vehicle manufacturers to differentiate their vehicles. This feature can be customized to deliver a specified sound or click when actuated. Automotive OEMs are focusing more on these sound responses and consider the acoustic response as part of their branding. The audible response is highly dependent on the switch design, and vehicle manufacturers need to get the same sound response for all units, regardless of the advanced switch configuration.

In order to provide solutions that deliver repeatable audible responses, switch manufacturers have developed established platforms that allow designs to carry over to different applications. This unique offer provides high-reliability and consistent haptics by an 'automotive proven' series, while also achieving drastically reduced development cost and time.

### Implementing new technologies

Consumers now expect touch screens in their smart phones, vehicle entertainment systems, GPS systems and computer monitors. Touch sensing controls, including tactile screens, can now be implemented into almost any electronic device, including center console interfaces. This "Clicker" function can be enabled with any touch-sensitive surface and provides uniform haptics over any surface. The simple mechanical system integrates low-profile tactile switches with the actuating superstructure to provide a clickable touch-sensing system. Based on a structure with supporting points, the actuator collects and transmits the force from the touching surface to the switch with minimal distortion or power consumption. The technology is more efficient than "hinged" solutions

and provides a smooth and uniform click. Multiple configurations, structures and profiles can be developed depending on the application and room available for integration, from 2.5mm to 10mm.

In addition, the Clicker technology can combine with multiple key areas based on the same actuating surface. Each area of a key or button can be used for a pre-selected function. Selecting the function is managed through actuation on the whole surface. The main benefit is that instead of managing separated keys/buttons, the unit can be managed by a single flush surface with haptics, reducing integration issues and simplifying some features like key alignment, backlighting and tactile difference between keys.

### Assembly

Electromechanical components for automotive applications often feature quick connections that support modular installation so that they can be plugged into the panel and locked firmly into place, simplifying both assembly and maintenance. This also lets users store individual switch elements separately and configure them during final assembly to meet application-specific needs, while saving storage space and costs.

Constant work on haptics leads to a reduction of key travel and reaching homogeneity among all controls. The consequence is a challenging tolerance reduction along all the mechanical characteristics, especially switch travel. Constant work on high precision stamping, overmolding and assembly leads to offer such improvement.

Manufacturers have also developed push button switches that offer panel-mounting options to simplify assembly. Rear panel-mounting switches are ideal for applications where multiple switches are going to be mounted to a pcb. Customers can mount them to the pcb first, then the entire assembly can be installed into the armrest or panel. This allows for a much easier installation compared to traditional front mounted switches that require the mounting hardware to be tightened from behind the panel, which is sometimes hard to get to; as well as having to run all the leads to the mating connectors on the pcb. Rear mounted switches allow customers to install the hardware from the top and still achieve the same look while simplifying the installation process.

### Custom electromechanical solutions

OEMs are approaching electromechanical component manufacturers for more than just the switch. By utilizing a

switch manufacturer for designs beyond the switch itself, increased flexibility in design can be realized. Switch dimensions are becoming more critical, making it imperative to work closely with customers to discern all details. Today, it is less about the switch being mounted to a PC board or adding wire leads or a connector to the switch and more about defining the issues that need to be solved, and having a system approach. Because switch manufacturers are now dealing



An interior control for an automobile's GPS navigation system.

with the entire module, they are spending an increasing amount of time with customers to determine how the module is being impacted in the application to assess potential challenges that were not previously considered.

By working closely with customers in all phases of the design process, switch manufacturers can identify materials that interface with the operator, and those in the actual contact mechanism can be re-evaluated and altered to conform to performance, reliability, lifespan and robustness standards.

For example, some manufacturers are now offering switch packages with multi-switching capability and high over-travel performance, with various core-switching technologies such as opposing tactile switches or a dome array on a PC board. Such packages often include additional PC board-mounted integrated electronics, custom circuitry and industry standard connectors for the complete solution.

Still other solutions optimized for automobiles, such as interior headliners, feature not only customized switches with insert molded housing and custom circuitry and termination, but also paint and laser etched switch button graphics and decoration capabilities, as well as backlighting for nighttime use. Today, switch manufacturers are doing even these customized graphics and decorations in-house.

Although the electromechanical components are some of the last devices designed or specified into a center console, dashboard or steering wheel, switches are one of the most important components within a system. Each automotive manufacturer has different performance requirements, external presentations, internal spacing and footprint restrictions. As such, each vehicle requires different packaging and orientation for switches to achieve functional and performance objectives. Customized haptic options (actuation travel, force and audible sound), ergonomic options (illumination, decoration, appearance),

# Automated Test Equipment

Chroma draws on over 30 years experience when supplying power conversion, battery, component and electrical safety test solutions to global industries. Chroma provides test engineers, technicians, and students with a wide range of programmable test instrumentation and automated test systems that support their efforts in bringing new technologies to market.

## AC Power Sources



	Standard Low Power	Standard High Power	Advanced Low Power	Advanced High Power	Regen Grid Simulator
Model	61600	61611, 61612	61500	61511, 61512	61800
Power Rating	500VA - 4000VA	12kVA / 18kVA	500VA - 4000VA	12kVA / 18kVA	30kVA / 45kVA / 60kVA
Voltage Range	0-150V/0-300V/Auto	0-150V/0-300V/Auto	0-150V/0-300V/Auto	0-150V/0-300V/Auto	0-330V <sub>LN</sub> / 0-571V <sub>LL</sub>
Frequency	DC, 15Hz-1kHz	DC, 15Hz-1.5kHz	DC, 15Hz-1kHz	DC, 15Hz-1.5kHz	DC, 30Hz-100Hz
Remote Interface	GPIO, RS-232C	GPIO, RS-232, USB, Ethernet	GPIO, RS-232C (opt)	GPIO, RS-232, USB, Ethernet	GPIO, RS-232, USB, Ethernet
LIST, PULSE, STEP modes			✓	✓	✓
Programmable voltage and current limit	✓	✓	✓	✓	✓
Programmable slew rate setting	✓	✓	✓	✓	✓
Harmonic synthesizer (up to 50)			✓	✓	✓
Turn on/off phase angle control	✓	✓	✓	✓	✓
Comprehensive measurements, including current harmonics			✓	✓	✓
Analog programmable interfaces	✓	✓	Optional	✓	✓
Optional Graphic User Interface	✓	✓	✓	✓	✓

## Electronic Loads



	Programmable AC/DC Load	NEW High Power DC Load	Standard DC Load	Advanced DC Load
Model	63800	63200A	6310A Modular	63600 Modular
Power Rating	1800W / 3600W / 4500W	3kW - 24kW, up to 480kW	100W, 200W, 250W, 300W, 600W	100W, 300W, 400W
Voltage Range	50V - 350Vrms	0-150V / 0-600V / 0-1200V	0 - 500V	0 - 600V
Current Range	up to 45Arms	up to 2000A	up to 240A	up to 80A per module
Dynamic Loading	45-440Hz	50kHz	20kHz	50kHz
Remote Interface	RS-232, GPIO	USB, GPIO, Ethernet	USB, GPIO, RS-232	USB, GPIO, Ethernet
Max Channels per Mainframe	1	1	8	10
Master/Slave Parallel Control	✓	✓		✓
Synchronize with Multiple Loads	✓	✓	✓	✓
Load Modes	CC, CR, CP	CC, CR, CV, CP, CZ	CC, CR, CV, CP	CC, CR, CV, CP, CZ
Programmable Slew Rate		✓	✓	✓
LED Array Simulation			✓	
Constant Impedance Mode	✓	✓		✓
V & I Digitizer		✓		✓
Analog Input		✓		✓
Optional Graphic User Interface	✓	✓	✓	✓

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## Tech giants turn attention to auto, trucking industries

**Tech companies** are moving to the automotive market, because that's where the money is. In mid-November, Brian Krzanich, CEO of Intel Corp., took the stage at the Los Angeles Auto Show to deliver his company's first keynote address at an automotive event. The headline news in the widely anticipated speech was that Intel Capital will be investing \$250 million in autonomous (i.e., computer-controlled) driving over the next two years.

Technologies that will benefit from the investment, according to Intel, include connectivity (of the car to the Internet), context awareness (the car knows what's going on around it), deep learning, and security. Intel's own processing power comes into play with the amount of data required for autonomous driving. Krzanich pointed out that cars are already equipped with a variety of sensors, cameras and controllers that create, gather and transmit data. He said that the automotive industry needs to be prepared to handle as much as four terabytes of data generated daily by every car.

### Cross-pollination between tech and auto firms

"The fact that Intel chose to make this announcement at the L.A. Auto Show highlights the massive crossover that's currently taking place between technology and transportation," commented Michael Macauley, CEO of Quadrant Information Services, a supplier of pricing analytics services to property and casualty insurance carriers. Referencing announcements made earlier this year regarding joint ventures between Google and Fiat Chrysler and between Uber and Volvo, Macauley said, "As cars become devices that we drive (or don't drive), and devices become more integrated with our transportation experience across modes, cross-pollination between tech companies and auto manufacturers is becoming a necessity."

However, what looks like cross-pollination to one observer can look like poaching to another. This is an understandable reaction on the part of the auto industry, Macauley pointed out. He noted that



what's happening here is, to some extent, the movement of a profitable but limited industry into fields that offer—for the victors—a lot more room in which to operate.

### More promising reward-to-punishment ratio

This is particularly important to a company such as Uber, which set out—effectively, according to most observers—to disrupt the taxi and limousine service industry. According to the Department of Commerce, the entire U.S. taxi and limousine industry last year generated revenues of about \$20-billion (all figures USD). Uber does not have a significant share of that market and they lost \$1-billion last year. They're now moving into autonomous trucking. As a \$9-trillion industry, trucking is 450-times larger than taxis and limo services. It's something with a more promising reward-to-punishment ratio.

Meanwhile, Tesla Motors CEO and visionary Elon Musk is sponsoring a design competition for something called the 'Hyperloop,' a system of metal pods running through buried pipeways that would allow people to travel from Los Angeles to San Francisco—a distance of 382-miles—in 35 minutes, at an average speed of 658mph. This would involve the solution of several as-yet-unsolved problems in physics, but Musk and the young scientists working on this believe it can be done. A team at Carnegie Mellon has come up with a concept it hopes will take home the grand prize in January.

This may be a great example of why it's better to have these two industries—tech and auto—working together rather than working separately, Macauley noted. "We do know that there's a tight, natural fit between these two industries, and that a shape-shifting will occur."

## Waterloo researchers to test self-driving car on Ontario roads

**Researchers** at the University of Waterloo will help move fully autonomous vehicles much closer to reality as they became the first to receive approval to test their innovations on all public roads in Ontario.

In a first for Canada, Ontario's Ministry of Transportation recently announced that the province approved Waterloo's three-year autonomous vehicle research program, under its AV pilot program. The Waterloo team is using a Lincoln MKZ hybrid sedan nicknamed Autonomoose.

"This is a direction in automotive engineering innovation that are we are proud to lead in Canada, and we applaud the Ontario Government for its foresight," says Pearl Sullivan, dean of the Faculty of Engineering at Waterloo. "As Canada's strongest research team in connected and autonomous vehicles, with engineering and computer science professors working in areas from embedded sensors, to advanced controls to artificial intelligence, we are very excited about this new frontier for piloting Waterloo innovations."

Fully connected to the Internet and featuring powerful computers to process and analyze data in real time, the test car includes technologies such as radar, sonar and lidar, as well as both inertial and vision sensors. A researcher will always be behind the wheel and ready to assume control at all times. The vehicle currently operates with some degree of self-driving capabilities, combining features such as adaptive cruise control to maintain a safe distance from other vehicles without intervention by the driver.

The goal of the research team, which includes nine professors working under the umbrella of the Waterloo Centre for Automotive Research (WatCAR), is to progressively add more automated features. Specific aims of the Waterloo project include improving automated driving in challenging Canadian weather conditions, further optimizing fuel efficiency to reduce emissions, and designing new computer-based controls. The researchers will test the vehicle everywhere from city streets to divided highways as they add and fine-tune new capabilities.

Initial industry partners in the project include AutonomouStuff, vendor of automated driving research development vehicles, and NVIDIA, manufacturer of an AI computer system known as Drive PX.

## BlackBerry creates innovation centre for connected, autonomous vehicles

**BlackBerry** has entered the race in connected and autonomous vehicle technology with its recent unveiling of its Autonomous Vehicle Innovation Centre (AVIC), to be housed within the firm's QNX facility in Ottawa.

The centre will accelerate the realization of connected and self-driving vehicles by developing production-ready software independently and in collaboration with partners in the private and public sector.

### Recruit and hire local software engineers

As part of this initiative, BlackBerry QNX plans to recruit and hire local software engineers to work on ongoing and emerging engineering projects for connected and autonomous cars. The Ministry of Transportation of Ontario recently approved BlackBerry QNX to test autonomous vehicles on Ontario roads as part of a pilot program. One of the centre's first projects will be supporting this pilot as well as BlackBerry QNX's work with the University of Waterloo, PolySync and Renesas Electronics to build an autonomous concept vehicle.

"Autonomous vehicles require software that is extremely sophisticated and highly secure," says John Chen, executive chairman and CEO of BlackBerry. "Our innovation track record in mobile security and our demonstrated leadership in automotive software make us ideally suited to dominate the market for embedded intelligence in the cars of the future."

### "Centre will create great middle-class jobs for Canadians," Trudeau

"This centre will create great middle-class jobs for Canadians, new opportunities for recent university graduates and further position Canada as a global hub for innovation," says Canadian Prime Minister Justin Trudeau.

BlackBerry QNX has been supplying mission-critical embedded software to the automotive industry for over 10 years and can be found in more than 60-million vehicles today. Millions of telematics-equipped cars on the road are using BlackBerry's Certicom security technology for communication authentication and authorization. Already a leading supplier of software for infotainment, acoustics, telematics and digital instrument clusters, BlackBerry QNX is extending its platform expertise into ADAS (Advanced Driver Assist Systems), CVAV (Connected Vehicle and Autonomous Vehicle) systems and secure Over the Air Software Update services.

Experts predict that 50 percent of all cars will connect to the cloud by 2020, and the wide range of 'connected things' could exceed 20 billion. In the coming hyper-connected world, cars will soon carry one of the highest concentrations of Internet of Things (IoT) edge nodes and sensors, generating a vast amount of valuable and actionable data. Anticipating this shift, BlackBerry is investing in key technologies and building a product portfolio that will provide the embedded intelligence that powers the core electronics of connected and autonomous cars.

## RS485 input isolated safety barrier is ultra-thin

**TD100W-EX-485** ultra-thin RS485 input isolated safety barrier supplies isolated dc power to the transmitters from security zone to danger zone, converts the RS-485 or RS-232 digital signal and transmit them to the security zone, while anti-interference capability of industrial production process control system increases to ensure system stability and reliability. 18-36Vdc input power is required to run this module. Device is mutually isolated, which allows it to provide the isolated 5V, 6V, 8V, 9V and 12V voltages.

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## Electromechanical components

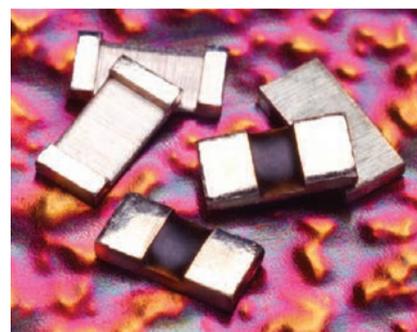
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sealing options, circuitry configurations, housing styles, mounting styles (including threaded or snap-in mounting) and termination options are integral to meeting these application requirements.

Combining innovative electromechanical designs with complete switch assemblies often affords customers greater flexibility and customization options that reduce assembly and manufacturing costs while improving performance and reliability. Working closely with the switch manufacturer to solve design problems and implement customized performance requirements can yield faster time-to-market by streamlining the prototyping and production ramp-up stages, thereby bringing the finished product to market more quickly.

For more information on customizing electromechanical components for automotive applications from C&K Switches, go to <http://ept.hotims.com/65985-62>



## Metal plate chip current sense resistors improve resistance values

**Resistance values** of the 1206 size TLR2B/2BW metal plate chip current sense resistors, have been expanded to now include 1mΩ and 1.5mΩ. The power rating for the 1206 chip size TLR2B is 0.5Watt and TLR2BW is 1Watt. These resistors feature a metal alloy to provide improved corrosion and heat resistance, with a small size surface mount type metal plate providing low resistance for current detection.

**KOA SPEER ELECTRONICS**

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# Cars reinvented: Huge new opportunities and dangers

By Dr Peter Harrop, chairman, IDTechEx

**The biggest change** in cars for 100-years is now starting, according to a report on electric car technology from IDTechEx.

It is driven by totally new requirements and capabilities. They will cause huge new businesses to appear but some giants currently making cars and their parts will spectacularly go bankrupt. Cities will ban private cars but encourage cars as autonomous taxis and rental vehicles. Already 65% of cars in China are bought by businesses. The Japanese want the car to be part of the hydrogen economy and a source of power when the next earthquakes and tsunamis hit. The emerging countries want car-like vehicles, mainly as taxis, that are one tenth of the cost and never refuel because the ample sunshine and wind will be grabbed and stored by the vehicle. There is even work on getting electricity from tires.

## China is key

Uniquely, there is a complete chapter on cars in China, the country that buys the most, has some of the lowest costs and leapfrogging innovation but completely different market drivers with the government controlling supply, demand and regulation. Even Chinese manufacturers do not know what comes next, some of which is naked protectionism and some of which, like the recent reintroduction of HEV financial support, a surprise for other reasons.

## Mechanics becomes electric

For cars, the mechanical world of cogs, axles, pistons and brakes is becoming one of power electronics, complex electric machine systems, batteries and their successors. Integration is the name of the game with components-in-a-box becoming smart wheels and smart inside and outside bodywork and seating. The dashboard and instruments will be made as one piece of formed composite with one company even planning highest-efficiency solar being the surface of this integrated dashboard to drive internal electrics. That featherweight solar layer was previously only affordable on satellites but its cost is promised to drop by one thousand.

## Structural electronics in cars

Results from the IDTechEx report tell us to think of optics, electrics, electronics and electrics combining in "structural electronics" to make the traditional component maker and assembler suddenly feel unwanted while there is a shortage of the new skills and manufacturing facilities.

Smart wheel systems could mean more space, less weight and better steering and performance in slippery conditions. Key enabling technologies rapidly move to batteries, power electronics and often multiple traction motors. Then comes very different energy storage, power electronics (now including many new forms energy harvesting including regeneration), signal electronics and reversing electric machines - often several per car and sometimes with the motor electronics costing more than the motor, Toyota tell us. Add software and services: big time.

## Surfing growth and collapse

The report shows peak car, peak HEV, peak PHEV and peak lead acid battery. For example, Nissan in Japan told us they have no plans to remove the lead acid battery from their pure electric cars but others are acting differently.

## Car-like vehicles emerging

The report finds a huge market emerging for the cheapest, easiest way of converting

existing production of cars to keep them legal as new global warming laws bite. This is the 48V mild hybrid: it will also peak in the next 15 years but, before that, it will transmogrify into a hugely popular form of electric vehicle by becoming capable of several pure electric modes with engine off. The Mercedes broad move to 48V MH in 2017 is only part of this story.

## Big picture reveals differently

The report takes a sober look at the detail reveals surprising aspects not popularly reported. For example, Fiat Chrysler is a laggard in EVs but they convinced us they are a leader in 48V MH. Why has Toyota just done a U turn on pure electric cars? Timing is all in this game.

## Energy independent cars

The analysis reveals when energy independent vehicles (EIVs) become significant, not least as cars. It exposes the world of LIDAR, RADAR, cameras, software and so on for autonomy with their relative importance changing rapidly. The price trends are dramatic. Is there a hare and tortoise story here with Tesla terrifying the industry by becoming the Apple of automotive, but acquiring major quality and financial challenges? Volkswagen and Daimler have become ambivalent about fuel cell cars. Some say they are the end game, Hyundai says they are an important option and yet others call them fool cells. Who is right? Will the Chinese flood the world with half-price basic electric cars? When?

## Big risks

It is very important that readers escape the evangelism of so many commentators and access the balanced analysis of companies such as IDTechEx. For example, it breaks all the rules of safe manufacturing to radically change your product while increasing production one hundredfold, yet we show how that is exactly what is happening with the lithium-ion batteries. Battery fires and explosions are ongoing but some car and battery makers have a superb record. Forecasts should not presume everything goes right. The anode, cathode, electrolyte and format are changing in a headlong race to smaller size and weight, less cooling and non-flammability.

For more information on the future of cars from IDTechEx, go to <http://ept.hotims.com/65985-63>



**IJA 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

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



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

- ◆ Only 1.0 in<sup>2</sup> Board Space
- ◆ 8 to 14V Input
- ◆ 0.6 - 2V Output
- ◆ Digital Adaptive Control
- ◆ Configurable Sequence and Fault Management

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

- ◆ Quarter Brick Footprint
- ◆ 48V Nominal Input
- ◆ 9.6 and 12V Output
- ◆ Up to 95% Operating Efficiency
- ◆ High True Usable Power

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**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>

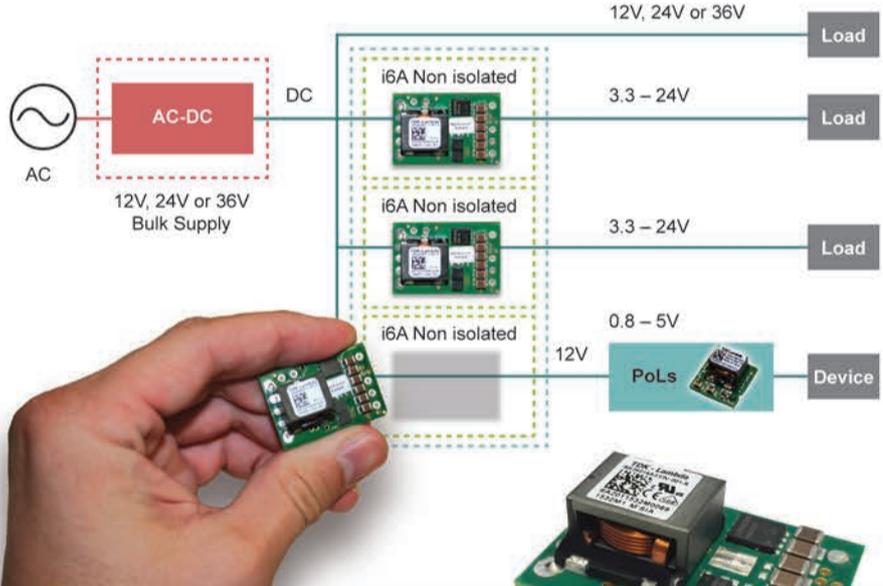


**ICH Series**  
12A Non-isolated SMT Point of Load

- ◆ 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

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

## 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

<http://ept.hotims.com/65985-12>

- ◆ 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





## ESD and heat protection considerations for LED design

By Sonja Brown, director of product marketing – piezo and protection devices, EPCOS, a TDK Group Company

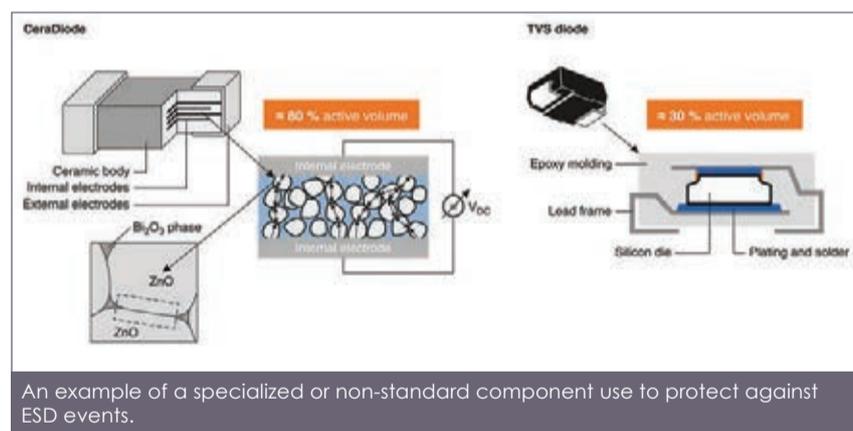
There are several factors that can affect solid state lighting in electronic design from stress issues, to packaging-related issues to component-related issues. Design engineers must take these factors into account. There are five key threats that affect the reliability of LED lighting systems in electronic designs:

- **Electrostatic discharge (ESD) events, including lightning**
- **Transient overcurrent events and surges**
- **Current and voltage spikes during hot swapping**
- **Reverse voltage effects**
- **Overtemperature protection**

For LED lighting systems to be reliable, all of the components and subsystems must be protected effectively against these dangers, which are encountered during assembly, maintenance and operation. High-performance ESD and overtemperature protection can protect against these dangers, resulting in a longer lifetime, lower maintenance costs and increased reliability of the LED lighting system. The use of high-quality protection ESD and overtemperature components provide effective and cost-efficient protection for LED arrays, their power supplies and control circuits.

### LED system overview

A LED bulb – or more technically, a luminaire – is made up of three basic subsystems: an LED power supply, a power-input connection to the grid, and an LED engine. The LED engine can be further broken down into LED arrays, LED drivers and control units.



Over the past several years, smart LED luminaires have gained popularity due to features including remote control and maintenance. Because of this, a fourth subsystem - communication power supplies and interfaces – is also often integrated into the luminaires. This allows smart networked lighting systems to be deployed that maximize the efficiency and quality of lighting, and helps facility managers know the status of each luminaire for maintenance.

As the LED lighting system technology has matured, engineers realized they needed a way to prevent ESD events and high energy surges from affecting the luminaire and to ensure system reliability. These surges can cause both immediate failures (often at a junction) and an increased rate of degradation caused by latent damage. Each of the four subsystems can be exposed to events that cause this kind of damage. As engineers review

the energy levels of possible events, they can determine what suitable protection devices are needed.

### High-energy surges

Voltage-dependent resistors, also known as varistors, have long been a solution of choice for overvoltage protection. This is because the electrical resistance varies with the applied voltage. Engineers should select varistors that are designed to hold up to the conditions of the end application.

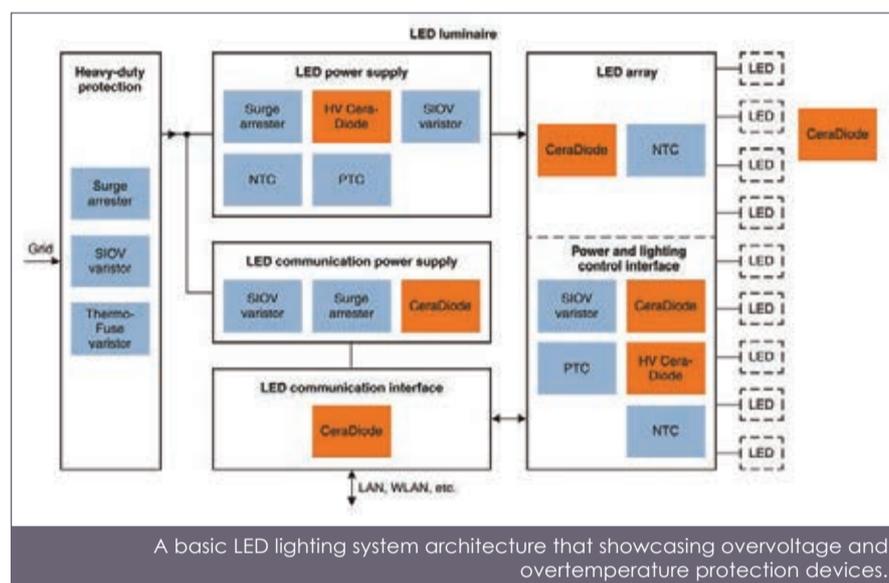
Take for example the protection of power supplies. Metal oxide varistors are especially well-suited to protect the power supplies of LED lighting systems from larger energetic surges. The design may specify varistors that feature a compact design, or that provide protection against big ESD events such as lightning strikes. And, due to the harsh nature of the elements and cost of maintenance, LED lighting systems designed for streetlights should meet both ANSI/IEEE C62.41.2 and the DOE MSSLC Model Specification for LED roadway luminaires. In these cases, surge arresters combined with varistors offer a space-saving integrated solution with the most ideal performance.

In the power input connection, a single package consisting of a disk varistor connected in series with a thermally coupled fuse is best suited to provide the protection required. In this case, if the varistor overheats, the thermal fuse – which is encapsulated in a plastic housing – disconnects the varistor from the power circuit preventing fire, safely shutting down the system.

### Low-energy and ESD discharges

Transient-voltage-suppression (TVS) diodes have been used for many years to protect circuits from low-voltage ESD events below 25 Joules. However, multilayer varistors offer important advantages over traditional TVS diodes. These include more miniature sizes and insertion heights, more dependable performance, faster response times and better overall operation across wide temperature ranges. In addition, TVS diodes can effectively be used to meet the absorption requirements in relation to component size.

LED engines can consist of hundreds of LEDs which are normally series-connected strings, parallel-connected strings or a combination of both. If one LED fails in a series-connected string, the entire series will fail. This is because LEDs in a series-connected string can cause an antenna effect making the array more sensitive



to ESD events. Multilayer varistors can provide protection against such events.

Networks are often reconfigured, moved, replaced and taken offline for maintenance. Consequently, hot swapping is a common practice and hotswapping can cause ESD events and low-voltage spikes. Multilayer varistors or TVS diodes that have extremely low parasitic capacitance are preferred for the ESD protection of data lines for the control of luminaires.

### Diodes vs varistors

Diodes and varistors are designed to meet unique design challenges for many applications. These solutions are often ruggedized, have a much smaller footprint, or are designed to protect against certain types of surge currents.

For example, the EPCOS CeraDiode from TDK is designed to absorb high energy at a better rate than TVS diodes and has a smaller footprint. 80 percent of the component volume of this product is used to absorb the energy ESD events, which is superior to the 30 percent of standard TVS diodes – and it has the same performance. Because of this, non-standard parts should be considered if they can help minimize space requirements and provide an identical or improved performance. This is particularly important in applications that require miniaturization, reliable protection and high performance.

Another example is bidirectional protection against ESD and transient disturbances provided by multilayer varistors. A typical TVS diode is inherently unidirectional, making it necessary to design in two diodes. However, varistors provide bidirectional protection as a single component with the same protection.

Other varistors provide reliable performance at higher temperatures. A typical TVS diode starts derating at room temperature, which is much lower than many applications require, making it crucial to select a varistor that can operate reliably over a very large temperature spectrum, thereby limiting failures caused by temperature fluctuation.

### Temperature protection

In most cases, sudden failures in LED lighting systems are caused by thermal stresses. Because LEDs require a constant current to deliver an uninterrupted luminance, their temperature must be controlled precisely within narrow limits. Thermistors, or thermally sensitive resistors, are an accurate and cost-effective sensor for measuring temperature.

A thermistor is a device whose electrical resistance is controlled by temperature. There are two types of thermistors: NTC thermistors and PTC thermistors. In NTC thermistors, or negative temperature coefficient thermistors, resistance decreases as temperature increases. In PTC thermistors, or positive temperature coefficient thermistors, resistance increases as temperature increases.

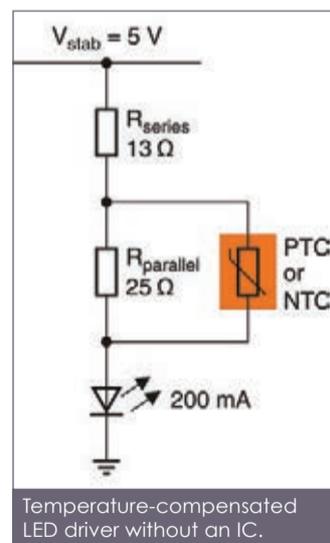
NTC thermistors come in surface mounted design (SMD) packages and protect the LED arrays against overheating and help control their temperature profile at peak lumen efficiency. This is performed by

automatically adjusting the current to the LEDs. Together with intelligent circuits, they enable an effective control system.

In temperature-compensated LED driver designs without integrated circuits, PTC thermistors can reduce the high temperatures of the forward current by placing them in series to the LED. In such a design, most of the LED current flows via the PTC thermistors.

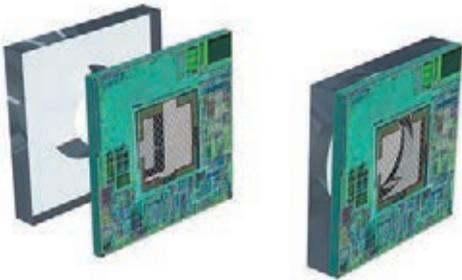
As LED technology continues to mature, design engineers can increasingly prevent the high- and low-energy surges and ESD events that

affect LED reliability by simply determining the most suitable protection devices that are required by the application. In addition, they can also plan for the proper temperature protection needed in their applications, thereby keeping the lights on in a very literal way.



For more information on solid state lighting from EPCOS, a TDK Group Company, go to <http://ept.hotims.com/65985-67>

## Compact, robust sensor IC comes with accurate sensor functionality



**MLX90819 sensor IC** is targeted at measuring mid pressure (10-50bar) levels, applying its proprietary micro-electro-mechanical system (MEMS) technology. Available as a bare die, device runs off a standard 5V supply and can be employed to accurately determine fluid pressure levels in wide variety of automotive and industrial focused applications. Device has a 1ms

response time, plus  $\pm 2.5\%$  over life accuracy and  $\pm 0.2\%$  linearity across its entire operational pressure range.

**MELEXIS**

<http://ept.hotims.com/65985-68>



## Nureva creates a 30' immersive display experience

**Nureva Inc.**, Calgary, an award-winning collaboration-solutions company, rolled out its creation of a 30' (9.1m) immersive collaboration environment that surrounds teams with their digital content. The surround experience is created by three panoramic projectors installed on adjoining walls and enabled by a multi-display setup tool in Span software.

This tool links the computers and merges the cloud-based canvas across the three systems. The resulting immersive environment gives teams a truly expansive view of their content, which comprises digital sticky notes, sketches, images and flip charts.

This configuration transforms huddle rooms into rich environments for creativity and innovation. As in any project room, team members benefit from being close to their content. Every detail is within easy reach, and content can be fluidly and efficiently moved across walls and around corners. Panning at any location seamlessly moves the whole canvas and its contents around all three walls.

### Links computers, merges cloud-based canvas

The result is more efficient collaboration and an enhanced sensory experience with users reporting reduced distractions and a heightened focus on their content. Team members can quickly identify connections, fill in gaps and see relationships that spark new ideas. In addition, the system's cloud-based software enables in-room and remote participants to access the material any time through personal devices.

"Wrapping a room with 30' of digital content takes immersive collaboration to a new level," says Nancy Knowlton, Nureva's CEO. "Creating a surround experience with the Span system was a logical next step to support the collaboration needs of our customers with products that fit with their processes and physical spaces."

The Span system combines one or multiple panoramic projectors with a projection surface and Span software to display an expansive digital canvas. Participants create and capture their ideas on their personal devices, either a computer or tablet and share them in the cloud. The system draws upon familiar, simple and flexible tools already widely used in paper-based collaboration processes including sticky notes, sketches, images and flip charts.



## High-intensity LEDs come in wide range of sizes

**670 Series LED Panel Mount Indicators** provide high-visibility and a wide range of sizes and operating voltage in high-durability housings. Devices provide high-intensity daylight visibility hundreds of times brighter than its 600 Series predecessor. Products are available in 2, 3.3, 6, 12 and 24Vdc operating voltages (depending on model). Each unit in the series consumes 90% less energy than equivalent incandescent indicators, while tolerating ambient temperatures from -20C to +75C and lasting up to 100,000 hours.

**DIALIGHT**

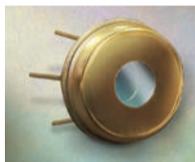
<http://ept.hotims.com/65985-69>

## Extreme ultraviolet (EUV) photodetector is low-noise

**SXUV20C** low-noise, extreme ultraviolet (EUV) photodetector provides a large 20mm<sup>2</sup> circular active area that delivers a substantial surface for easy alignment to the EUV laser. Device boosts responsivity in the 1nm to 200nm wavelength region and is stable over long periods of time when exposed to high intensity EUV energy. Device boosts hardness in extreme UV environments while providing lower noise than firm's previously released products.

**OPTO DIODE**

<http://ept.hotims.com/65985-70>



## LED driver IC saves 0.5W in backlighting

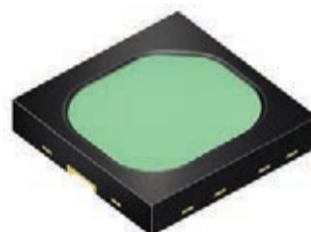
**ARC2C0608** ultra-high efficiency LED driver reduces losses in the LED boost by about 50%, resulting in savings of more than 0.5W for high brightness (400NIT) ultra-high-def (UHD) LED backlit displays, all in a very low profile solution size of 1mm or less. Device provides integrated programmable current sinks, suitable for driving up to six strings of LEDs, integrating all MOSFETs plus associated control and driver circuitry.

**ARCTIC SAND**

<http://ept.hotims.com/65985-71>



## Broadband infrared LED emitter serves near-infrared spectroscopy



**SFH 4735 LED** emits broadband infrared light in a wavelength range from 650 to 1,050 nanometers (nm). Device is based on a blue chip and a special phosphor converter. Product's main application is near-infrared spectroscopy for analyzing food quality. Infrared spectroscopy uses the characteristic absorption behavior of certain molecular compounds. If a defined spectrum is directed at a sample, it is possible to determine the

presence and quantity of certain ingredients from the wavelength distribution of the reflected light.

**OSRAM OPTO SEMICONDUCTORS**

<http://ept.hotims.com/65985-74>

## RGB LED provides independent control of red, green, blue chips

**VLMRGB6112** high-brightness, tricolor LED optimized for interior automotive lighting, RGB displays and backlighting. Device provides separate red, green and blue LED chips inside the compact 3.5 mm by 2.8mm by 1.45mm PLCC-6 surface-mount package. Device enables individual control of each chip, making it possible to realize every color within the color room defined by the gamut triangle area inside the CIE 1931 color space through color mixing.

**VISHAY INTERTECHNOLOGY**

<http://ept.hotims.com/65985-75>



## 7" 1,000 nits TFT suits industrial outdoor market

**Highbright WVGA 7-inch TFT display**, with LVDS or RGB interface and tape attached or optically bonded resistive and PCAP touch screens as standard options. Product allows the user to view what is being displayed even in direct sunlight. Device provides a contrast ratio of 500:1, an operating temp range of -20-+70C and a viewing cone of +/-70 in the horizontal and -70/50 in the vertical direction.

**AZ DISPLAYS**

<http://ept.hotims.com/65985-72>

## Opto reflector system mounts directly onto COB LED system

**Khatod Optoelectronic** reflector system can be directly mounted onto COB LED systems equipped with any standard adaptor or holder complying with Zhaga standard, having 35mm and 25mm spacing between the holes for the fixing screws. Product provides high diffusion flux and luminous intensity, without vibration problems. UV protected, product complies with UL94 specifications.

**DB LECTRO**

<http://ept.hotims.com/65985-73>

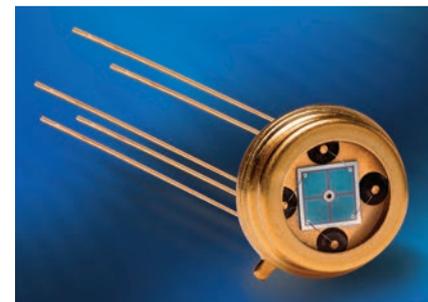


## Annular quadrant backscatter detectors operate at 350nm - 1100nm

**Annular Quadrant Silicon Photodiodes** operate between 350nm to 1100nm and are used for backscatter reflectivity measurements. The silicon (Si) quadrant detector provides an annular package design and includes a 200µm laser-cut hole on the chip and the header that enables a fiber to be coupled from the back of the detector. This ensures that the detector sensing area is always normal to the direction of the light, reducing the need for angular compensation during backscatter measurements. Available in T0-5 and T0-8 metal packages, the active area on each element is 1.6mm<sup>2</sup> and 19.6mm<sup>2</sup> respectively.

**OSI OPTOELECTRONICS**

<http://ept.hotims.com/65985-76>



## 2500W 1U high industrial power supplies have PMBus communications

RFE2500 ac-dc power supplies deliver up to 2500W output power in a low profile 1U package. Industrial units provide rugged screw terminal and bus-bar connections and are suitable for use in many applications requiring reliable 12V, 24V or 48V bulk power. Operating efficiencies of 90 to 93% minimize waste heat dissipation and eases system cooling requirements. With a universal input of 85 to 265Vac, unit is fully featured with ac fail, dc good, remote on/off, remote sense, a 12V 0.5A auxiliary supply, +/-20% output voltage adjustment (by either front panel potentiometer, external resistance or a 0-5V signal) and over current set point programming.



TDK-LAMBDA AMERICAS

<http://ept.hotims.com/65985-77>

## Rugged steel enclosures suit hazardous environments

Klippon TB (Terminal Box) range of hazardous area steel enclosures includes versions MH (Multi-Hinge), QL (Quarter-Lock) and FS (Fixed-Screw). Products provide a range of approvals that include cULus, AEx, ATEX and IECEx ratings, making them suitable for use in Class 1/Division 2 and Class 1/Zone 0, 1, 2, 20, 21 and 22. Units comply with the latest, stricter requirements covering equipment for use in potentially explosive atmospheres. Products carry ingress protection ratings of IP66/67 along with NEMA 3, 4X and 12. Extended heat and cold stability testing have been administered to document the enclosures ability to withstand extreme usage environments (336 hours at 155°C/311°F and -65°C/-85°F for 24 hours).



WEIDMULLER

<http://ept.hotims.com/65985-78>

## Durable labels withstand tough conditions

D1 and LW Durable Labels maintain safety in work environments and withstand the toughest conditions. Suitable for labeling shelves, warehousing, chemical storage, floor markers, equipment/inventory and more, the LW Durable Labels provide industrial-strength adhesive and a rugged coating that resists peeling and abrasion due to moisture and solvents to save safety managers time and frustration. Product sticks securely to challenging surfaces like metal tread plate, textured PVC, wood, glass, etc. Product has moisture-resistant design and withstands damp conditions up to 85% humidity. Product withstands a range of temperatures from 0° to 122°F / -18° to 50°C.



DYMO

<http://ept.hotims.com/65985-79>

## Laser wire stripping machine handles 50 to 6AWG cables

Mercury-4 laser wire stripping machine, designed by Laser Wire Solutions, strips wires and cables ranging in size from 50 to 6AWG and does not require any mechanical adjustments to process different wire sizes. Using the color touchscreen, the operator selects the desired stripping parameters from the programmed library and all parameters (strip lengths, laser power and speed, etc.) are automatically set. Once the operator selects the required program, the machine is ready for operation. Unit provides high quality, completely nick-free stripping every time and with non-contact, no wear parts.



SCHLEUNIGER

<http://ept.hotims.com/65985-80>

## 250W baseplate cooled quarter-brick dc-dc converter boosts efficiency

ICQ series 250 Watt isolated dc-dc quarter-brick converters are highly efficient, typically 92%, with a 4:1 (9 to 36 VDC) Vin range. Products are suitable for rough service/industrial applications and incorporate features such as a specially designed enclosed package that uses baseplate cooling to improve thermal performance. Devices deliver the full 225 Watt output power with a baseplate temperature in the range of -40 to +90°C without derating.



MURATA POWER SOLUTIONS

<http://ept.hotims.com/65985-81>

## Box, panel industrial PCs boost performance

Valueline powerful box and panel industrial PCs for state-of-the-art automation operating concepts, provides improved performance, comprehensive functions, versatility and attractive design. Units are robust and sturdy, thanks to glass front suitable for industrial use.

Products are available in numerous types and with various different functions. Reliable and durable, products include latest Intel Celeron and Intel Core i5 processors and comes with display size options 15.6" - 18.5" -21.5".

PHOENIX CONTACT

<http://ept.hotims.com/65985-82>



## Cooling fans are rated for IP69K protection



NMB Technologies IP69K rated cooling fans protect against closed range, high temperature and high pressure spray-downs. Units are designed to be protected from environmental factors, and suit extreme environment applications. Product

series is available in 12Vdc, 24Vdc and 48Vdc, with air flow from 8 to 346 CFM. Sizes available include 40mm, 60mm, 92mm, 120mm, 150mm and 175mm. Designed with a new, high reliability in high temperature metal casing, plastic magnet and if desired, stainless bearings with ceramic balls, and offer a life expectancy of 100,000 hours in 25°C.

CST ARWIN

<http://ept.hotims.com/65985-83>

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## Solder wire feeder enhances control, convenience

Metcal USF-1000 Solder Wire Feeder adds a new level of control and convenience to the soldering process. Designed to integrate easily with Metcal's MX-5200 or MX-500 series solder systems, product increases soldering speed while eliminating wasteful tangles and unspooling.

EMX ENTERPRISES

<http://ept.hotims.com/65985-84>



### Modular subracks mount on 3U, 6U and custom sized boards

Modular subracks mount on 3U and 6U high or 4U and 7U custom sized boards and allow for spacing for fans. Units come in 84HP (for 19" rackmount size), 42HP and 21HP widths. The extruded rails feature tapped holes and optional extensions for IEEE injector/ejector latches. Multiple depth options are available and EMC versions are also standard. Ruggedized versions of subracks and rail components are available.

**PIXUS TECHNOLOGIES**

<http://ept.hotims.com/65985-85>

### Ac-dc converter targets medical applications

15W LH15-20BxxMU and 25W LH25-20BxxMU series 15W/25W medical ac-dc converters target medical applications, providing reinforced insulation design, 4000VAC high isolation and low leakage current (<100µA) together with output short-circuit, over-current and over-voltage protections to ensure the safety of patients and the system. Both series meet medical design standard EN60601-1 and ANSI/AAMI ES60601-1 (3rd edition, 2xMOPP). Products provide high efficiency up to 89% and low standby power consumption less than 0.1W to save energy effectively.



**MORNSUN**

<http://ept.hotims.com/65985-86>

### 5-Way switch based joystick delivers four directional outputs

NV series switch-based miniature industrial joystick provides four directional outputs plus a fifth center pushbutton option that provides a positive, tactile feedback in all directions for precise and secure fingertip control.



The compact 16mm devices are available with either a castle or conical shaped actuator and numerous color options. With a chrome-plated metal case and IP69K sealing, the durable devices withstand all types of adverse conditions such as water, frost, dust, sand and hydrocarbons, while maintaining its tactile feedback during excessive shock and vibration. Rated at over 1 million mechanical lifecycles per direction, the ergonomic, customizable and robust devices are suitable in remote control applications.

**APEM**

<http://ept.hotims.com/65985-87>

### Human vision components module speeds recognition

HVC-P2 Human Vision Components (HVC) module has a maximum recognition speed 10-times that of the previous model. Device is offered in long-distance and wide-angle detection types, provides users more choice to fit their application(s). Product can be utilized in varying environments, while also serving to recognize users needs allow applications to provide a more comfortable lifestyle. Lens choices between wide-angle type and long-distance type depending on detection distance and range needs. Horizontal angles of views from approximately 50 to 90-degrees and vertical angles of view from approximately 40 to 70-degrees.



**OMRON**

<http://ept.hotims.com/65985-88>

### Signal analysis solution combines 800MHz RT bandwidth with streaming storage



RSA7100A wideband signal analysis solution combines 800MHz of real-time bandwidth with up to two hours of streaming storage at full bandwidth in one solution. Unit's 16kHz to 26.5GHz frequency range covers a broad range of analysis needs for critical wide-bandwidth applications. Product reduces the cost of wideband signal capture, record and analysis while increasing the likelihood of capturing wideband signal transients. Unit can trigger on and measure signals of just 700ns duration in the

frequency domain in real time while offering in-depth signal analysis with SignalVu-PC RF and vector analysis software.

**TEKTRONIX**

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# ProductSource

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## MSM LA CS: Robust Metal Pushbutton Switch with Ceramic Actuator

SCHURTER's MSM LA CS, stainless steel pushbutton switch features an abrasion-proof ceramic actuator with latching action. Maximum switching current 16 A at 250 VAC, uprated from 12 A. Rated IP64 from front contact area, IK 07 for impact resistance. 19 and 22mm mounting options. UL, CSA, ENEC & CQC approvals.



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msm-la-cs.schurter.com

<http://ept.hotims.com/65985-14>

## UL Listed fiber-optic patch cables

Phoenix Contact introduces UL Listed fiber-optic patch cables: the first on the market to meet UL 746C. These patch cables range from transmission categories OM1 through OM4. Preassembled and available in 1-meter, 2-meter and customized cable lengths. Users can choose from LC-Duplex, SC-Duplex, B-FOC (ST), SC-RJ, and FSMA connectors. All IP20 patch cables provide excellent optical and mechanical transmission properties, including a customized measurement report for insertion and return loss.



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## Filter Connectors

CONEC uses the patented planar filter technology ensuring high-quality filtering in high frequency ranges.



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## The Most Versatile Cut & Strip Platform

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



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## Highly accurate NTC Thermistors

EPCOS NTC (negative temperature coefficient) thermistors by TDK Corporation offer very accurate sensing elements for temperature measurement and compensation.



EPCOS NTC thermistors feature superior performance in high stability applications, precise temperature sensing up to +150 °C, short response time and are AEC-Q200 qualified. Available case sizes 0402 and 0603.

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**TDK**

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## Omron's New D2AW Sealed Ultra-Subminiature Basic Switch

Long stroke sealed switch (IP67 rated) with high reliability and high insulation performance. Also includes quiet operation via sliding contact construction. Used for transportation and wet home appliance applications. Other sealed switches include D2QW, D2HW, D2VW, D2SW. Click below for more information.



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## products on review

### No-clean liquid flux applies with lead-free, tin lead solder

AIM SOLDER FX16 alcohol-based no-clean liquid flux is formulated for lead-free and tin-lead soldering operations. Product provides powerful wetting and enhances soldering on all surface finishes including OSP and immersion tin. Product will reduce flagging and tailing defects for both wave and selective soldering and has a sealed shelf life of one year when stored at room temperature. Formulated for application via spray, brush or dip, product leaves very low post-process residues that are electrically safe even without heating.

COMTREE

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### Railway inverters deliver 3-phase pure sine wave output

CTP-300R-F7 Series 3-phase 300VA sine wave inverters for railway applications meet the stringent requirements of EN50155 for electronic equipment used on rolling stock. Devices deliver a 3-phase output of 208Vrms, line-to-line, at 60 or 400Hz. A 115Vrms phase-to-neutral output can also be used. Products operate from wide EN50155 input ranges of 24Vdc (17-34V), 36Vdc (25-51V), 48Vdc (33-67V), 72Vdc (50-101V), 96Vdc (67-135V) or 110Vdc (77-154V).

ABSOLUTE ELECTRONICS

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### Power supply supports printer applications up to 500W

MFPDF-500L-24 500 Watt single output power supply with built-in active PFC function (PF>0.95) is high efficiency. Unit provides universal 90 to 264Vac ac input, delivering long life and high reliability. Product comes with a wide operating ambient temperature range of -30C thru 70C and provides a 150%(750W) peak load capacity. Complete with constant current output, device has build-in remote ON-OFF control, plus a 1U low profile of 40.7mm.

MEGA ELECTRONICS

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### Absolute electric rotary encoders have 17 bit resolution

Netzer Precision DS-25 absolute electric rotary encoders provide many advantages, including 17 bit resolution and < 0.025° accuracy. The lightweight miniature devices provide analog Sin/Cos, Digital SSI, BiSS-C output options. Products come with hollow floating shaft, as well as no bearing or other contact. Devices come with total weight of 4gr and a low profile of 7mm.

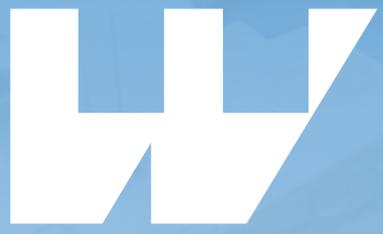
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