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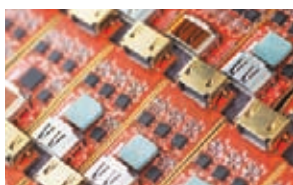
electronic products and technology - JUNE-JULY 2016

## MEDICAL COMPONENTS

medical components

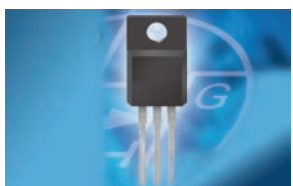


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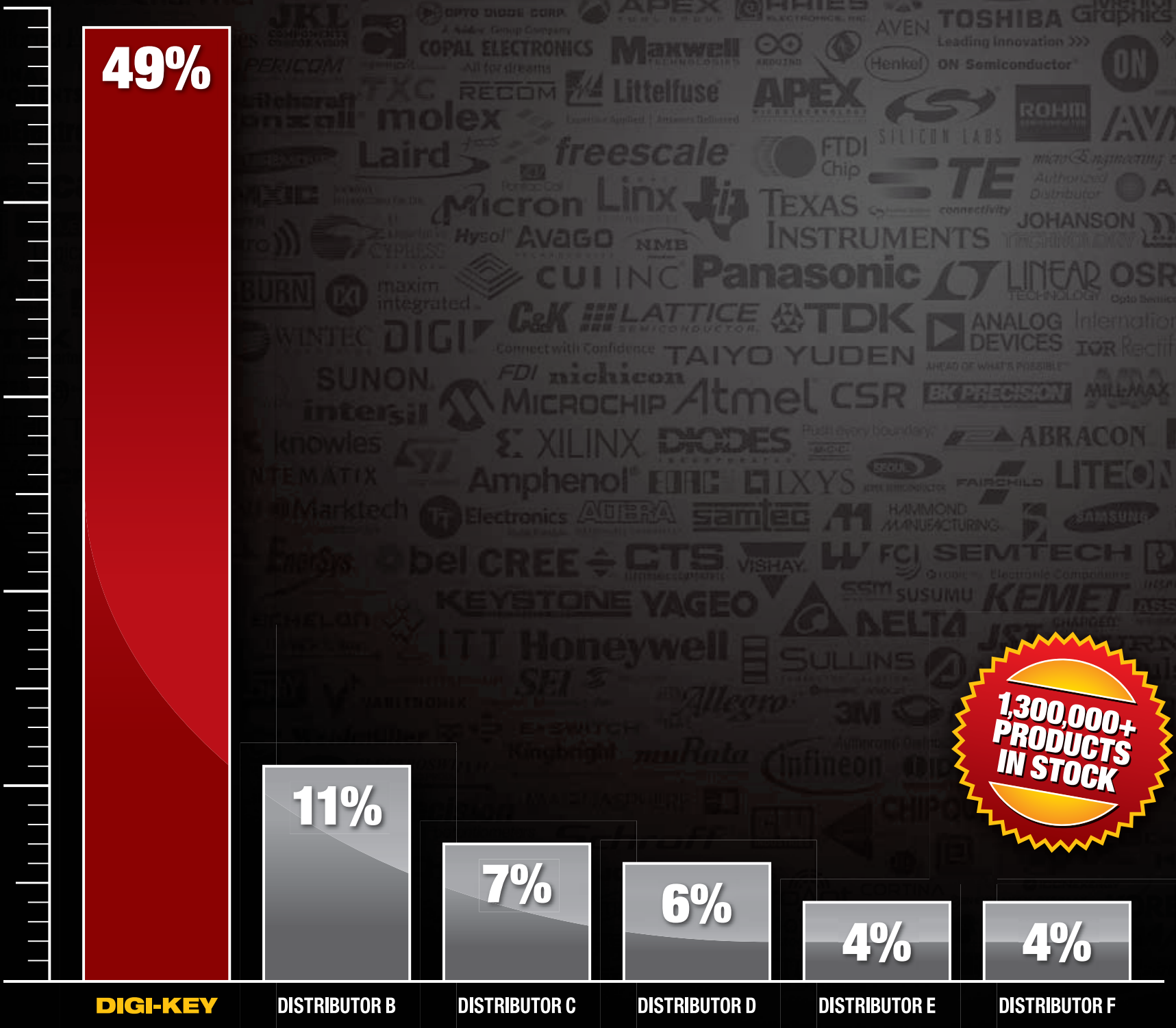


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## OCE Discovery unearths, rewards tech innovations

Marking its 11th year of showcasing some of the most exciting ground-level tech innovations coming out of Ontario, the OCE Discovery event returned to the Metro Convention Centre in Toronto this spring, wowing visitors with examples of what's next in sectors as diverse as cleantech, advanced manufacturing, advanced health, digital technology and aerospace.

The event reached new heights in quality programming with two world-class keynotes, stimulating panel discussions, high stakes pitch competitions and an interesting showcase of exciting new technologies on display. The two-day gathering also featured a number of design-related competitions including the David McFadden Energy Entrepreneur Challenge, carrying the theme of 'Conservation as a tool for meeting the world's energy challenges'. Founders of Toronto-based Argentum Electronics, a solar energy startup based at the Innovation Centre for Urban Energy (iCUE) at Ryerson University captured top mention for its development of smart power electronics and charge controllers for the solar industry. The firm's solar charge controller aims to extract the most energy out of solar panels. So far, the team has developed a working prototype, which they plan to eventually commercialize.

Argentum Electronics' founders and electrical engineering students at Ryerson Bolis Ibrahim and Oleh Zhyhinas received \$25,000 and a suite of business services to assist in advancing their winning business concept. This adds to their earlier financial support derived from winning Ryerson's own Norman Esch

Engineering Innovation and Entrepreneurship Awards.

Toronto-based iMerciv Inc. won the Tech Pitch Competition with The BuzzClip, a wearable obstacle detection for the blind or partially sighted. The small, discreet and versatile wearable uses ultrasound to detect obstacles that may lie directly in one's path. It then notifies the user of these obstacles through intuitive vibrations, allowing the user to safely navigate around any objects that they may encounter.

The device features a sensor with dual range detection at both one and two metres. A spring loaded arm lets the user know when obstacles are in their proximity through intuitive vibrations.

iMerciv co-founders Bin Liu and Arjun Mali captured \$20,000 in prize money, going up against 35 Ontario-based companies that exhibited their accessibility-focused innovation on the exhibit floor. The showcase helped bring a broader awareness of the companies that exist in this niche market, exposed companies to potential private investors and engaged the entire innovation ecosystem.

It is these types of innovative minds and initiatives that Canada, not just Ontario - needs to continue propagating in order for our electronic design community to remain vibrant, alive and relevant.

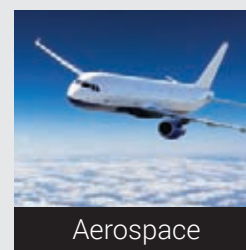
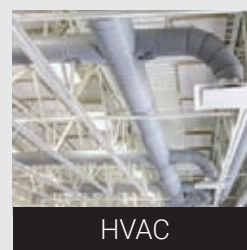
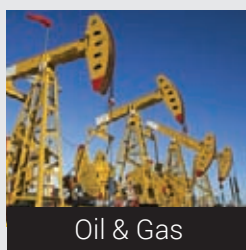
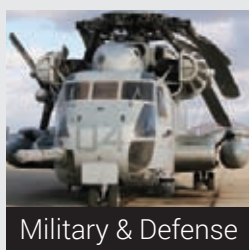
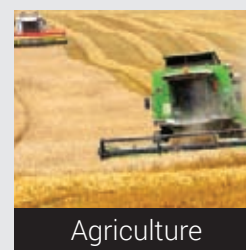
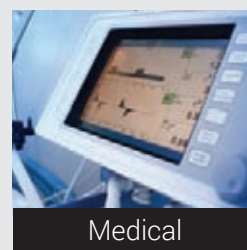
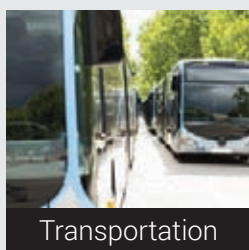
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# NEWSWATCH

## Lazaridis Institute, Communitech to help tech firms

The Lazaridis Institute for the Management of Technology Enterprises in Waterloo ON announced a partnership with Communitech to help small and medium-sized technology firms in Canada scale more rapidly into globally competitive enterprises.

Steve Currie, vice-president of strategy at Communitech says Canada has one of the most successful entrepreneurial ecosystems in the world, as demonstrated by a strong pipeline of thousands of technology start-ups. But Canada's tech industry cannot thrive on start-ups alone. Of the more than 36,000 technology companies in Canada, fewer than 5% are high-growth companies at the scale that provides the majority of net job growth. These companies – scale-ups – are the key to unlocking greater economic prosperity for Canada, Currie adds.

### A scale-up requires a different mindset

To build a globally competitive tech company, a scale-up requires a different mindset and development focus than that which suits the early stages of growth. Recent Lazaridis Institute research indicates that the primary barrier for scale-ups is access to experienced executives who understand the complexities and speed of today's dynamic technology markets. There is a shortage in Canada of tech executives with deep experience in selling, marketing, organizational design and the capture of international markets. The mandate of the Lazaridis Institute, which is located within the Lazaridis School of Business & Economics at Wilfrid Laurier University, is to enlarge the talent pool by better preparing current and future generations of Canadian executives for the management of rapid and continued growth in the tech sector.

The partnership between Communitech and the Lazaridis Institute will focus on how to best support growth-oriented small and medium-sized Canadian tech companies in the cultivation of the management talent they need to compete successfully in global markets. As a first step, Communitech will assist the Lazaridis Institute in developing an assessment tool to measure key indicators of management capacity and operational readiness in scale-up and potential scale-up companies.

## Tech initiative develops patented OLED backplanes

Christie's Advanced Technology Group is working in collaboration with DifTek Lasers Inc. along with researchers at the University of Waterloo and Conestoga College, in investigating how to merge the high brightness of LEDs with the cost effectiveness and fill-factor of LCDs into an OLED display.

Working with Christie's Advanced Technology Group, DifTek Lasers patented the technology and manufacturing process, and the group is working with Conestoga College's Centre for Advanced Manufacturing to begin scaling up the size of the backplanes that are manufactured. Although this technology is still in the experimentation phase, the goal of this patented technology is to apply it to the manufacture of large displays.

"The fundamental problem with the current production methods for OLED panels is the low-quality semiconductor materials that manufacturers use to make the transistors on the active-matrix backplane," says John Vieth, senior director, Advanced Technology Group, Christie. "We've invented, and are now refining, a process for manufacturing backplanes incorporating the same crystalline Silicon semiconductor material used in computers that will support the high current and fast switching required for OLED displays."

In a paper presented at the Society for Information Display's Display Week 2016, Vieth and co-authors summarize this new backplane technology, saying, "By embedding single crystal silicon spheres in ceramic substrates and planarizing the surface, large area substrates with high mobility silicon can be realized. By utilizing well-established, high-performance and low-cost processes for the manufacture, scalability, placement and planarization of single crystal silicon particles, it is now possible to manufacture large-area, high-performance and planar electronic backplanes. We have achieved device performance 300 times that of devices found in today's liquid crystal displays."

Says Vieth, "Right now, we're working on a display that's just a 16 x 16 pixel square, but we're excited by the possibility of manufacturing OLED backplanes in large panels for commercial applications. We think the low cost and high-brightness of our OLED panels will be attractive to the display market."

Together, DifTek Lasers Inc. and Christie are seeking relationships with other parties with operations in display panel manufacturing to join in the commercialization of this exciting advance in display technology that will set new cost/performance benchmarks.

## Harting hosts its annual open house at EDS

### Unveils new tools, products and initiatives - honors outstanding distributor partners

Harting held its annual open house and delivered its distributor awards at the Electronics Distribution Show (EDS) in Las Vegas this spring. This annual tradition gives its distribution partners the opportunity to see the company's latest initiatives and products, according to Jon DeSouza, president & CEO of Harting Canada Inc.

This year's theme 'Driving the Industry,' focused on the expansion of Harting's educational tools, expansion into Mexico and new products including the Han ES and the Hermes Award winning IIC MICA device. The event began with a presentation by DeSouza and Philip Harting, president/partner and chairman of the Harting Technology Group.

Last year, Harting made a promise to expand its educational tools for the market with the creation of the Harting Roadshow Truck, Harting Knowledge Center Content Hub App, and expansion of HARTING-U.com. This year, the firm fulfilled that promise and brought those tools into the hall for visitors to experience first-hand. Booth visitors were treated to a tour of the Roadshow Truck by Harting's technical experts and invited to schedule the truck to come to their customers.

Harting also demonstrated its VideoCall an Expert service to partners, which allows customers to video chat with a technical expert offering real-time support and eliminating the wait for email responses or the difficulty of explaining a problem over the phone.

### Delivering new solutions

Harting launched the Han ES Press connect, which provides conductor termination technology based on the cage clamp termination, allowing simple, quick and vibration-proof assembly of conductors with or without ferrule. The Han ES Press plug-in jumpers also enable multiple contacts to be bridged directly at the connector. Dr. Jan Regtmeier, director of product management demonstrated Harting's Hermes Award winning IIC MICA product, captured during the Hannover Messe show in Germany this spring. MICA (Modular Industry Computing Architecture) is a modular platform of open hardware and software that can be swiftly and economically adapted to many industrial application areas.

Harting shared its latest expansion plans, which includes opening a sales office in Mexico City, as well as a manufacturing facility in Silao in July. The Harting Mexico facility is an important step forward in Harting's strategy, aimed at bringing them closer to their North American customers.

### Distributor awards

Fittingly at the EDS Show, Harting handed out its annual distributor awards in four different categories:

- Allied Electronics took home two awards for Distributor of the Year and New Product Sales Growth. In 2015 Allied Electronics grew sales and new product revenue more than any other distributor and displayed an overall outstanding partnership with Harting.
- Mouser Electronics was awarded New Customer Growth for gaining more new Harting customers than any other distributor that year.
- Arrow Electronics was presented the award Digital Marketing Partner of the Year.

## Queen's University to unveil world's first wireless flexible smartphone

Researchers at Queen's University's Human Media Lab have developed the world's first full-colour, high-resolution and wireless flexible smartphone to combine multitouch with bend input. The phone, which they have named ReFlex, allows users to experience physical tactile feedback when interacting with their apps through bend gestures.

"This represents a completely new way of physical interaction with flexible smartphones" says Roel Vertegaal (School of Computing), director of the Human Media Lab at Queen's University.

"When this smartphone is bent down on the right, pages flip through the fingers from right to left, just like they would in a book. More extreme bends speed up the page flips. Users can feel the sensation of the page moving through their fingertips via a detailed vibration of the phone. This allows eyes-free navigation, making it easier for users to keep track of where they are in a document."

ReFlex is based on a high definition 720p LG Display Flexible OLED touch screen powered by an Android 4.4 "KitKat" board mounted to the side of the display. Bend sensors behind the display sense the force with which a user bends the screen, which is made available to apps for use as input. ReFlex also features a voice coil that allows the phone to simulate forces and friction through highly detailed vibrations of the display. Combined with the passive force feedback felt when bending the display, this allows for a highly realistic simulation of physical forces when interacting with virtual objects.

"This allows for the most accurate physical simulation of interacting with virtual data possible on a smartphone today," says Dr. Vertegaal. "When a user plays the 'Angry Birds' game with ReFlex, they bend the screen to stretch the sling shot. As the rubber band expands, users experience vibrations that simulate those of a real stretching rubber band. When released, the band snaps, sending a jolt through the phone and sending the bird flying across the screen."

Dr. Vertegaal thinks bendable, flexible smartphones will be in the hands of consumers within five years. Queen's researchers will unveil the ReFlex prototype at the tenth anniversary Conference on Tangible Embedded and Embodied Interaction (TEI) conference in Eindhoven, The Netherlands on February 17, 2017.



Harting captured the highly regarded Hermes Award during the Hannover Messe show in Germany this spring for its IIC MICA product. MICA (Modular Industry Computing Architecture) is a modular platform of open hardware and software that can be swiftly and economically adapted to many industrial application areas.

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## Supply Chain Management

# Production considerations for start-ups

## Understanding the pitfalls and demands of bringing new hardware to market

By Marjory Craw-Ivanco, V.P. operations, Urtech Manufacturing



### The idea

There is nothing more exciting than having that 'Eureka' moment, when you have an outstanding idea that you are convinced it will become the next revolutionary trend breaking, phenomenal device. You talk to friends and colleagues who are blown away by your ability to innovate. However, before you run out and remortgage your (or your parents) house, please consider the following key pieces of advice and potential guidance from someone who has navigated the world of hardware design, new product launch and product sustainability and evolution.



**Know your funding sources:** There is a big difference between getting a loan from friends and family, a crowdfunding source and the bank. Understand the scope of the financing available, the expected returns and the time frame till profitability is required. Funding mechanisms can very quickly influence your flexibility and schedule.

**Think about building your sales channels:** It's all very well to have product, but getting out there at the right time and in the right locations will be critical to your success.

**Know your time to market:** Factor in everything not just the design time.

### Proof of concept

Once you have considered all of these factors then you might be ready to move forward to your proof of concept. The proof of concept (first prototype) could be constructed on a bench in a lab or the garage, but once you have determined that the concept works and you have made whatever iterations you deem necessary, you may then transition to a functional prototype.

### The functional prototype

The functional or working prototype generally has the form, fit and function of your final product. This may be developed with rudimentary electronics and 3D printed plastics and casings, but it should be good enough to help support your funding campaigns. Once you are happy with the functional prototype it is time to think about how you will build in volume. A key consideration is 'design for manufacturing'.

### Design for manufacturing

When you employ DFM tools then details such as: component selection, processing parameters, functional test systems and ease of assembly can be modified to ensure the highest possible yield and the lowest possible cost.

At this stage, you may also wish to consider some form of reliability testing, either drop tests, temperature and humidity cycling or shipping tests to ensure that once released to the market the product can be shipped and distributed safely.

### Supply chain

Make sure you select good parts. Part selection is critical for a number of reasons ranging from functionality to continuity of supply and delivery. This may be of particular importance if you identify a custom part, be sure whoever is involved in the delivery of the custom part has scalability. It may also be wise to engage your factory partner on alternate component selections and alternate vendor lists to mitigate risks (and costs) associated with supply.

### Certification

Often times in order to sell, or give away, a few units you may not need any type of product certification. However, before you start building your product in volume you will need to seek approval at a certified lab, to demonstrate that your product conforms to FCC, or CSA or UL. Depending on the product functionality. This is likely also a good time to research product assurances.

### Manufacturing

The next step is to choose your factory partner. This is a very critical step in your launch process. Although a great deal of manufacturing has transitioned to Asia or Mexico over the past decade - driven by what is considered to be lower cost manufacturing facilities - a new company should carefully consider the actual landed cost of pursuing this option. Typically, in order to be fully successful with a product launch overseas, companies have to install several engineers in the facility for extended periods of time to ensure build and design protocols are adhered to. Of course, it is possible to work with one of the very large contract manufacturers, however, being a small fish in a big pond can have its drawbacks for relatively small start-up companies.

Before heading overseas, it may make sense to check-out some local facilities to begin the production process. It will be easier to communicate and control the process, monitor quality and make any necessary last minute changes. Indeed, we at Urtech Manufacturing, have several North American customers who have decided to 're-shore' its off-shore activities at our factory in Burlington, Ontario due to quality, price, proximity, delivery and the convenience of working right here at home.

### Software/firmware & product testing

Firmware changes frequently, particularly in new product design. Consider how and where you want to program any devices, either pre-build or post build. Also product testing is critical to ensure product quality prior to shipping. Often times during product development new companies do not have the resource bandwidth to develop product test. This is where a good factory partner can assist you in ensuring the test coverage is suitable and adequate for your circumstances.

### Packing, shipping and fulfilment

Of course, there are several ways this can be done. Bulk shipments from the

factory to your facility may be the process that you would like to use if you would like to own the final touch on the product before it reaches the end customer. For individual consumer commercial distribution it may be necessary to have specially designed point of sale boxes that are packed with various accessories and the necessary cosmetic guidelines that reflect the brand of your product. These boxes would then be introduced to a master carton for shipping. Prior to shipping, all of the packaging material should be tested to ensure that the packages maintain integrity during the shipping process.

### Reverse logistics

One very important consideration that should not be forgotten, is that sometimes devices fail in the field. When they do, they need to be replaced and repaired or recycled. Understanding and assessing the field fail rate is a very important factor in establishing the overall technical and financial success of your product.



### The level headed review

Almost by definition, one must consider a start-up as an organization dedicated to creating something new under conditions of extreme uncertainty. Before you venture into the arena please consider the following:

**Know your why:** Not only is it important to understand the functionality of your product and the value it will bring to your customers but there is an innate requirement that, to embark on the rigorous journey of bringing a product to market, one needs to really understand why this product will be differentiated in the market, why is your product so special?

**Pick your co-founders:** It can become really tense during product design and launch. Make sure you know who you will be working with and their tolerance for risk.

**Identify your minimal viable product:** Hopefully your idea will be the first in a long series of innovations, but, don't lose your shirt until you have identified that there is a market for your product.

**Price your product (know your margin):** Create your brand. Brand definition and recognition can be really key differentiators. I, like most technical engineering types, never paid much attention to what the packaging looked like, as I was always more interested in functionality. Don't be fooled by function, in order to get people to try or test your device you must first get them to buy it, so branding is key.

### Overall guidance

Like many of you, we were a 'Start-up' only five short years ago. At Urtech, we completely understand the challenges associated with launching a new company while launching new products. Not only have we helped independent start-ups, within our facility, we have allocated space for small start-up companies to develop products and conducted proof-of-concept activities. By following these steps and by seeking more product specific guidance then your launch could be quite straightforward. If you need any help, please feel free to reach out.

For more information on contract manufacturing considerations for Urtech Manufacturing, go to <http://ept.hotims.com/61398-39>





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## Why buy authentic?

The counterfeiting of popular brands continues to increase each year, costing industries \$1.77 trillion annually. Specifically, electrical product counterfeiting makes up an estimated five to seven percent of world trade. These counterfeit devices, including circuit breakers, extension cords and surge protectors, are unsafe lookalikes that have the potential to harm both people and property.

According to Ontario Electrical Safety Authority's electrical safety report, the percentage of product safety investigations into devices with suspected counterfeit labels reached 16% in 2012. By 2013, the percentage rose to 38%. This is a disturbing trend that needs immediate attention across industries.

### Understand the dangers

It will take the collective efforts of industry professionals, organizations, manufacturers, governments and customers alike to remove these dangerous devices from the marketplace. However, these groups must first understand the dangers of non-genuine products, as well as how to both recognize and avoid them.

A counterfeit is a product, service or package for a product that uses, without authorization, the trademark, service mark or copyright of another intended to deceive prospective customers into believing that the product or service is genuine. Many of these components are

# The case against counterfeit products

## The importance of recognizing and reporting counterfeit components

By Tom Grace, manager, brand protection, Eaton's Electrical Sector – Americas

intended to serve as protective devices, and often made without regard for electrical safety or even meeting minimal performance specifications. The use of such counterfeit electrical devices can result in malfunctions causing overheating or short circuits that may lead to fires, shocks or explosions that can ultimately cost workers their lives and produce considerable property damage.

### Tips and best practices

So, what can industry professionals do to prevent these products from entering their work environments? Here are a few tips and best practices for avoiding, identifying and reporting suspect counterfeit electrical products.

**Purchase authentic products:** The best way to avoid counterfeit electrical products in the first place is to buy authentic from an authorized distributor or reseller. There is a higher risk of counterfeits if one cannot trace the path of commerce to the original manufacturer.

**Know what to look for:** Before you can report a counterfeit good, you need to know how to identify one. Counterfeiters are becoming more sophisticated, creating products that are difficult to recognize and using deception, the Internet, and prices below market level to attract buyers. Be sure to question any 'bargains' with prices that seem too good to be true, because they likely are. Saving a few dollars at first is not worth exposure to the long term safety risks that accompany faulty products.

Also, take note of any poor quality labels with legacy branding, missing date codes and extraneous markings or labels not applied by the original manufacturers. Any product that appears to have been tampered with, is missing information or is noticeably poorly made should raise a red flag. Take advantage of any authentication tools offered by manufacturers to confirm the authenticity of suspect products.

**Report counterfeit products:** If you come across a suspect product, report it to the brand owner immediately. The owner can then authenticate the device and remove it from the marketplace.

If you cannot get in touch with a brand owner, contact the Canadian Crime Stoppers Association at 1-800-222-8477 or by WebTip.

If everyone along the supply chain played an active role in stopping counterfeit electrical products from being bought and sold, it would lead to more effective detection and reporting of counterfeits, ultimately keeping dangerous products from entering your work environment.

For more information about counterfeit electrical products, visit [www.eaton.com/counterfeit](http://www.eaton.com/counterfeit).

## Digi-Key's web tools entice new and existing designer markets

**Having the ability** to successfully reach out to the young, emerging design community, while maintaining the levels of service and product selection to its existing and older, established clientele remains a significant strength for Digi-Key Electronics, one of the world's largest web-based distributors of electronic components.

**EP&T Magazine** had the opportunity to catch up with senior personnel at Digi-Key during the Electronics Distribution Show (EDS) held in Las Vegas this spring. Dave Doherty, president and chief operating officer boldly predicted a 6% increase in revenues for his company during a presentation to industry members at the firm's annual EDS breakfast. He did, however stress that the figure is somewhat skewed by global currency exchange rates, which includes Canada's sinking dollar.

"In same currency sales, business looks great," Doherty says. "We like to peel it back and look at the underlying activity of reaching customers and we are shipping more (10%) line items year over year."

Doherty took the reins in his new role last summer, after long-time president and COO, Mark Larson joined founder Ron Stordahl in a board-level role as vice chairman, where he serves as a company advisor.

While the firm has experienced a slight reduction in its average order size during the first quarter of 2016, Doherty says he expects things to change for the better, as driven by the company's recent digital marketing initiatives. Ten months ago Digi-Key appointed Jim Ricciardelli as vice-president of digital business. The industry veteran combines his knowledge as a recent disty executive with Arrow Electronics and early web search engine pioneer Lycos Inc.

Expanding its overall digital footprint, Digi-Key has recently introduced new web-based tools, such as the maker.io site, targeted toward the maker professional. Doherty points out that Digi-Key was started by a maker professional in founder Dr. Ronald Stordahl and has a long history of being a destination for these entrepreneurial engineers.

"The Maker.io site helps them take their ideas from concept to product," Doherty says. "Our mission is to enable the creativity of our customer. We do that by offering such tools."

Digi-Key also recently introduced Scheme-it, an online schematic and diagramming tool that allows anyone to design and share electronic circuit diagrams. The tool includes a comprehensive electronic symbol library and an integrated Digi-Key component catalog that allows for a wide range of circuit designs. Additionally, a built-in bill of materials manager is provided to keep track of parts used in a design. Once a schematic drawing is complete, users can export it to an image file or share it via email with others. Scheme-it works natively in all major web browsers without requiring the use of any plugins.

"For a segment of our customer base, this rudimentary simulation tool (Scheme-it) acts as a virtual 'electronic' napkin, or starter tool, where early design ideas and concepts are often born," Doherty says. "I have a son in university studying electrical engineering and his professor suggested to the class that they go to Digi-Key and download scheme-it while pursuing a specific design project."

Digi-Key also offers its customers PartSim, a free and easy to use circuit simulator that runs in your web browser, as well as PCBWeb, a free CAD application for designing and manufacturing electronics hardware.

"It's exciting for us because our customers are engaging with us even before laying parts on the board," states Doherty. "The importance of user-familiarity with website is paramount. Our customers know how to navigate it and they know where to find things quickly and efficiently."

Prior to joining the Digi-Key team, Ricciardelli says he was under the impression that the disty's customer base was represented by an older, established and loyal following. While that part is true, he was amazed at how many students and members of the maker community love Digi-Key.

"They use us to help them in the design process, because we are more than just a website. We are an engineering tool, that they can use to actually select parts," Ricciardelli says. "If these customers are not ready to start at the component level – then they are going to start at the board or kit level. We have that solution for them."

Ricciardelli understands that the availability of very low cost modular hardware tools combined with simple-to-use free software development environments has led to an explosion in the number of makers and developers. As a result, Maker.io is platform (Arduino, BeagleBone, Raspberry Pi, Photon, etc.), post, and project based. Beyond the roadmap, maker professionals as community members can submit projects either publicly or privately. This collaborative and project-based approach will help designers better understand the phases along the map.

Referring to the maker market as a real 'movement', Ricciardelli says one of its 'rock stars' Limor Fried, founder of the electronics and tutorial company, Adafruit, is a fan and user of Digi-Key and its online catalog.

"We know who these people are and they know who we are. We must continue to evolve our tools and inventory to make sure they keep coming to stay in love with us," Ricciardelli adds.

At the end of the day, both Doherty and Ricciardelli are confident that Digi-Key will continue its evolution towards maintaining existing ties and ingratiate emerging design communities.

"When the market starts to swing and we get the wind at our back and increase average order sizes – all these efforts get brought to bear," Doherty says.



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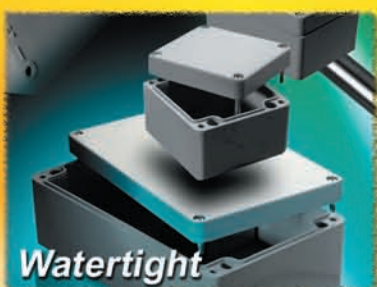


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# Outsourcing pcb design can help you... *and here's why*

By Mark Tinkler, business development & sales at Vision Circuits - Toronto Division

**At Vision Circuits**, most of the companies that we work with have in-house printed circuit board (pcb) design capabilities, and, occasionally, we encounter a potential customer who will ask us: "Why do I need to outsource my printed circuit board design? I have in-house resources that do that!"

Even if you have in-house designers, a close look into outsourcing pcb design is definitely warranted if you want to improve time-to-market, product quality and reliability, flexibility, customer satisfaction, or the bottom line.

To be clear, pcb design represents the conversion of electronic schematic diagrams into sets of data that are then used to create fully developed, manufactured, assembled, tested, and qualified printed circuit boards. This pcb design process is also known as pcb layout.

Two key elements must be considered in any improvement – pcb design capacity and pcb design capability.

## Pcb design capacity

**Resources:** Are you getting the most out of your in-house electronic design talent? Some companies use an electronics design engineer (one who engineers the electronic design and creates the schematic) to also create the pcb design.

By subcontracting the pcb design to a qualified pcb design firm, you can free the electronic design engineer to focus purely on electronic design. By making this change, you will significantly increase the capacity of new product development at your company.

**Growth:** Is your organization in a growth phase? Do you plan on entering one soon? During a growth phase, companies will hire more pcb design talent to meet the demand. Unfortunately, pcb design talent is then dismissed after the growth phase hit a plateau. This is disruptive to an organization and to design professionals.

By using a pcb design firm, you will increase your company's flexibility during periods of growth and reduce involuntary employee turnover. By developing a solid partnership with a qualified pcb design firm, you will always have ready and reliable pcb design resources when you need them.

**Transitions:** Change is constant. Some companies move from one design software tool to another; at times driven by pcb design staff/engineering leadership changes. Companies also merge. In these cases, previous pcb designs need to be transitioned to a new common pcb design software tool. Different iterations of pcb design software tools and library data/structures can also exist within a company; in many cases the format and control is questionable. A qualified pcb design firm can help you to close these gaps and will enable your pcb design system to create better products, faster.

## Pcb design capability

**Design Software:** Some companies fail to realize that pcb design has a huge impact on overall performance, reliability and cost of finished product. Some pcb designers use low cost pcb design software tools or older versions of pcb design tools (both have limited capabilities) which will create costly constraints further in the design and manufacturing process.

Best practice is to engage with a qualified pcb design firm that fully uses the latest pcb design software tools and that has formed strong relationships with their design software providers. This will benefit all involved, most importantly your customers.

**Collaboration:** Improve your in-house capabilities through collaboration. A qualified pcb design firm will help companies improve their pcb design capabilities by working collaboratively with your in-house designers. This is a great resource to have in order to explore and implement best practices or to bounce ideas around. The end result is better pcb design.

**Technology Expansion:** Is your company specialized in one segment of the industry? Are you looking for the best pcb design practices for a specific industry? Are you expanding into a new technology area? A qualified pcb design

firm can help. Work with a pcb design firm that has the depth of experience in many industry segments and technologies for best results.

**Library Improvement:** Companies can always improve their pcb design libraries. Libraries are the foundational building blocks of any great pcb design. Libraries often are not kept in order or have rogue elements included in them. This often results in challenges in final pcb design quality and translates into manufacturability and reliability issues (and costs) downstream. Look to a solid pcb design firm for best practices and assistance in improving your libraries.

**DFM/DFA/DFx:** Improve your pcb designs for manufacturability, assembly, test, and overall design excellence. Some companies place this responsibility with downstream entities such as bare pcb manufacturers and assembly shops. Critical design rules and validation/verification elements must be incorporated early in the process and include information integral to the design, manufacturing, and testing processes. Look for a pcb design firm that has great relationships (and active communication) with component manufacturers, bare pcb manufacturers, assembly companies, and testing firms. You will experience improved time-to-market and less overall cost.

There are caveats in the use of an outsourced pcb design firm. They must have a great reputation, be trusted, and be strongly aligned with your company, for your product development process to be a success.

For more information on printed circuit board design capacity or capabilities from Vision Circuits, go to <http://www.visioncircuits.com>.




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## PEI-Genesis acquires Filconn

**Assemblers** of precision connectors and cable assemblies PEI-Genesis, Philadelphia PA, has acquired Arizona-based FilConn Inc., manufacturer of precision high reliability filter, transient suppression and custom configured connectors for the MilAero, medical, transit and oil/gas industries.

The purchase allows the company to better serve customers' needs for low volume, quick turn, custom connectors, according to Steven Fisher, CEO of PEI-Genesis.

"We consider ourselves a design focused company that solves customers' technical problems. This acquisition enhances that capability, further encouraging our customers to partner with us from the initial stages of design through delivery," says Fisher.

## Gap Wireless distributing iBwave Wi-Fi Suite

**Gap Wireless Inc.**, Mississauga ON, a leading stocking distributor of mobile wireless solutions, has added the iBwave Wi-Fi Suite to its extensive product portfolio. The product provides bundled cloud-connected products to streamline the in-building Wi-Fi network planning and design process.

"iBwave's next-generation product suite will enable our carrier and contractor customers to more efficiently and collaboratively manage their Wi-Fi network design and in-building installation projects," says Glenn Poulos, vice-president and general manager, Gap Wireless. "Gap Wireless now distributes both the iBwave Wi-Fi solution for the PC and iBwave Wi-Fi Mobile."

iBwave Wi-Fi is a complete Wi-Fi network design production solution that integrates seamlessly with the iBwave Wi-Fi Mobile app, enabling Wi-Fi design teams and their customers to easily collaborate regardless of location. The solution provides 3D modeling, prediction calibration, a components database of all network equipment, and an iBwave viewer for customers to easily view design files and run their own reports.

iBwave Wi-Fi Mobile is a cloud-connected mobile app that enables users to survey and design Wi-Fi networks from their tablet. Networks can be designed on-site by dragging and dropping APs and network equipment. Images can be captured using the tablet's camera and annotation added to clarify installation instructions. With the project uploaded to the cloud, collaboration and access is easy from iBwave Wi-Fi.



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## Medical Components

# Exploring differences in commercialization, design and potential between medical & consumer wearables

By Travis Stevens, PEng., MSc., vice-president engineering, Orpyx Medical Technologies Inc., Calgary AB



Orpyx LogR - Real-time measurement of plantar pressure for research. No tether, computer, or lab is required.

**Our earliest ancestors** first created wearable technology the instant they covered themselves as a means of protection from their environment. From that humble beginning, wearable technology has continued to evolve, powered by the discovery of new materials, components (both mechanical and electronic) and the creation of new manufacturing techniques.

Even the term wearable has undergone an evolution itself. Over the past decade wearable has become a noun used to describe devices and textiles enhanced with sensors and electronics that measure and interact with their users and their environment. As it currently stands, wearables have almost exclusively been targeted at the consumer market, with the bulk of these devices being classified in the subcategory of fitness and activity trackers.

However, there are new and novel medically-focused wearable devices emerging from the shadow of the consumer space. These new medically focused wearables, such as the Orpyx SurroSense Rx, are able to leverage both the awareness and acceptance enjoyed by consumer oriented devices and incorporate the technology and manufacturing used in the consumer products to make highly integrated, special purpose devices.

The following article explores some of the differences in the medical and consumer wearables as it relates to design, commercialization and potential.

### Largest difference in commercialization is regulatory requirements

The single largest difference in the commercialization of consumer and a medical wearable is the regulatory requirements that must be met. Every country in the world has its own regulatory framework and approvals process, and though there is some commonality between them, success in any given market requires understanding and conforming to the regulatory framework in place for that country. The largest organizational impact of regulatory compliance will be the need to have a quality management system in place. The industry-accepted quality system for medical devices is ISO 13485, and implementation of a 13485 quality system will affect every part of the business involved in the realization and commercialization of the device.

The ISO 13485 quality system, and for that matter, health regulatory bodies, are very focused on minimizing the risk to patients. The primary mechanisms for risk mitigation are risk assessments. From a design perspective, a risk assessment should be done at the outset of the design process, and continued throughout the product lifecycle to ensure that risks can be mitigated as early, and as cost effectively as possible. Also important to the quality system is the need to show requirements traceability; in other words, can a line be drawn from the creation to realization of a requirement in the prod-

uct. Requirements traceability is nothing new to product development, however, what is important in the medical wearable context is the need to have evidence that shows the above requirements' traceability.

### Key differentiator is to have evidence that validates any claims made

Another key differentiator between the medical and consumer wearable market is the need to have evidence that validates any claims made as it relates to the device. In the consumer world, there have been a number of companies defending themselves in class action lawsuits because their products did not live up to the claims being made, however, these lawsuits were only initiated once the products had already been on the market and enjoyed widespread adoption. There was no requirement for there to be evidence supporting the product claims prior to the sale of the product.

On the other hand, medical wearables are required to have evidence that supports the medical claims being made by these devices, and the only way to gather this evidence is through trial. The complexity and scope of the clinical trial will be related to the nature of the claims being made, and in the end it will be up to the regulatory body to determine if there is sufficient evidence to validate the claims. The time and effort required to gather this evidence is something that a consumer-oriented company could easily underestimate if it attempts to pivot its technology to a medical application – it should anticipate major burdens in both regulatory approval and go-to-market efforts.

### Components & algorithms must provide accuracy to fulfill claims

Related to the need to provide evidence for the efficacy of the device, is the need to create a device that is accurate. As an example, the accuracy of consumer activity trackers has been studied by a number of different institutions, with the reported accuracy varying depending on the activity being studied.

Also, a quick review of the top consumer wearable websites reveals that no concrete claims are made as to the accuracy of the device, and to be fair, no one is being put at risk if an activity tracker under- or over-reports the number of steps that an individual has taken. In contrast, a medical wearable must be designed to be accurate because the consequences of an inaccurate measurement could result in harm to the user. Even though medical wearables are able to leverage many of the same constituent parts as the consumer products, additional care must be taken to ensure the components and algorithms have the accuracy required to fulfill the claimed purpose of the device.

One of the interesting promises of medically-oriented wearables that combine the usability and connectivity of a consumer wearable with the accuracy of a medical device is the ability to continuously monitor patients and gather data that was previously unavailable to healthcare practitioners. However, conducting analysis on health-related data is not without its own set of challenges. First and foremost, privacy is the major concern when it comes to medical data, and many countries have strict laws as it relates to the handling of patient health information. Violation of these laws can result in serious fines, so before any of this information is collected, it is critical to understand the privacy



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laws of the country in which the devices are used and to address all the technical issues as it relates to the collection, transmission and storage of patient health information.

**Advances in wearable technology has opened up a number of new applications, including the development of medically-oriented wearable devices.**

The second issue with the data generated by medical wearables is the sheer volume of it. Luckily, tools and techniques such as machine learning and infrastructure such as cloud computing are making it possible to collect and analyze this large volume of data in a way that was never possible before. Collection of this data will improve the quality of care for patients a number of different ways, it will make it possible for health-care practitioner to monitor patients outside of the hospital, and, if necessary, intervene based on the data being recorded. It will also allow for better insights as it relates to disease progression.

Advances in wearable technology has opened up a number of new applications, including the development of medically-oriented wearable devices. The potential of these medically-oriented devices is significant by combining highly accurate data collection with high connectivity and bidirectional communication.

However, bringing these types of devices to market is not without unique challenges. It is essential to comply with the regulatory environment of the market, and to gather sufficient, objective evidence that supports the claims made of the device's benefits and performance.

In addition, ensuring patient privacy is critical in the collection, transmission and storage of data. Despite these challenges, the future of medical wearables looks extremely bright and I look forward to remaining on the leading edge of their development.

For more information on wearable technology from Orpyx Medical Technologies Inc., go to <http://ept.hotims.com/61398-43>

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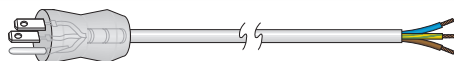
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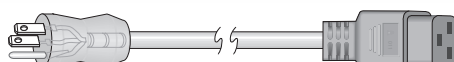
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# Shrinking portable medical devices impacted by modern electronic connectors

By Ed Garstkiewicz, industry segment manager, Harting Inc. of North America

**The need to minimize** healthcare costs is creating greater demand for medical electronics equipment that, among other things, improves and expands patient diagnostics inside and outside healthcare facilities. For example, portable medical instruments such as glucose meters, blood pressure monitors, and oxygen meters can be designed with communication capabilities to provide continuous information to caregivers almost anywhere.

Small hand-held devices can also improve various diagnostic procedures in dentistry and medical offices. While such devices hold the promise of improved care at lower cost, they require advanced connector technologies that allow greater miniaturization to improve the product's portability and functionality while assuring it can be used safely.



Figure 1: D-sub connectors are available with built-in filtering.

## Electromagnetic interference and noise

When we consider information transfer, small portable medical devices typically transmit data to healthcare providers wirelessly or by cabled LAN networks. Electronic connectors are essential elements in these connections and must work flawlessly without contributing noise or distortion to the signals. Often, despite careful system design, electromagnetic interference and noise can find its way into data lines. In the past, add-

ing separate suppression devices to protect the data communications interface circuit from electromagnetic interference, noise and electrostatic discharge – the transfer of static high voltage from a human body – also added bulk and cost to the final product.

Now, D-sub connectors (the most common digital I/O interface) are available with built-in filtering that minimizes these dangers. They can be purchased with inductive ferrite filtering in the pcb material holding the connector pins (Figure 1). This cost-effective, low-level filtering has minimal insertion loss while reducing EMI emissions that might otherwise be close to the specified limit.

Another approach in D-sub filtering is a patented four-layer pcb material with surface mount chip capacitors. The filtering performance of the capacitors and screening effect of the pcb protects against any introduction or radiation of noise through the I/O port. Ringing and crosstalk are virtually eliminated.

## Built-in filtering

Filtered D-sub connectors are available from Harting and others in a wide range of configurations that include standard and custom pin-outs, various housing and hood styles, cable and bulkhead mountings, surface mount types, straight and right angle pins for pcb re-flow soldering, etc. Built-in filtering eliminates or reduces the need for separate suppression devices, resulting in smaller less costly data communication circuit board designs.

In addition, this style of built-in filtering fits within standard D-sub shells, allowing designers the flexibility to add filtering late in the design stage if an EMI or ESD glitch is discovered. That may avoid the need to modify a circuit board to suppress these problems. Avoiding such late-stage modifications is an important consideration. Taking a new medical device of any kind through all the steps for regulatory approval is a time consuming process. Therefore, R&D engineers must

take all practical steps along the way to keep the product development cycle and time to market to a minimum.

## Minimize space utilization

Another approach to minimize space utilization and weight is to employ mezzanine stackable connectors on pcbs for routing power and signals. These miniature connectors using surface mount technology (SMT) (Figure 2) offer high contact density and are available in multiple stacking heights for 'board-to-board' and 'board-to-cable' applications. In the latter, insulation displacement (IDC) connectors for ribbon cables provide a high degree of freedom to system

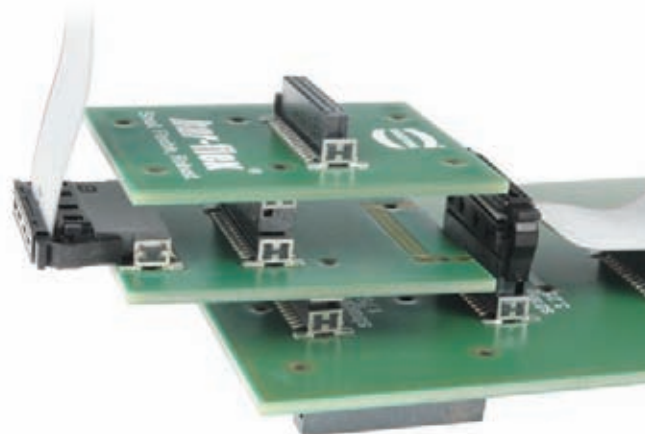


Figure 2: SMT miniature connectors provide high contact density and are available in multiple stacking heights.

designers. Some scalable mezzanine connectors are particularly rugged.

For example, Harting's har-flex family includes extra robust SMT flanges that can absorb considerable mechanical stress on the solder contacts, allowing repeated insertion and removal. Combining this robustness with the ability to interconnect two circuit boards within any configuration (Figure 3) and a wide range of pin count (6 to 100 poles) provides the kind of flexibility needed by today's designers of complex high density medical systems. These types of solutions often provide manufacturing benefits by being both reflow solder and pick and place compatible.

For more information on electronic connectors and interface technologies from Harting Inc. of North America, go to <http://ept.hotims.com/61398-44>

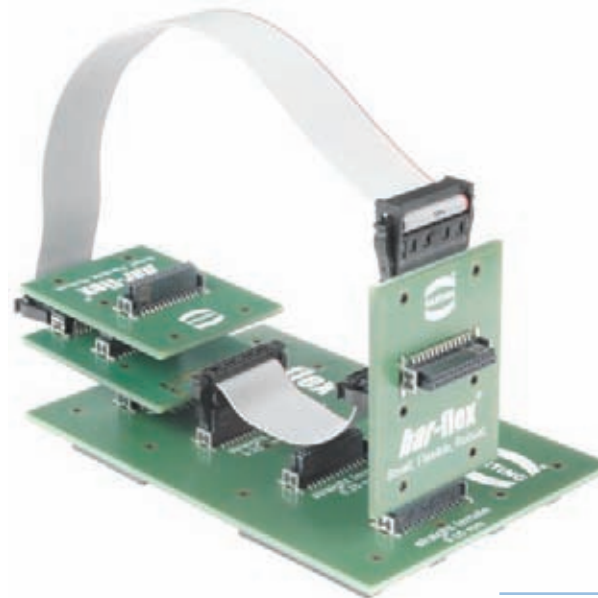


Figure 3: Harting's har-flex family interconnects two circuit boards within any configuration.

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**MasterSil 910Med** one part acetox type silicone system meets USP Class VI specifications for biocompatibility and ISO 10993-5 testing for cytotoxicity. Translucent paste withstands many sterilization methods, including liquid sterilants, gamma radiation and EtO. Product delivers high flexibility and has an elongation of 400-600%, imparting reliable thermal cycling and mechanical shock resistance. Product provides good bond strength to metals, composites, glass ceramics, rubbers, plastics and other silicone substrates. Easy to handle product is serviceable over the broad temperature range of -75°F to +400°F. It is also a competent electrical insulator with a volume resistivity of >1015 ohm-cm.

## MASTER BOND

<http://ept.hotims.com/61398-45>



## Ultra-miniature connector can include 12 power, signal contacts



**MiniMax 06** ultra-miniature connector can include up to 12 power and signal contacts in a footprint of only 10mm. This corresponds to a density factor of 0.83 and a new configuration with 2 signal and 2 high-power 1.3mm contacts for applications needing 10 Amps or more power. Device is easy to use and ensures premium performance even in harsh environments. Available as a pre-cabled solution, device is suited for handheld or body-worn applications when space is limited, in such fields as defense & security, instrumentation, testing equipment, civil or military unmanned aerial vehicles (UAVs), among many others.

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## GaN power amplifier operating in 2 to 6GHz band

**PE15A5025** 50 Watt gallium nitride (GaN) coaxial power amplifier operates in the popular 2 to 6GHz frequency band. The compact and rugged device delivers high levels of output power and efficiency and has the advantage of high output load impedance that makes port matching easier over wider bandwidths using lower loss components. Device provides 50dB of small signal gain with a saturated output power level of +47dBm typical and 30% power added efficiency (PAE). While generating 50 watts of saturated output power under worst case conditions, the output harmonic response is -15 dBc and spurious levels are kept at -70 dBc. The amplifier requires a +28 Vdc power supply and is unconditionally stable.

**PASTERNAK**

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## All-in-one, dustproof toggle switch is waterproof

**Dual Seal Waterproof M Series Toggle Switch** for both single pole and double pole applications is a complete, all-in-one waterproof, dustproof device. Suitable for applications that require IP67 rated waterproof protection, device provides high torque bushing construction to prevent rotation and separation from the frame during installation. Device provides anti-rotation design on all non-cylindrical levers. Stainless steel device's interlocked actuator block prevents switch failure due to biased lever movement.

**NKK SWITCHES**

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## Medical grade MLCCs deliver reliability, design flexibility

**MQ Series** medical grade MLCCs are manufactured tested and qualified using stringent medical design, in-process and lot acceptance requirements. Available in several different dielectrics, case sizes, voltage and capacitance ratings and termination options, devices boost versatility and reliability performance required by medical applications. Products are available in eight EIA case sizes spanning 0402 to 2225 and four dielectric materials: NP0 (COG), X7R, X7S, and X5R. Voltage ratings for the series range from 4V to 100V, capacitance values span 1pF to 100µF and capacitance tolerances extend from ±0.1pF to ±30%.

**AVX**

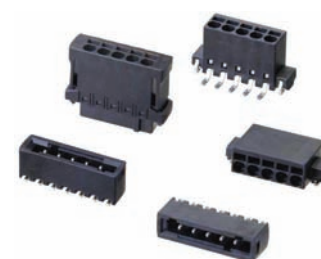
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## Terminal block connectors come with 2 to 12 contacts

**XW4 2.54mm** pitch terminal block connectors are available with 2-12 contacts. Both vertical and horizontal models are available. Device provides push-in terminals to easily complete connections, while push-in connection method allows repeated repairs. Devices provide hold down structure for strength on printed circuit boards. Product's active lock mechanism improves vibration and shock resistance. Available in reel packaging, devices are UL approved and RoHS compliant.

**OMRON ELECTRONIC COMPONENTS**

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## Dc-dc converter meets medical design standard


**G/H series** 1-2W medical dc-dc converter meets medical design standard EN60601-1 and ANSI/AAMI ES60601-1 3rd Edition (1xMOPP/2xMOPP). Both creepage and air clearance of the transformer are 5mm, and 5.5mm for pcb. Device's isolation voltage is as high as 4200Vac (6000Vdc), which is 40% higher than standard voltage (3000Vac) of 2xMOPP. Moreover, patient leakage current is less than 2µA, which greatly ensures the patient's safety. Devices operate high efficiency up to 84% to save energy effectively.

**MORNSUN**

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 <p><b>IJA Series</b> 35A Non-isolated SMT Point of Load with PMBus™ ◆ Only 0.45 in² Board Space ◆ 8 to 14V Input ◆ 0.6 - 3.3V Output ◆ Digital Adaptive Control ◆ Configurable Sequence and Fault Management <a href="http://us.tdk-lambda.com/lp/products/ijb-series.htm">http://us.tdk-lambda.com/lp/products/ijb-series.htm</a></p>	 <p><b>IJB Series</b> 60A Non-isolated SMT Point of Load with PMBus™ ◆ Only 1.0 in² Board Space ◆ 8 to 14V Input ◆ 0.6 - 2V Output ◆ Digital Adaptive Control ◆ Configurable Sequence and Fault Management <a href="http://us.tdk-lambda.com/lp/products/ijb-series.htm">http://us.tdk-lambda.com/lp/products/ijb-series.htm</a></p>	 <p><b>IQG Series</b> 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 <a href="http://us.tdk-lambda.com/lp/products/iqg-series.htm">http://us.tdk-lambda.com/lp/products/iqg-series.htm</a></p>
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**IAH Series**  
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◆ 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>

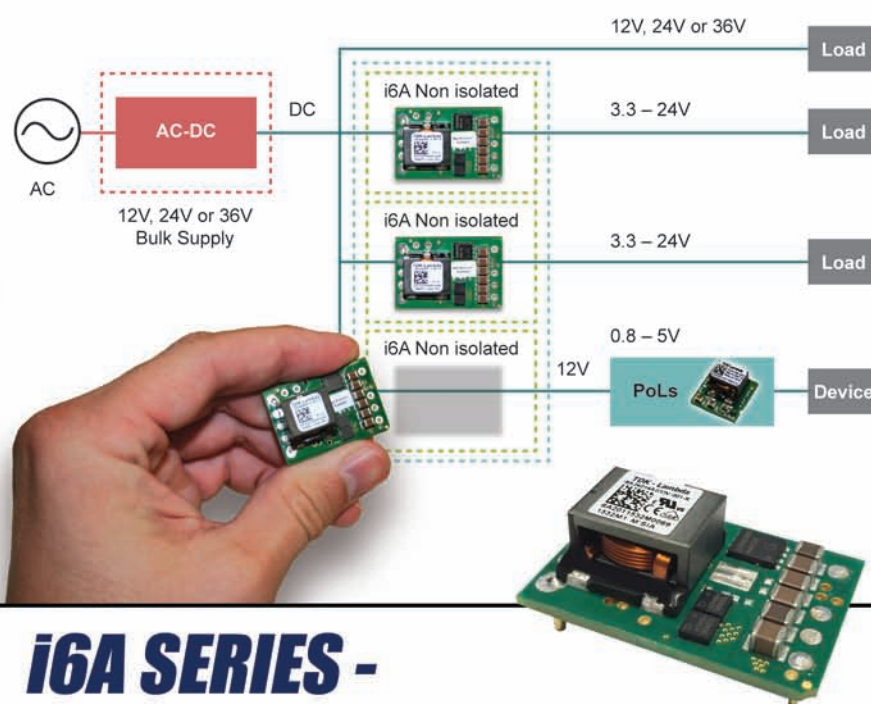


**IBH Series**  
20A Non-isolated SMT Point of Load  
◆ Only 0.36 in² Board Space  
◆ 3.5 - 14V Input  
◆ 0.7 - 5.5 Output  
◆ No External Tuning Components Needed  
◆ DOSA Compatible Footprint  
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**ICH Series**  
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## CPU board enhances onboard functionality

**CB30C safety critical CPU board** is based on VITA 59 RCE (Rugged COM Express). The QorIQ-based board integrates a functional safety architecture with a rugged, low power, small form factor (SFF) making it suitable for embedded control systems in medical environments. Product improves reliability and delivers safety-critical operation, which is both fail-silent and fail-safe. Device's dedicated safe supervisor (SUPV) meets EN 50129 SIL 2 oversees the hardware and monitors all environmental conditions, such as voltage, temperature, shock and vibration, of the CPU subsystem.

**MEN MICRO**

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## What's on Your Radar Screen?

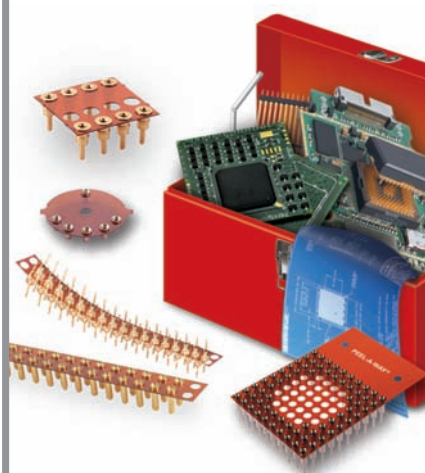
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## Global use of facial recognition biometrics is growing

The global facial recognition biometrics in consumer electronics market is expected to grow at a CAGR of more than 102% during the forecast period, according to an analysts forecast from global technology research firm Technavio.

To calculate the size of the market for 2016-2020, the report considers the revenue generated from the sales of consumer electronics integrated with facial recognition technology. The revenue generated from after-sales services is not considered.

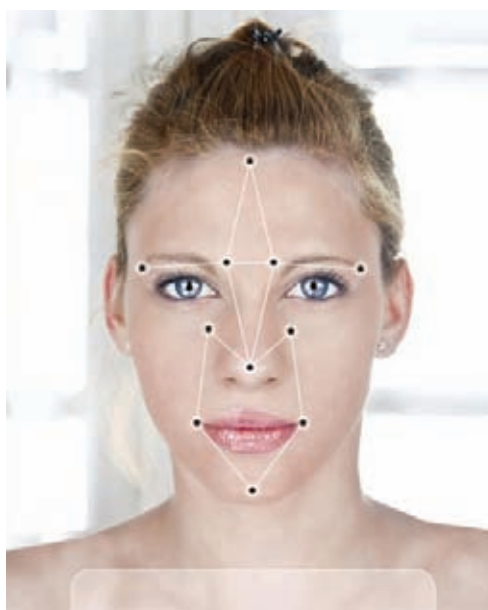
Technavio ICT analysts highlight the following four factors that are contributing to the growth of the global facial recognition biometrics in consumer electronics market:

- High adoption of mobile devices for financial transactions
- Instances of identity and data theft
- Implementation of BYOD policy in enterprises
- High demand of facial recognition in healthcare sector.

### High adoption of mobile devices for financial transactions

The acceptance of consumer electronics is increasing among individual consumers as their use for carrying out financial transactions has also increased. A number of financial institutions are encouraging mobile banking and online financial transactions. So instances of identity and data thefts are on the rise. Before 1999, only non-biometrics technologies were being used for authentication purposes.

Amrita Choudhury, a lead analyst at Technavio, specializing in research on automatic identification system, says,



Biometric Facial recognition analyzes the characteristics of an individual's face images captured through a digital video camera. It records the overall facial structure, including distances between eyes, nose, mouth, and jaw edges. These measurements are stored in a database and used as a comparison when a user stands before the camera.

"Facial recognition and authentication technologies have emerged to address the need for end-users to remember passwords or carry hardware tokens for authenticating themselves to execute any transaction."

### Instances of identity and data theft

Growing usage of the Internet, websites and applications by end-users has led to an increase in the number of iden-

tity and data theft cases. With the growing popularity of social network websites, instances of identity theft cases have increased. With the increasing complexity of such attacks, awareness among end-users is increasing, which is forcing OEMs of consumer electronics to implement facial recognition solutions in laptops, smartphones and tablets.

### Implementation of BYOD policy in enterprises

BYOD policies enable employees to use their personal devices for work purposes, enabling them to work without any location or time constraints. This increases their productivity and reduces travel time. SMEs worldwide are increasingly adopting BYOD policies to reduce their operational costs. An increase in the mobile workforce has enabled companies to have their employees across a given region, which in turn has boosted their productivity and sales.

Technavio expects the mobile workforce to increase further during the forecast period because of the high penetration of mobile devices. The increased use of mobile devices will enable employees to access confidential data from remote locations.

"Since employees use mobile devices for accessing personal and confidential professional data, the need for integration of facial recognition systems in mobile devices has increased," says Amrita.

### High demand of facial recognition in healthcare sector

Due to growing instances of data thefts in the healthcare sector, the need for facial recognition has increased for the purposes of authenticating and verifying individuals. Furthermore, with the growing usage of consumer electronics for the remote monitoring of patients, it has become necessary for OEMs to integrate facial recognition systems in these consumer electronics to ensure authorized access to confidential data such as electronic health record. Organizations in the healthcare sector need to comply with the government regulations such as Health Insurance Portability and Accountability Act (HIPAA) to avoid being penalized.

Facial recognition systems are making it possible for healthcare professionals to provide secure medical information to their patients via personal devices.





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## Non-isolated dc-dc converters operate from wide input voltage

**i6A4W** step-down non-isolated dc-dc converters are capable of operating from a wide input voltage of 9V to 53V and deliver an output voltage that can be adjustable from 3.3V to 15V. Products allow operation from 48V inputs and can be used as drop-in replacements for expensive isolated 1/6th converters driving 12V POL devices in medical, communications, industrial and test and measurement equipment. In the 1/16th brick form factor, measuring 33 x 22.9 x 12.7mm, units can also be used in conjunction with single output 12V, 24V, 36V and 48V output ac-dc power supplies to generate additional regulated high current outputs, with or without battery back-up.

**TDK-LAMBDA**

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## Smart graphics displays are customizable

**OM-SGD Series** of panel meters with bright color TFT smart graphics displays are available in three screen sizes. Units provide a wide operating power supply voltage range of 4 to 30Vdc and two alarm outputs. Waterproof NEMA 6 (IP67) versions are also available. Using firm's Simple Wizard based configuration software, select from more than 40 standard display configurations to program. Customize colors, text labels, input scaling and units before uploading the selected display configuration to the meter via USB interface to the PC.

**OMEGA ENGINEERING**

<http://ept.hotims.com/61398-54>



## Bulkhead mounted housing comes with self-closing cover

**Han B Snap Cap** bulkhead mounted housing is equipped with a hinged cover that automatically closes when the connector is removed. The hinged cover effectively protects the interior from external influences via a spring. This special spring on the bearing pedestal presses the hinged cover against the housing with sufficient pressure to prevent water spray and dust from

entering the interior. Housing is locked with Han-Easy Lock levers, which are easily closed, provide a good sealing effect and have a low operational force. Device meets the requirements of IP44 and in the plugged condition, such as in combination with a suitable Han B hood, it complies with the IP65 protection class.

**HARTING**

<http://ept.hotims.com/61398-58>



## 300W PMBus compliant eighth brick conforms to ABC standard

**DBE series of 300 Watt** fully regulated digitally controlled dc-dc converters packaged in an industry standard eighth-brick format provide a footprint that conforms to the Advanced Bus Converter (ABC) Digital standard as specified by the AMP Group industry collaboration. Product accommodates the internationally accepted telecommunications network voltage (TNV) standard input range from 36 to 75Vin and provides a PMBus compliant digital system interface. A 32-bit ARM processor contains firm's proprietary firmware designed specifically to control and manage the converter's operation.

**MURATA POWER SOLUTIONS**

<http://ept.hotims.com/61398-55>



## 300W convection cooled dc-dc converters boost reliability

**BHT-319R-F4 series** of dc-dc converters have an operational life of 30 years at high temperatures in railway and industrial environments. The convection cooled units deliver 300W continuous output power over a -40°C to +85°C temperature range without derating. By eliminating optocouplers and electrolytic capacitors, the MTBF of the units is significantly higher than in conventional converter designs.

**ABSOPULSE ELECTRONICS**

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## SMT coin cell contacts suit battery enclosures

**SMT enclosure** coin cell contacts provide improved design versatility for cost effective, dependable connections in self-contained battery compartments. Devices require minimal board space, while allowing easy installation and removal of a coin cell battery within a battery enclosure. Product's ultra low profile and compact design make it suitable for small hand held controls, key fobs, personal medical devices, digital timers, and many other industrial and consumer applications. Manufactured from gold plated stainless steel, devices provide low contact resistance ensuring easy reflow soldering for reliable solder joints. Product's spring tension adjusts to all cell height variations for dependable connectivity of coin cells with diameters from 12mm and larger with heights from 1.2mm to 7.7mm.

**KEYSTONE ELECTRONICS**

<http://ept.hotims.com/61398-56>

## 3-Phase power connector terminates with screwdriver

**EPIC Power M12 630V** cable circular 3-phase power connector for up to 12A and 630V requires only a screw driver to terminate. Small device comes with high performance gold plated contacts and saves space in narrow designs. Product's compact form factor is suitable for small motors. Device is s-coded to prevent connection error. IP67 rated device is dust and watertight.

**LAPP GROUP CANADA**

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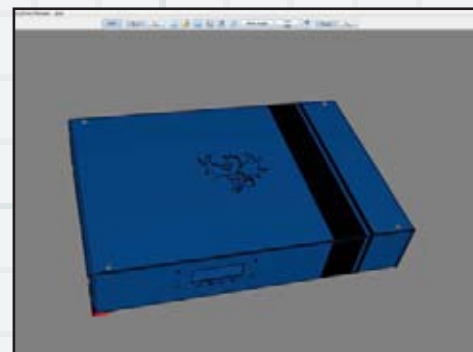
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## Semiconductors & ICs

### Intel puts the brakes on Moore's Law

*Intel will slow the pace at which it rolls out new chip-making technology and is still searching for a successor to silicon transistors.*

By Tom Simonite, MIT Technology Review San Francisco bureau chief

**Chip maker Intel** has signaled a slowing of Moore's Law, a technological phenomenon that has played a role in just about every major advance in engineering and technology for decades.

Since the 1970s, Intel has released chips that fit twice as many transistors into the same space roughly every two years, aiming to follow an exponential curve named after Gordon Moore, one of the company's cofounders. That continual shrinking has helped make computers more powerful, compact, and energy-efficient. It has helped bring us smartphones, powerful Internet services, and breakthroughs in fields such as artificial intelligence and genetics. And Moore's Law has become shorthand for the idea that anything involving computing gets more capable over time.

But Intel disclosed in a regulatory filing last month that it is slowing the pace with which it launches new chip-making technology. The gap between successive generations of chips with new, smaller transistors will widen. With the transistors in Intel's latest chips already as small as 14 nanometers, it is becoming more difficult to shrink them further in a way that's cost-effective for production.

Intel's strategy shift is not a complete surprise. It already pushed back the debut of its first chips with 10-nanometer transistors from the end of this year to sometime in 2017. But it is notable that the company has now admitted that wasn't a one-off, and that it can't keep up the pace it used to. That means Moore's Law will slow down, too.

That doesn't necessarily mean that our devices are about to stop improving, or that ideas such as driverless cars will stall from lack of processing power. Intel says it will deliver extra performance upgrades between generations of transistor technology by making improvements to the way chips are designed. And the company's chips are essentially irrelevant to mobile devices, a market dominated by competitors that are generally a few years behind in terms of shrinking transistors and adopting new manufacturing technologies. It is also arguable that for many important new use cases for computing, such as wearable devices or medical implants, chips are already powerful enough and power consumption is more important.

But raw computing power still matters. Putting more of it behind machine-learning algorithms has been crucial to recent breakthroughs in artificial intelligence, for example. Intel is likely to have to deliver more bad news about the future of chips and Moore's Law before too long.

The company's chief of manufacturing said in February that Intel needs to switch away from silicon transistors in about four years. "The new technology will be fundamentally different," he said, before admitting that Intel doesn't yet have a successor lined up. There are two leading candidates—technologies known as spintronics and tunneling transistors—but they may not offer big increases in computing power. Both are far from being ready for use in making processors in large volumes.

### Gallium nitride to widen footprint in global power semi industry

By Michael Markides, director, power and utilities, IHS Technology

**At the recent** American Power Electronics Conference (APEC) in Long Beach CA, the IHS Power team dove into key industry topics like the ever-increasing electrification of automobiles, expected growth from smart energy applications and the total market slowdown that began in the second half of 2015.

The most notable topic, however, was the presence of many gallium-nitride (GaN) specialist suppliers and their optimism this new technology will at last be rapidly adopted in the market.

Wideband gap materials, namely silicon carbide (SiC) and GaN, have been commonly used in the semiconductor industry for many years, but market adoption has not reached the levels the industry has been hoping for. While these new materials offer the promise of better performance than silicon (Si), numerous issues have held back their adoption. First, price is always at the core of the argument – but to date only in a few niche applications, and only with a few products, does the increase in performance justify the higher price. For example SiC has made inroads into the market for Schottky diodes, because the increased cost is justified by better performance of forward voltage, higher operating temperature, decreased leakage current, and lower reverse recovery charge (Qrr). The second main reason for poor adoption of wideband gap materials is the difficulties in supplying

the material, manufacturing, packing and engineering, which has been a major reason GaN has not yet made major inroads in the market.

At APEC 2016, GaN suppliers were optimistic – noting major improvements in design and engineering to increase the reliability and performance of GaN transistors, which now gives them a much more realistic path to adoption. GaN also has greater cost-reduction potential, because GaN power devices can be grown on silicon substrates that are larger and less expensive than SiC.

GaN suppliers are now aggressively targeting the market in two ways: first by replacing silicon super-junction devices in existing markets and applications; and second, using the higher performance to target LIDAR, medical imaging and other emerging applications and even for low-voltage management in data centers, where power density and efficiency concerns are paramount and GaN's increased performance is more welcome.

GaN will provide the higher performance needed for LIDAR and other new applications. LIDAR will potentially revolutionize the autonomous car market in the near future – enabling self-driving cars that are self-aware. In addition, GaN is now included in data-center power supplies in data centers that are constantly under pressure to compute more bytes in less space with better power management.

### Global semi market slumps in 2015

*Weakness in end-market demand will cause revenue decay to extend into 2016 and beyond, says IHS*

**Global semiconductor** revenues fell by two percent in 2015, according to a report from IHS Inc. Sequential quarterly growth was weak throughout every quarter of 2015, especially in the first quarter when the market declined 8.9 percent over the previous quarter – the deepest sequential quarterly decline since the semiconductor market collapsed in the fourth quarter of 2008 and first quarter of 2009. Global revenue in 2015 totaled \$347.3 billion, down from \$354.3 billion in 2014, the report says. The market drop follows solid growth of 8.3 percent in 2014 and 6.4 percent in 2013.

"Weak results last year signal the beginning of what is expected to be a three-year period of declining to stagnant growth for semiconductor revenues," said Dale Ford, vice president and chief analyst at IHS Technology. "Anemic end-market demand in the major segments of wireless communications, data processing and consumer electronics will hobble semiconductor growth during this time."

Overall semiconductor revenue growth will limp along at roughly 2.1 percent growth compound annual growth rate (CAGR) between 2015 and 2020, according to the latest information from the IHS Semiconductors Service. Current technology, economic, market and product trends suggest that sometime between 2020 and 2022 new products will come to market that will enable a significant level of growth in semiconductor revenues.

#### Reshaping the leader board

"Of course the big story for the semiconductor industry was the record level of merger-and-acquisition activity last

year," Ford said. "Top players pursued bold, strategic maneuvers to enhance their market position and improve overall revenue growth and profitability."

Intel retained its number one ranking in 2015, after completing its acquisition of Altera, which allowed the company to offset declining processor revenues and achieve 2.9 percent overall growth in 2015. Qualcomm slipped to number four in the rankings as its revenues fell by 14.5 percent, because the company's 2015 acquisition of CSR was not enough to counter declining revenues in the wireless markets. The final major deal among the top 10 in 2015 was NXP's acquisition of Freescale, which boosted it from number 15 in the 2014 rankings to number seven in 2015.

Among the top 20, Infineon's acquisition of International Rectifier enabled it to jump to number 12 in 2015. Announced deals that are expected to close in the first half of 2016 will continue to reshape the leader board. Avago Technologies continues its aggressive acquisition activity with its purchase of Broadcom. Broadcom is already ranked at number nine in 2015. The combined revenues of the two companies would place them at number five overall. ON Semiconductor's acquisition of Fairchild Semiconductor should boost it up two notches in the rankings.

Among the top 25 semiconductor suppliers, 14 companies achieved growth in 2015. This stands in sharp contrast to the overall semiconductor market where less than 42 percent of 285 companies tracked by IHS were able to achieve positive revenue results in 2015.

### Energy efficient MOSFETs expand to 800 volts

**CDM22012-800LRF** UltraMOS MOSFET is energy efficient, high voltage and minimizes total conduction losses while maximizing power density. Device is a 12A, 800V MOSFET in the TO-220FP (Full Pack) package. The low  $r_{DS(ON)}$  of 0.370 and low total gate charge of 7.6nC are key energy efficiency characteristics of this device, which surpass the operational performance of similarly rated standard MOSFETs. Devices are available in industry standard packages as well as in custom packages.

**CENTRAL SEMICONDUCTOR**

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### Energy harvesting PMU boosts efficiency in IoT designs

**ADP509x** energy harvesting Power Management Unit (PMU) enables faster, more efficient energy harvesting in IoT applications where energy is scarce. Device converts harvested power down to 16µW to 100mW range with only sub-µW operation losses. Device speeds cold-startup time, with a multiple-power-path design, enabling smoother operation. Energy harvesting is a key critical component in achieving fully autonomous IoT solutions.

**ANALOG DEVICES**

<http://ept.hotims.com/61398-61>



### FPGAs enhance IO variants for smart connectivity

**ECP5 family** of low power, small form factor connectivity and acceleration FPGAs are pin compatible and enable OEMs to seamlessly update their designs to meet evolving

interface requirements in the industrial, communications and consumer markets. Devices support 5G SERDES and up to 85K LUTs in a small 10x10 mm package. Devices support multiple 5G protocols including PCI Express Gen 2.0, CPRI and JESD204B. Product family enables seamless connectivity to ASICs and ASSPs in a wide array of applica-

tions. Numerous resources including software, device samples, soft IP and hardware boards are available upon request.

**LATTICE SEMICONDUCTOR**

<http://ept.hotims.com/61398-62>







## Production Equipment

### Materials deposition inkjet printer supports PE processes

**X-Serie** turnkey materials deposition inkjet printer is a tool for process development in printed electronics and smart 3D printing. Product provides patented rotative head-holder 'plug and play' full curing area, in-situ characterization devices and exclusive software suite. Unit is suitable as an 'all inclusive' tool to enable advanced inkjet process development. Product handles substrates up to 305mm x 305mm with a thickness up to 10mm. Unit provides high accuracy five axis with motorized adjustable printing resolution, substrate alignment and nozzles self-calibration.

**CERADROP**



<http://ept.hotims.com/61398-63>

### AOI System inspects double-sided pcbs

**BF-10BT** Offline AOI System for double-sided printed circuit board (pcb) inspection, is robust and highly repeatable hardware built for 24/7 continuous operation. System inspects both sides of the pcb in one process with 10µm resolution. Unit inspects 01005 (0402) components and detects solder balls down to 150µm with high speed and superior data handling capabilities. Product is suitable for final inspection, through-hole inspection after wave or selective soldering, or manual inspection.

**SAKI**

<http://ept.hotims.com/61398-64>



### X-Ray inspection system features advanced s/w tools

**X-SPECTION 6000** Cabinet X-Ray Inspection System includes advanced s/w tools required for a wide variety of applications. Unit delivers high flexibility with enhanced tilt and a rotating work table. Technologically advanced system comes with standard features that include fully integrated, 130kV high power closed X-ray tube, 60° camera tilt for oblique angle viewing, 22" x 18" inspection stage with 350° rotation, color mapping camera with zoom window provides easy location and identification of faults and Z axis movement of the x-ray tube and detector.

**SCIENSCOPE INTERNATIONAL**

<http://ept.hotims.com/61398-65>

### Stencil cleaner is compatible with most equipment

**E5611 stencil cleaner** is made with cost-effective cleaning chemistry designed to be diluted for removing flux, solder paste and uncured adhesives from stencils and misprints. Product is compatible with most standard stencil cleaning equipment. Product boosts performance and adds real value with improved prints and modern, green technology that is better for the environment.

**KYZEN**

<http://ept.hotims.com/61398-66>

### 3D AOI system inspects pcbs

**K Series3D** 3D AOI inspection system for printed circuit boards delivers accurate component inspection by combining its 2D AOI and 3D SPI experience with new proprietary technologies. Unit delivers accurate all-around defect coverage including lifted components, lifted leads, tombstones, etc., for components up to 25mm in height. Coupling high quality telecentric 2D images with dual camera blue-laser-based 3D profiles guarantees superior inspection quality for both pre-reflow and post-reflow.

**VI TECHNOLOGY**

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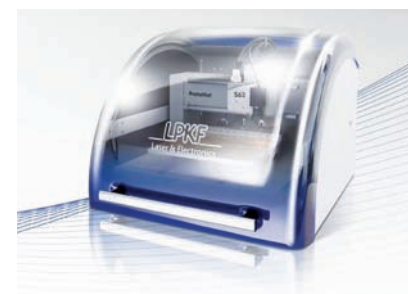


### Benchtop pcb milling machine suitable for prototyping

**ProtoMat S63** benchtop machine creates printed circuit boards (pcb) by milling away unwanted copper from substrates, leaving only the desired circuit traces behind. Unit is capable of producing multiple design iterations in a single day and its long list of applications includes everything from analog to microwave boards, as well as test fixtures, RF shields and 2.5D depth milling.

**LPKF LASER & ELECTRONICS**

<http://ept.hotims.com/61398-68>



### Dual-curing adhesives achieve full strength at 60°C

**DUALBOND** dual-curing adhesives reach full strength at only 60 °C after prefixation by light. Product range is completed by adhesives curing in a single step at low temperatures, three times faster than previous products. The epoxy resin-based adhesives are



mainly used in electronics and can be prefixed after only half a second of exposure to light. Products boost adhesion to LCP and allow adjustment of the adhesive properties ranging from flexible to hard (elongation at tear up to 70%). Low curing temperature reduces the thermal stress between the materials, thus limiting the stress on

the component. Product allows processing of temperature-sensitive substrates without difficulty: higher temperatures would only damage the sensitive components.

**DELO**

<http://ept.hotims.com/61398-69>

### Adhesive boosts optical clarity in electronics applications

**ASHLAND** Arosset PS 6449 solution-based acrylic pressure sensitive adhesive (PSA) delivers improved optical clarity to electronics applications. Product is acid free and reduces the likelihood of future corrosion. Product provides a good balance of adhesion and cohesion and improved temperature resistance. Product can be used in bonding multiple layers together in electronics applications, where optical clarity, durability, weatherability performance are required.

**ASHLAND**

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### newswatch

#### ASC now UL approved on polyimide materials

**American Standard Circuits (ASC)** West Chicago IL, CEO Anaya Vardya recently announced that his company is now UL approved on all polyimide materials.

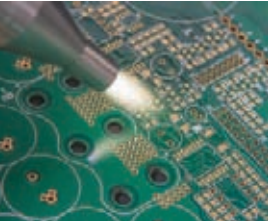
"American Standard Circuits is pleased to have received UL approval of Isola Polyimide P96 cores / P26 prepreg. It is a top priority for us to provide our customers with as many technologies as possible for their demanding printed circuit board requirements," Vardya says. "It's just another example of our quest to be a total solutions provider."

Earlier this spring, ASC completed its ISO 9001:2008 3-year recertification audit which was carried out by independent ANAB certified registrar Intertek.



# Multi-cure conformal coating steps-up protection, improves pcb performance & security

## ‘True’ black color conformal coating introduced



Plasma treating.

For many years manufacturers of electronics (OEMs) have been looking for a coating that allows them to hide information on their circuitry and provide environmental protection. With the release of its newest conformal coating option, Electronic Coating Technologies (ECT), Brampton ON, figures it has found the solution.

In the past this task has been done primarily using epoxies as potting compounds or glob top materials. This requires several steps before the application of the epoxy. Silicone molds, dam and fill gasket application or placement of the circuitry in plastic potting cases.

Multi-Cure 29816, a ‘true’ black UV curable material - comprised of a single-component, 100% solids, light and heat curable conformal coating- is designed to enhance security on printed circuit boards (pcbs). In addition to its ability to improve circuit reliability in harsh conditions, its opaque black color is intended to cover markings, labeling, as well as sensitive information on the circuit board.

Another use is as a conformal coating on LED circuit boards used in the manufacture of LED displays and lighting fixtures. The matt black finish improves the optics of the LEDs by creating a surface that does not reflect unwanted light.

Lighting display companies that wanted a black background to their displays have needed to use two component epoxies or polyurethanes to get the desired display effect.

This process has been time consuming and inefficient from both a waste and time standpoint. The use of one component fast curing materials dramatically streamlines the production process.

Formulated with a secondary heat cure, 29816 can typically be applied and cured at up to 5 mils thick - in one pass. It’s easily dispensed and for thicker coating requirements the material can be applied in multiple passes. It becomes immediately tack free after curing, helping to avoid handling defects such as fingerprints that may be left on the boards if they are handled too soon, or other damage caused by stacking and arranging the printing boards during processing.

Moreover, this multi-cure material can be applied to a variety of substrates including glass reinforced epoxy laminates, and various substrates found on components on PCBA’s with a good bond. In essence, the 29816 coating has been developed to cover sensitive information. As with all chemistries testing needs to be done to determine adhesion to specific substrates for maximum security. Electronic Coating Technologies provides automated atmospheric plasma treating capabilities to enhance adhesion to circuit assemblies when it is required.

The 29816 is applied like other conformal coatings by PVA Selective Conformal Machine. The use of the automated application allows the black conformal coating material to apply around LEDs without the need for masking LEDs or ‘keep out’ areas on a PCBA. The use of UV curable black conformal coating and automated application equipment greatly reduces material and associated applications costs compared to traditional potting processes.

Typical processing consists of application of the coating to the PCBA with a PVA robot and then transferred to either an inline PVA curing tunnel or a Dymax stand alone curing tunnel. This process lends itself to a safe environmentally friendly application of materials. While typical two component potting compounds lead to the creation of waste, both environmental and in manufacturing time, solvent free single component coatings and encapsulants allow for lean manufacturing techniques and reduced hazardous wastes.

29816 is yet another addition to the TEC conformal coatings product line, which includes UV/heat-curable as well as UV/moisture-curable materials in a range of viscosities, all providing circuit board protection and shadow-curing capabilities. Its ability to cure in seconds enables faster processing, greater output and lower processing costs. When cured with Dymax light-curing

spot lamps, focused-beam lamps, or flood lamps, it delivers ideal speed and performance. Dymax lamps provide suitable balance of UV and visible light for the fastest, deepest cures.

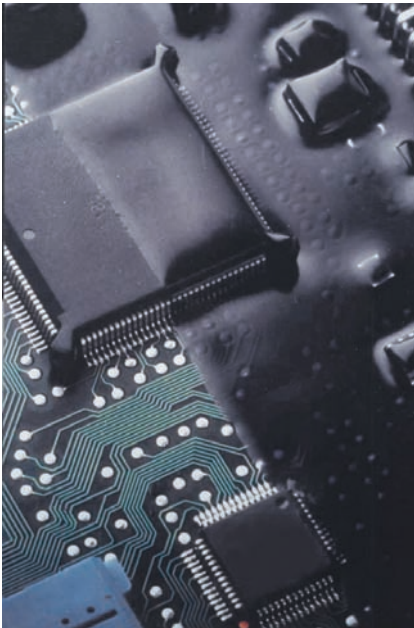
Light-curable conformal coatings help ensure pcb reliability in environments where moisture, condensation, dust, dirt, salts, chemicals, abrasion, thermal shock, mechanical shock, and other factors can all affect circuit performance. Each of ECT’s conformal coatings is one part (no mixing required) for easy dispensing and is electrically insulated so it can be applied over the entire pcb surface or in select areas to provide protection from service environments.

These conformal coatings are solvent-free and contain very low VOCs, eliminating the need for solvent handling. Many are formulated with secondary cure mechanisms (heat or moisture) allowing for curing in shadowed areas. Fluorescing grades

are also available, making it easier to see coating placement and coverage. IPC approved, MIL-I-46058C and UL listed grades are also available.

Electronic Coating Technologies is headquartered in Brampton, Ontario with other facilities in Cohoes New York and Everett Washington. The company is registered in the Canadian Controlled Goods Program and ITAR roistered in the USA. Electronic Coating Technologies is an ISO 9001:2008 registered company.

For more information on Multi-Cure 29816, a black UV Curable material from Electronic Coating Technologies, go to <http://ept.hotims.com/61398-71>



Black 29816 Coated Circuit Board

	UV Only	UV/Visible Light	Heat	Moisture	Features	Viscosity, cP	Shore Hardness	Tensile at Break, MPa [psi]	Modulus of Elasticity, MPa [psi]	Specifications
Conformal Coatings										
29814	●	●	●	●	Dual-Cure light/moisture cure for shadowed areas; solvent free; superior re-workability; thermal shock and chemical resistance; blue fluorescing	1,100	D70	15.8 [2,300]	275 [40,000]	MIL-I-46058C IPC-CC-830-B UL 746E UL 94V-0
29816	●	●	●	●	Secondary heat cure for shadowed areas; true black protective coating; designed for thin coatings	6,000	-	42.7 [6,200]	717 [104,000]	-
29978-E	●	●	●	●	Dual-Cure light/moisture cure for shadowed areas; solvent free; chemical resistance; blue fluorescing	125	D75	11 [1,600]	150 [21,800]	MIL-I-46058C IPC-CC-830-B UL 746E UL 94V-0
29979	●	●	●	●	Secondary heat cure for shadowed areas; flexible; high viscosity coating; blue fluorescing	14,000	D45	6.9 [1,000]	24.1 [3,500]	-
29817	●	●	●	●	Flexible; medium-viscosity coating for thin coating applications; solvent free; isocyanate free; blue fluorescing	2,300	D60	10 [1,500]	89 [13,000]	MIL-I-46058C IPC-CC-830-B UL Recognized
29818	●	●	●	●	Secondary heat cure for shadowed areas; blue fluorescing	150	D80	41.4 [6,000]	413.7 [60,000]	MIL-I-46058C IPC-CC-830-B UL 746C UL 94V-0

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product source feature product source feature product source feature

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## New Release - OrCAD 17.2-2016

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



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## High Density, High Current Inductors

MPS's new HWI4427 and HWI4434 series of Helical Edge Wound (HEW) High Current Inductors offers the highest current density package size in the industry. These inductors offer a wide range of inductance values from 1.4µH to 83µH and rated current up to 122 amps or higher in a very compact package. Various mounting options are also available, including mounting clip and base for extra, added support and resistance against vibration and shock.

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## Moxa EDS-205



The EDS-205 is one of a series of entry-level industrial 5-port managed Ethernet switches that are rated to operate at temperatures ranging from -10 to 60°C. They are rugged enough for any harsh industrial environment and can be easily installed on a DIN-rail as well as in distribution boxes. These plug-and-play switches are in stock in Canada and are available for immediate delivery at a new lower price!

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## products on review

### Machined banding backshell for 360° shield termination

EM360 banding backshell for D-sub connector applications provides 360-degree shield termination capability using a Band-It-style clamp. Device provides top opening, side opening and low-profile options. Product's split-body design is lightweight and made of a low magnetic aluminum alloy (EN AW 5083). Device features electroless nickel plating, while various cable entry diameters are available. Device is targeted to spaceflight and commercial aerospace applications where overall shielding is a necessity.



POSITRONIC

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### Dc-dc converter line meets certifications

connectPower PRO dc-dc converter product line complements firm's PROeco and PROmax power supplies. Units carry Class I Div 2 and ATEX certification as well as Class III protection. The electrically isolated product line avoids critical earth loops; from an unregulated or distorted input voltage, it generates a stable, low-distortion output voltage. Products provide a versatile solution for all 24Vdc power supply applications. Units are resistant to shock and vibration and can be mounted side-by-side without clearance requirements, offering up to a 30% reduction in cabinet space requirements.



WEIDMULLER

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## Nanocrystalline common mode chokes mount on pcb

**DKIH series** current compensated chokes with high current types for pcb mounting are now available with a nanocrystalline ring core, providing 8x higher inductance performance than ferrite core versions in the same compact dimension. Product is suitable for single and three phase applications with rated currents from 10 to 50 amperes. Due to its open design, devices are lightweight and compact, suppressing EMI noise caused by power applications on the pcb. Approved according IEC 60938, UL 1283 and CSA 22.2 no. 8, devices are suitable for single phase ac or dc applications from 10 up to 50 amperes. The voltage rating is 300Vac (IEC, UL) and 250Vac (CSA) with an inductance range of 1.6 to 6.9mH.

**SCHURTER**

<http://ept.hotims.com/61398-74>



## TX1 carrier serves start-up embedded market

**Orbitty NVIDIA** Jetson TX1 small form factor carrier serves the embedded marketplace in a wide range of applications. Device's lower price point will attract users in the educational space, start-ups and maker pros. Measuring 87mm x 50mm, product's design includes 1x USB 3.0, 1x USB 2.0 OTG, 1x HDMI, 1x GbE, 1x microSD, 2x 3.3V UART, I2C, and 4x GPIO. NVIDIA Jetson TX1 supercomputer on a module features the NVIDIA Maxwell architecture, 256 NVIDIA CUDA cores, 64-bit CPUs and power efficiency.

**CONNECT TECH**

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## CAUI-4 100G Ethernet compliance test software generates comprehensive pass/fail reports

**N8841A CAUI-4** compliance software application (for real-time Infiniium Z-Series oscilloscopes with 63 GHz bandwidth) and the N1082A-4TP CAUI-4 compliance software application (for 86100D DCA-X sampling oscilloscopes) help network design engineers accelerate turn-on and debug of 100G Ethernet networking systems. Automatic execution of physical layer tests ensures accurate results while reducing test times from hours to minutes. Software provides automated test scripts that allow quick and reliable testing of chip-to-chip and chip-to-module channels at specified test points. Engineers can automate both software applications to run over extended periods of time as well as add their incremental user-defined tests if desired.

**KEYSIGHT TECHNOLOGIES**

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## Digital thermal multimeter reaches tight spaces

**Fluke 279FC** Wireless TRMS digital thermal multimeter is full-featured with an integrated thermal imaging camera. Product is compatible with iFlex (a flexible current clamp) to expand measurement capabilities and



get into tight, hard to reach spaces. Unit transmits results wirelessly to a smartphone and instantly monitors measurements live on smartphone screen. Create and email reports from the field. Device operates with an ac mV Range of 600.0mV with a resolution of 0.1mV and an ac mV accuracy of 45Hz to 500Hz.

**ITM INSTRUMENTS**

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## Power supplies serve embedded open frame switchers

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