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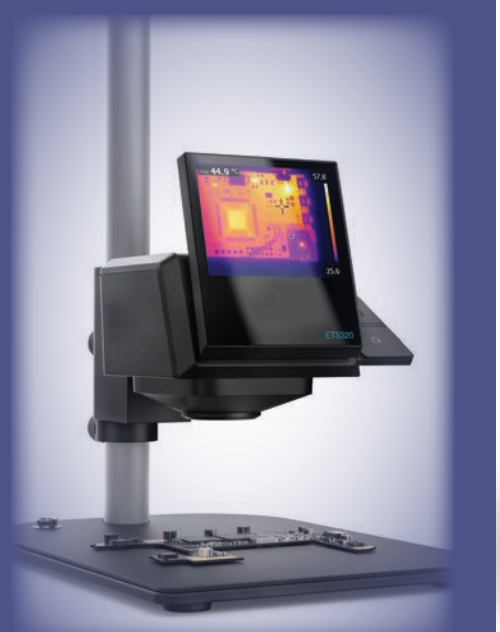

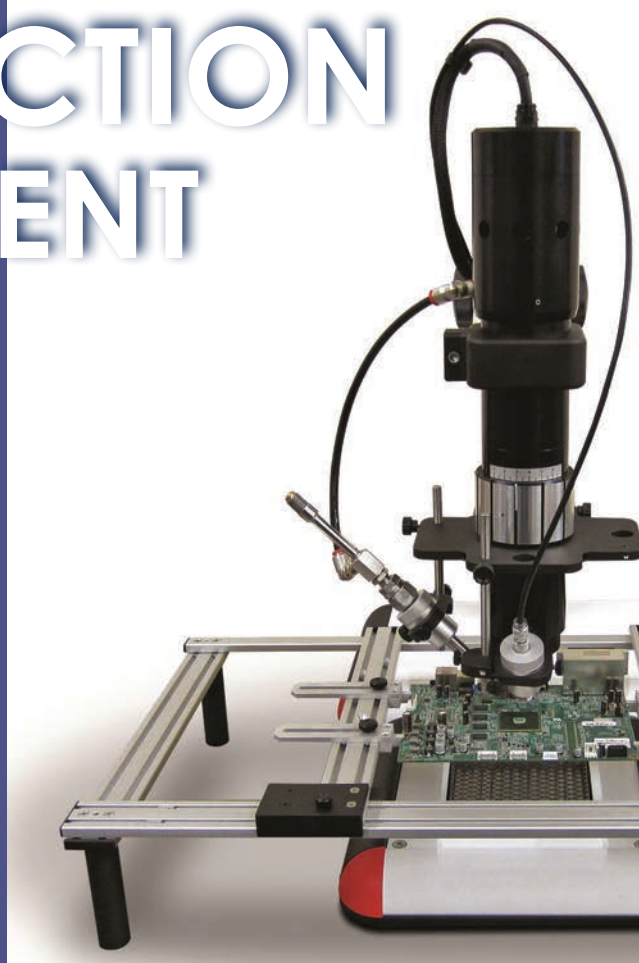

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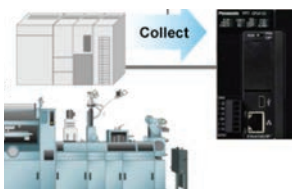

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Canada

Wavefront Summit rides digital innovation tsunami

As the digital revolution continues its tumult upon traditional business models globally, tech firms across Canada are investigating how they might capitalize on the opportunities presented by the emerging knowledge-based economy.

Naturally, players in the electronics design sphere must investigate how they can capture their share of infrastructure development in this new paradigm.

I had the opportunity to attend an event in Toronto this May, which focused primarily on bringing stakeholders together to discuss the latest trends, create connections and deliver groundbreaking business intelligence to drive performance, growth and profitability in the digital era. The summit gathering was organized by Vancouver-based Wavefront, a start-up accelerator for wireless, mobile and IoT innovations.

According to James Maynard, president and CEO of Wavefront, all Canadian businesses must adopt the mindset of a startup – immediately. Maynard's emphasis on building digital competitiveness is backed by the results of a 2016 survey by Forbes Insights and Hitachi. The survey results show digital transformation is the top strategic priority for 50% of CEOs and investing in new technologies to enable digitization is the top investment priority over the next two years.

"We need to approach this with more urgency and with a different mindset. In the past, innovation was closely linked with cost reduction. As much as 70% of a corporate investment was aimed at optimizing existing processes. Approximately 20% was directed at driving adjacent growth. Only 10% was focused on new markets and opportunities," Maynard's said in a piece he wrote for the *Globe & Mail*.

"That approach worked when we had five- and 10-year business cycles. But today, we need to turn that model upside down. Businesses must match the pace of change in the marketplace. In particular, rapidly changing customer expectations are putting pressure on businesses to transform their processes. It's time for business leaders to aggressively re-evaluate how they manage their innovation investments," Maynard said.

Responsible for supporting the growth of wireless and mobile companies for the past decade in Canada, Wavefront has witnessed a fledgling industry grow into an unstoppable force. Representing the only national organization focused exclusively on IoT in Canada, Wavefront provides services to SMEs that are transforming processes and seizing global opportunities.

"We need to cultivate forward-thinking corporate leaders who are determined not to be left behind. Government must understand they have to develop regulatory and policy agendas that are in sync with and moving at the pace of the new digital economy," Maynard states.

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NEWSWATCH

NEWSWATCH NEWSWATCH

U of Waterloo supercomputer to field big data research, machine learning

The University of Waterloo, Compute Canada and Compute Ontario unveiled the largest supercomputer at any Canadian university. Located at Waterloo, it will provide expanded resources for researchers across the country working on a broad range of topics, including artificial intelligence, genomics and advanced manufacturing.

Named Graham, the supercomputer can handle more simultaneous computational jobs than any other academic supercomputer in Canada, ultimately generating more research results at one time. With its extraordinary computing power and a storage system of more than 50 petabytes — or 50 million gigabytes — Graham can support researchers who are collecting, analyzing, or sharing immense volumes of data.

"Research and innovation have helped define the University of Waterloo, and will remain important priorities for our future," says Feridun Hamdullahpur, president and vice-chancellor of Waterloo. "Graham allows us to increase our capacity to be a global leader in advanced computing. Thanks to the support of both the federal and provincial governments, CFI, Compute Canada and Compute Ontario we will be even closer to realizing this vision."

Supercomputing, data centres part of national initiative

Graham is the result of an investment worth $17 million from the Canada Foundation for Innovation (CFI) and the Government of Ontario. It is one of four new supercomputing and data centres that are part of a national initiative valued at $75 million that involves CFI, and various provincial and industry partners. Compute Canada, in collaboration with its member institutions and partners, is implementing the improvements to facilities across the country. SHARCNET, a multi-university consortium in Ontario, led the implementation at Waterloo in partnership with Compute Ontario.

Supercomputers are a fundamental part of Advanced Research Computing (ARC), which plays an essential role in scientific discovery, innovation and national competitiveness. Graham is the third of four new national systems at universities across Canada.

Entest to join Testforce Group of Companies

The Testforce Group of Companies has expanded its reach in the test and measurement industry with the recent acquisition of Entest Inc., a test and measurement distributor.

Entest will join the Testforce USA, DVTEST, Testforce International, and Xpresstest businesses as part of the test and measurement arm of Testforce. Entest will have a balanced partnership with these companies which currently operate in similar capacities, allowing them to utilize valuable relationships with existing suppliers. Each Testforce company will continue to operate as a separate entity with no disruption to their respective customers, suppliers and representatives.

"The transaction provides Testforce immediate expansion into the US, expediting what would have been possible through organic growth," says Tony Tirelli, V.P. business development at Testforce. "Through the application of Testforce's business model, Entest's existing direct sales and rep channel will receive additional resources to further grow the US business."

Telecommunications: Ottawa must not hold back the 4th industrial revolution

The advent of the Internet of Things (IoT), expected to soon revolutionize every aspect of the economy and people's lives, will force Ottawa to reconsider its telecommunications priorities and policies, argues the 2017 edition of The State of Competition in Canada's Telecommunications Industry, recently published by the MEI.

This "fourth industrial revolution," as it is described, will not just disrupt the telecommunications industry. From appliances to security systems and from body sensors for patients to the management of road traffic and agricultural production, everything will soon be connected to the Internet. In Canada, the total value of this market will reach $21-billion by 2018. This increased data traffic will need to pass through telecommunications networks, in particular the new 5G wireless technology that will be deployed over the coming years.

"Major network investments will therefore be required to accommodate this exponential growth of traffic," explains Martin Masse, co-author of the report. "Yet only solid national and regional providers with their own infrastructure have the means to invest in the wireline and wireless networks that will be required to keep up with IoT developments. These providers invest more than $11-billion on average every year in network infrastructure, while resellers only invest about $30-million."

Masse points out that the policies of the federal government and the CRTC over the past decade, aimed at propping up undercapitalized wireless players and Internet service resellers, have only encouraged artificial competition and led to waste and the misallocation of resources like spectrum. These policies, if pursued by Ottawa going forward, may well slow down the development of the Internet of Things in Canada.

Indeed, these policies were criticized in the first three annual editions of this report.

"Facilities-based competition, as opposed to service-based competition, is the best way to spur innovation. We pointed this out in previous editions of this report, but it's even truer today, with the arrival of the Internet of Things," says Paul Beaudry, co-author of the report.

There is no doubt, according to him, that Ottawa should adapt its policies to the new IoT reality.

"In any case, only providers with their own wireline and wireless infrastructure will be able to manage the networks so as to ensure the safety and robustness required, for example, for the navigation systems of self-driving cars. Resellers will have no role to play in this market," Beaudry explains.

Rittal launches ROI calculator online

Rittal Corp., global manufacturer of industrial enclosures, accessories and machinery, has launched an online tool to help system integrators calculate and compare the labor savings of automated panel modification.

For prospective buyers of the Rittal Perforex system, the calculator is a simple tool to show how quickly the machine will pay for itself in labor and time savings. The inputs for the Return on Investment (ROI) Calculator include:

- Number of holes and cutouts per job
- Number of enclosures modified per month
- Labor rate

"In general, manual modification that takes a few days, can be completed in hours on automated modification equipment like the Perforex," says Mike Herzog, Rittal automation systems business manager.

Patriot One Technologies broadens product commercialization

Patriot One Technologies Inc., Toronto-based developer of an award-winning concealed weapons detection system, reached an agreement with a strategic industry partner aimed at significantly broadening its ongoing product commercialization activities.

The opportunity is being undertaken with a well-established and industry leading organization recognized as a Tier 1 Systems Integrator with offices and facilities around the globe. Patriot One has entered into an agreement which provides for a technical evaluation by both parties to identify operational efficiencies and opportunities employing Patriot One's concealed weapons detection software and related hardware components. This will be accomplished through a series of integration tests with the partner.

Both parties have indicated a willingness in principle to enter into a Value-Added Reseller (VAR) relationship whereby Patriot One may appoint the partner as a sales representative for several potential major markets.

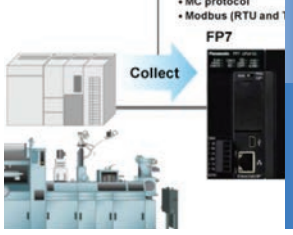
"Working with major commercial partners exactly aligns with our business model, as it offers extraordinarily attractive opportunities to propel our product roll-out and holds the potential to drive significant awareness of our product's ability to decrease the menace of random public violence," says Martin Cronin CEO, Patriot One.

MIPI Alliance forms group to define embedded security considerations

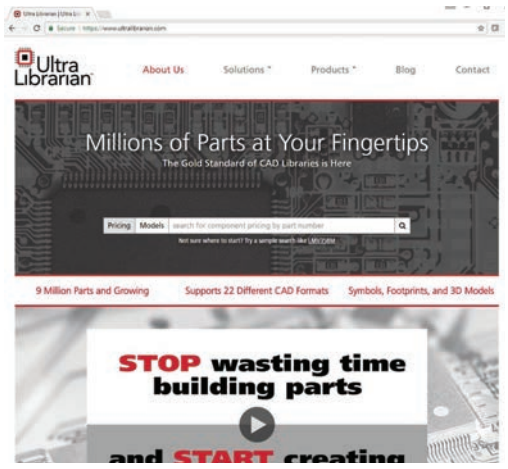
The MIPI Alliance, an international organization that develops interface specifications for mobile and mobile-influenced industries, has formed a Security Birds of a Feather (BoF) group to evaluate potential needs and strategies for addressing security in MIPI Alliance interface specifications. The Alliance is issuing a call for participation in the BoF to engage the broadest possible community of security representatives in this work. The group is open to MIPI Alliance member companies as well as non-member security experts.

While MIPI Alliance's interface specifications are industry de facto in mobile devices and a broad range of mobile-influenced applications, the Security BoF provides an opportunity to engage the broader mobile ecosystem to ensure that the security needs of the industries served are met. The new security BoF, in partnership with the MIPI Alliance Technical Steering Group (TSG), will provide recommendations and guidelines to the MIPI Alliance Board of Directors on how to address the ever-growing mobile security concerns. These strategic initiatives will impact security design decisions in mobile components and chipsets, smartphones, mobile-connected devices, IoT products, automotive use cases and other applications.

"The security BoF will help the MIPI Alliance define security needs and guide a consistent approach for addressing security in MIPI specifications," said Enrico Carrieri, chair of the MIPI Alliance Security Birds of a Feather group. "We expect the work of this group to provide strategic value for those developing products in mobile devices, automotive, wearables, biometrics, point-of-sale devices and many other growing markets."



Website 'Librarian' eases access to ECAD/MCAD



EMA Design Automation, a full-service provider and innovator of electronic design automation (EDA) solutions, has created a website for Ultra Librarian.

The site, found at **www.UltraLibrarian.com**, provides electronics designers online access to pre-authored and verified parts with pricing and technical information to help them choose the best electronics components for their designs and the ability to download symbols, footprints and 3D models.

"With the creation of this site, engineers now have a centralized, online component repository for part search and model download," says Manny Marcano, president and CEO of EMA. "This reduces potential errors and speeds up the design process by minimizing the time designers spend searching for and creating library content, giving them more time to create outstanding designs."

The new Ultra Librarian website allows users to search through over 40 million components to compare pricing, availability and technical information in order to find the perfect parts for the design. The site allows searching by part number, partial part number, or keyword. Non-specific searches often return tens of thousands of results, so users can narrow their search by category, compliance, distributor, or manufacturer. The resulting part list includes links to a detail page, the manufacturer, and the datasheet for final selection. Once the appropriate part is selected, the user can switch to the model page to download a symbol, footprint and 3D STEP model for the part, if they exist.

PEI-Genesis reaches million unique part milestone

Reinforcing itself as a global leader in quick-turn assembly of precision connectors and cable assemblies, PEI-Genesis recently reached an inventory of one-million unique parts.

"It's the perfect time to say 'thanks a million' to our customers, our partners and our own team who collectively drove us to this milestone," says Steven Fisher, PEI-Genesis president and CEO. "When my father started the company just over 70 years ago, the company probably had around several thousand parts on hand. To hit the one million mark is a true testament to the long-term strategic focus of the company to make unique component combinations available with minimum order size of one piece and shipping, in most cases, in less than 48 hours."

Avnet signs global disty deal with Silego

Avnet, a leading global technology distributor and Silego Technology have reached a new exclusive global distribution channel agreement, whereby Avnet will be Silego's only global distributor and will serve as Silego's sole demand creation distributor in the Americas and Europe. Avnet will also bolster Silego's current regional distributor network in Japan, Korea, Taiwan and China.

Silego pioneered the development of Configurable Mixed-signal ICs (CMICs), using nonvolatile memory to configure and integrate analog, digital logic and power functions, enabling design engineers to reduce power, cost, size and time to market. Since the introduction of the CMIC technology, Silego has developed five generations of CMIC silicon and design tools and sold over 2.7 billion units.

Mouser signs global disty deal with MEMSIC

Mouser Electronics Inc. has reached a global distribution agreement with MEMSIC Inc., global leader for the consumer electronics, communications, automotive, medical and industrial sensing sectors. Through the new agreement, Mouser will distribute MEMSIC micro-electromechanical systems (MEMS) sensors to customers worldwide.

The MEMSIC product line enables mobility and the Internet of Things (IoT) by combining all the essential elements for engineers' application needs, including solutions for drones, mobile, wearable, industrial, medical and smart parking applications.

X Tronics to represent SUNS electromechanical

X Tronics Inc., Concord ON, has signed a manufacturers representatives' agreement with SUNS, a leading manufacturer of high quality industrial control components. The firm's products range from the widest variety in limit and micro switches to complete lines of foot switches, push buttons, and control stations. As an established member in the industry, SUNS' manufacturing facilities are ISO9001:2008 and all products are certified by UL, CSA, CE and CCC standards.

Making automation work with legacy systems

By Rich Miron, Digi-Key Electronics Corp.

Smart manufacturing, or Industry 4.0 (the fourth industrial revolution), which is empowered by the Industrial Internet of things (IIoT), can enable companies to improve key performance indicators like productivity, equipment uptime and product quality. It does this by combining automation with big data to not only improve productivity, but to also reduce waste, lower energy consumption, and enhance factory flexibility.

Companies may be eager to take advantage of the opportunities that are available, but uncertain about how to make the change without incurring unacceptable disruption or wasting their investment in existing equipment.

Businesses have several considerations which may present additional hindrances to transitioning their production lines including the significant capital commitment in machinery currently in place and the fact that owners may not be ready to engage in wholesale replacement, or an upgrade project that may involve reprogramming controllers such as PLCs. PLC programs can be complex, and even if enough is known about the current program for successful modification to be possible, the PLC itself may not have enough additional resources available to support the extra functionality.

Adding smart to existing facilities

To address these concerns, some organizations are exploring approaches to introducing web connectivity as an add-on to an existing installation. This opportunity may help to lower the cost of entry to smart manufacturing, especially in cases where the installed equipment may contain large numbers of sensors that are used for basic process control. Although rich data may be currently collected, the lack of external connectivity prevents the company from realizing its full value.

The Industrial Internet Consortium (IIC) has published the Smart Manufacturing Connectivity Testbed, which proposes a solution for extracting data that normally flows through an I/O module to the PLC. This testbed replaces conventional I/O modules with a gateway that sends the data to an IT system through an additional communication channel using the industry-standard OPC Unified Architecture protocol. By using open standards for communication and a common device model, the IIC proposal enables users to configure and manipulate the sensors via the IT system.

Connect to a machine, connect to the Internet

The Panasonic FP7 dual-role PLC has been designed to enable companies to introduce IoT functionality as an add-on to an existing automation system. The controller is equipped to deal with any protocol such as Ethernet/IP, Modbus (RTU and TCP), Profibus and others, allowing it to collect information from an already installed PLC (Figure 1).

A built-in web server enables users to visualize the data using a browser on an ordinary device such as a mobile or desktop PC. The dashboard can be customized

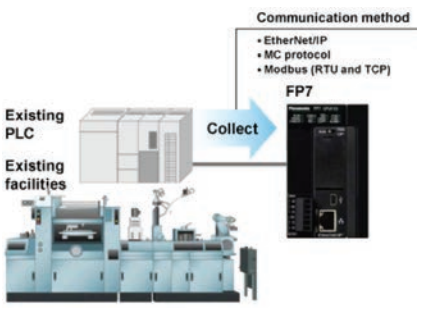


Figure 1: A dual-role controller collects information from an existing PLC and makes it accessible remotely and securely.

using a PC-based creator tool that allows components such as switches, lamps and meters to be selected and arranged by drag and drop, and set up quickly and easily by selecting properties (Figure 2). The FP7 also supports email alerts that can be used to send status updates, event notifications, or exceptional conditions that require immediate attention.

By directing data from the existing controller to a device such as a smartphone or PC equipped with a browser (Figure 3), the FP7 provides an easy-to-use and low-cost entry point for manufacturers to explore the power of the IoT to enable smart manufacturing practices. It can be added without major disruption, and can connect to multiple automation controllers such as PLCs or other Ethernet compatible equipment, and display data from up to 16 controllers simultaneously. It can also connect to several PCs at the same time.

Figure 2: The graphics creation tool helps design a clear dashboard to display the collected data.

Collected data can be stored securely and managed on the device, and flexible sharing of the controller's code and data registers maximizes utilization of the available storage and so saves purchasing additional expensive memory. On the other hand, it is also possible to transfer collected data to other media, such as

Figure 3: Data can be accessed using any connected device equipped with a web browser.

a PC, or via Secure Sockets Layer (SSL) compatible secure communication with an FTP client or a web server on an external LAN. This allows data such as inspection data from a production line to be accumulated on the server and inspected at any time. The FP7 can also read data back from the external devices.

Companies using this approach to IoT connectivity and browser-based process management can extend their smart manufacturing by using the FP7 to transfer captured data to a Cloud-based analytical application.

As a modular PLC that can be configured with a variety of digital and analogue I/O, the FP7 also allows new sensors to be added to the system to provide more detailed information about the process or equipment being monitored. Other modules include positioning units, high-speed counters, pulse output units and remote I/O. This enables a scalable approach to smart manufacturing, permitting users to experience the power of the IoT at a minimal risk before moving on to develop a customized long term strategy.

Conclusion

The advantages of smart manufacturing can be clearly understood when looking at improved manufacturing productivity and overall business performance. However, implementing smart manufacturing in a cost-effective manner and developing scalable strategies are difficult challenges that can be complicated further by legacy equipment technical limitations. Studies, such as the IIC's connectivity testbed, have acknowledged the need to add smart manufacturing capabilities to existing facilities with minimal changes to legacy equipment. Utilizing a dual-role PLC, such as the Panasonic FP7, offers a practical solution for realizing greater value from the data currently unavailable from unconnected automation equipment.

For more information on Industry 4.0 from Digi-Key Electronics Corp., go to http://ept.hotims.com/65988-24

Harting distributes awards at EDS Show

Open house features keynote from MIT Hyperloop project team lead and delivers awards to distribution partners

German-based interconnect provider Harting Technology Group held its annual open house and distributor awards event during the Electronics Distribution Show (EDS) this May at the Mirage Hotel in Las Vegas.

Now an annual tradition for the firm, Harting provides its distribution partners the opportunity to see how it is shaping the future with new technologies. This year the theme was 'Tomorrow's technologies trusted today', highlighting how Harting technologies make future-forward applications possible.

The event began with president & CEO of Harting Americas, Jon DeSouza, who discussed how the company's trusted technologies has made innvoation possible throughout the years and is leading the way for IIoT. DeSouza highlighted two key products that are helping to push the company to the forefront of IIoT – the Hermes award winning Harting MICA and the Smart Han, which brings intelligence directly to the connector.

Following, Philip Harting, chairman of the board of Harting globally, shared a update on the future of the company worldwide. He communicated that the company is forecasting an 8% growth in 2017 and how partnerships with distributors has been a key component.

The highlight of the event was a keynote from Dan Dorsch, one of the project team leads from the MIT Hyperloop project. Dorsch gave an overview of the project – which Harting sponsored – focusing on the challenges of the project and how Harting's products helped them win the award for Safety and Reliability and place third in the overall Hyperloop pod competition.

Finally, Harting acknowledged its partners with their annual Distribution Awards. The following companies received recognition from Harting for their successes in the last year:

- Distinguished Award for Distributor of the Year: Digi-Key Electronics who grew FY16 billings and bookings revenue by more than any other Harting Distributor.
- Distinguished Award for New Customer Growth: Allied Electronics who added more new Harting customers than any other Distributor and sold to more customers in FY16 than any other Distributor.
- Distinguished Award for New Product Sales Growth: Digi-Key Electronics who grew new product sales revenue by more than any other Harting Distributor.
- Digital Marketing Partner of the Year: Arrow Electronics who made a significant investment in Harting NPI and digital marketing.

Allied Wire & Cable gains representation in Canada

Allied Wire & Cable (AWC) recently appointed veteran of the wire and cable industry, Eric Tremblay, to its sales force. Previously serving as a longtime employee of BJG and A.E. Petsche, Tremblay will be running its newest office in Montreal.

"I'm excited to join the Allied team and expand our reach internationally with feet on the ground," says Tremblay on his move to Allied. "I was very impressed with the Collegeville facility: its lean practices, organized and efficient warehouse, as well the very welcoming staff. I look forward to working with the staff from all branches and increase our sales across all industry sectors."

Tremblay has more than 20-years of experience in the MIL-aero wire and cable industry in North America and Europe. His background encompasses inside sales, outside sales, account management and office/branch management.

Allied Wire & Cable is a family-owned and operated specialty manufacturer and distributor with over 25 years of experience in the wire and cable industry. AWC serves all major global markets including: government, military, aerospace, automotive, and telecommunications. AWC is dedicated to personalized service and assigns an individual sales rep to each and every customer.

Allied Wire & Cable is headquartered in Collegeville, PA, with sales and stocking locations throughout the USA and in Canada.

The testing dilemma for young tech startups

By Cliff Ortmeyer, global head of technology product marketing and solutions development, Premier Farnell

The last decade has seen a surge in innovation by small, young technology startups, proving that companies don't need to be large and seasoned to lead the market. While startups have flexibility and focus that many big companies lack, some areas of technical development are harder for small companies to master.

For a young company anxious to get its products in the market, electronic test and measurement (T&M) may seem like a time-consuming, exacting distraction that slows time to market. Yet T&M is a crucial discipline in any development workflow, and thorough testing is arguably even more critical for startups than for more established companies.

Launching an unreliable product because corners are cut to allow an earlier launch can be financially disastrous to large companies, who may have to invest huge sums of money to repair their reputation (think of the recent issue of flaming handset batteries). Startups, however, will rarely survive such events.

It is true that small companies focused on development of cutting edge products and technologies rarely have deep expertise in T&M. That's why product designers in startups often need outside support to help navigate the exciting yet critical early workflows when bringing their ideas to life, particularly to ensure adequate and thorough testing.

T&M hurdles for startups

There's no question that testing is considered one of the least glamorous aspects of electronics, a perception that can have an impact on the role of testing programs at small startups. Entrepreneurs can fall into the trap of forecasting to hire a sales team, but forgetting to budget for testing. Although sales teams are necessary, without sufficient budget to test new products adequately, the sales team might not have a product to sell.

Another testing issue common with startups involves small initial test runs of new products. While the first five or ten products off the production line may function as expected, later units off the line may not perform to specifications. This can be due to errors in design or variation in components. Testing helps design engineers discover unanticipated problems that manifest when production is scaled, especially if components are operating on the edge of their tolerance.

There is a huge difference between a design that is successful on paper and a design that behaves as expected when put it to the test. All devices are made from individual components, which have their unique tolerances and parameters. Even with careful attention, stack tolerances can quickly cause a design to fail due to misalignment of boundary components.

The growth of embedded software-based products means the focus on testing to find and fix run-time problems can be even more critical. Even though many of these products use off-the-shelf hardware, the complex nature of the software, especially in IoT, industrial and healthcare industries, requires a well-planned testing regime.

A related challenge that startups face is the need to access reliable manufacturing. Although testing products during development is crucial, high-quality manufacturing processes are also important to ensure high-quality products. As good as the product design may be, without a reliable manufacturing partner to perform their part in the process, the product may never get past prototyping.

Testing expertise and expense may present challenges for startups

Access to testing expertise is another challenge. Current engineer programs tend to turn out young developers with great coding and software development skills, but are often less familiar with hardware integration (in fact, development boards such as BeagleBoards and Raspberry Pi make it possible for designers with very little hardware experience to become effective developers). However, thorough testing requires knowledge of the hardware platform, particularly for application dependent testing that evaluates the tolerances of microprocessors when running critical applications.

In fact, with the rapid expansion of new technologies over recent years, one of the big challenges for designers in early-stage companies is having the expertise to know what and how to test when products contain multiple, overlapping technologies.

Designers in small startups are often under pressure to be experts in multiple fields, which is a fine idea on paper but not realistic in practice. Wireless power, for example, is a technology that many designers may be required to implement in future designs. This means that designers must know not only how to design a wireless power system, but also understand how to test for multiple parameters they have never encountered before.

Designers in small startups are often under pressure to be experts in multiple fields, which is a fine idea on paper but not realistic in practice

Unless they have expertise in this field of design, proper testing of items like foreign object insertion may cause a product design flaw that might not be discovered until it's too late. This challenge is particularly evident when designing a product for use in regulated industries such as healthcare, as products must meet strict regulatory requirements and industry standards. Obtaining the necessary certification is difficult, and especially so for startups that may be unfamiliar with the processes.

Another area requiring specialized testing skills is energy efficiency. With an increased focus on saving energy, entire solutions must be designed with power savings in mind, meaning each part of a design needs to be tested and optimized. The increasing adoption of IoT in almost every market sector drives the placement of sensors everywhere, and often energy efficiency is the most challenging requirement in these systems, particularly if the device is battery-powered. The use of certified and regularly calibrated test tools is crucial to avoid inaccurate readings which could go on to cause problems further down the line.

The cost of testing can also be a significant obstacle for startups. Though the investment is worth making, T&M tools and the time commitment to testing both require significant outlays, and sometimes account for a large portion of a product's initial manufacturing cost.

Tips for more effective startup testing strategies

Successful startups have clearly defined approaches for testing during product development and launch. That's because the primary benefit of a healthy testing strategy is the development of more robust products that are truly market-ready. Other benefits include reduced development costs from finding faults earlier in the design process, and a more efficient design phase that leads to reduced time to market.

Here are some tips to help startups put in place an effective testing program. While small startups may feel they lack the bandwidth and expertise to fully establish a full T&M protocol, equipment distributors and manufacturing partners offer services that can lower the threshold of cost and expertise necessary for a thorough testing strategy, putting effective testing within reach of even the smallest companies.

Reduce the cost of T&M eEquipment:

One of the main elements of a successful testing strategy is having access to the right tools to test your product. Investing in test equipment to support a testing strategy provides a strong foundation for ongoing product development, making all future versions of a product easier to test and improve since the groundwork is already laid.

Investing in high-quality testing and measurement tools will pay dividends, as they can be used across the product lifecycle, from research through to development and beyond.

A trusted technology partner can provide startups with access to a broad range of testing tools specifically suited to the needs and budgets of different sized businesses and startups. Rather than buying individual tools, for instance, mixed domain tools allow design engineers to test for a variety of requirements using one multipurpose integrated tool, which is a more cost-effective investment. The increased use of USB-based tools also provides a major advantage for startups, as they allow access to multiple tools at a lower cost. Equipment rental is also a good idea, especially for instruments that are not used frequently. Purchase of private label brands is another good cost-saving option.

Use Simulation Technology as Part of the Test Strategy:

Time to market is a huge factor for most startups, as their smaller size and agility allows them to gain and retain a competitive edge over larger and more slow-moving companies. With the increase in design complexity, whether it is utilizing more PCB layers, more complex software development, or even new mechanical and packaging technologies, simulation technology can help startups maintain their advantage by finding and eliminating errors that may not otherwise be revealed until production, meaning that the number of design iterations can be reduced.

Understand Necessary Standards and Tests:

Developers need to understand that certain industries are regulated, and for products to be approved in these markets, they must meet regulatory standards. For instance, wearable health and medical devices are a popular target for IoT designers. However, these products may need to meet strict Food and Drug Administration (FDA) and other guidelines to reach a mass market. In addition, different governmental units may mandate different tests.

Products to be sold in the European Union need to meet Conformité Européenne (CE) compliance, while products to be sold in the United States must be certified to Federal Communication Commission (FCC) standards. Products that are targeted for sale in both geographies will need to comply with both sets of standards. Regulatory compliance is complex and a moving target. Seeking guidance from your technology equipment provider can take the guesswork out of meeting regulatory compliance.

Rely on a trusted manufacturing partner to get it right:

The manufacturer that builds your product also can evaluate it during production, especially for adding the proper test points on the board and designing a proper final test procedure. Working with an experienced manufacturer will help not only define the necessary test software and hardware jig, but also root out potential failures caused by using fake components acquired through channels other than authorized distributors.

Manufacturers can also perform incoming quality control testing of components, which helps ensure that the components operate to their published parameters. This can be a particular problem when parts become obsolete or unavailable, as finding a compatible replacement can be a headache. A thorough testing framework is useful in this scenario because replacement parts can be tested for compatibility prior to being introduced to the production line. Buying from an authorized distributor can also help to alleviate these issues.

Conclusion

While developing an ongoing testing strategy does present challenges, the benefits to startups far outweigh the cost and time required. Failure to test can result in catastrophic consequences and startups are particularly vulnerable.

Fortunately, there are solutions that make testing and measurement accessible for design engineers, and by working with an experienced industry partner, designers can be sure they will receive the expertise, tools, support and guidance needed to make their designs—and indeed their new business—a success. To help address the knowledge gap with new technologies, designers need to work with companies that have the expertise, experience and support to guide them through the necessary processes.

For more information supply chain support for start-ups from Newark element14, go to http://ept.hotims.com/65988-25

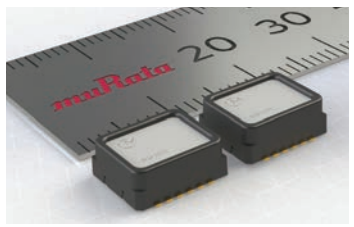
Medical 35W triple output power supplies require no minimum loading

CUT35 low profile, triple output power supplies are packaged in the industry standard 2" x 4" footprint and require no minimum load, simplifying installation. Operating from a universal input voltage of 85 to 265Vac, products are available in two standard models - CUT35-522 providing 5V +12V output voltages and CUT35-5FF 5V +15V with an output power of 35W. Units can be configured as dual output power supplies (5V 24V or 5V 30V) by connecting outputs 2 and 3 in series.

TDK-LAMBDA

http://ept.hotims.com/65988-26

3 axis MEMS accelerometer boosts performance



SCA3300 series high performance 3 axis MEMS accelerometers measures 7.6 x 8.6 x 3.3mm and is suitable for a range of industrial and automotive applications. Small surface mount sensor provides several measurement ranges of 1.5, 3, or 6g and delivers lower than 10mg offset stability. Devices deliver best-in-class MEMS sensor characteristics with a non-linearity of 0.1% and noise density of 37 ug/√Hz. Device boasts an operating temperature range from -40C to +125C.

MURATA

http://ept.hotims.com/65988-27

Connector range utilizes half-moon inserts

S series Push-Pull connector system includes outershell design using firm's chocolate bar shape. Product uses the S series half-moon inserts and is fully compatible with the existing S series sockets on the market. Both straight plug and free socket use the collet of the B series, thus offering a slightly different cable range than the existing S series.

LEMO

http://ept.hotims.com/65988-28

SMD ceramic capacitors come in 1808, 1812 packages

SANYO-CAP S3 Series SMD ceramic capacitors are X2-Y3 safety certified and available in both 1808 and 1812 package sizes. Products are cULus and TUV approved and come in the value range from 3.9pF to 1,000pF in NPO material and 150pF to 5,600pF in X7R material. Rated voltages of 2,000 and 3,000 volts are available in both materials. NPO values are available in both 5% and 10% while X7R values are available in 10% and 20% tolerances. Devices are available in standard tape & reel packaging with quantites per reel from 500 pieces to 3,000 pieces depending on the case thickness.

S-P INTERNATIONAL

http://ept.hotims.com/65988-29

USB connectors suitable for harsh environments

IP67 SuperSpeed-USB 3.0 Connector Series, suitable for use in harsh environments, provides data transfer rates 10-times faster than USB 2.0. Devices are integrated into firm's bayonet locking housing, allowing a fast, simple and robust IP67 protected connection and protecting against environmental influences in rough conditions. Product family supports up to six devices with up to 150mA load per device, i.e. a total load of 900mA. Products are available in plastic and metallised plastic. The Type A / Type A panel mounted receptacles are suitable for front and rear panel mounting.

CONEC

http://ept.hotims.com/65988-30

Pre-assembled FO splice boxes meet high demands

Ready to splice, pre-assembled 19" splice boxes for OM2 and OM4 classes of fiber optic-based cabling of control cabinets or computer centers. Units provide a compartment that can be pulled out at the front with 12 or 24 LC duplex connections. The FO pigtails fed into the splice cassettes each have unique color coding to simplify assignment to the front connections. Individual test reports establish the insertion and return loss of each pigtail, so that the pre-assembled boxes made from robust sheet steel are ready to splice.

PHOENIX CONTACT

http://ept.hotims.com/65988-31

newswatch

Stretchable electronics defined: report sheds light

by Dr Khasha Ghaffarzadeh, Research Director, IDTechEx

Stretchable Electronics is a term that conceals great diversity. Indeed, it is an umbrella term that refers to a whole host of emerging electronic materials, components and devices that exhibit some degree of mechanical stretchability.

Stretchable electronics has been in the making for more than a decade, but it up to now it has been mostly a solution looking for a problem. Recent analysis by IDTechEx Research however finds that this is about to change. A new report from IDTechEx finds that the market for stretchable electronics will reach at least $600m by 2027.

Stretchable interconnects are the first to market

The seemingly simple interconnect is one of the first applications to be commercially launched. Here specially formulated conductive inks or stretchable wires/yarns are used in electronic textile applications. The inks are also targeting other applications such as highly pliable pcbs, or long and stretchy medical electrodes (e.g., ECG).

The same or similar inks can also be used as sensors by exploiting the resistance changes with elongation. The inks are often protected under an encapsulation or overcoat layer, which in itself is becoming an area of innovation for material suppliers.

In-mold application to take off after years of false starts

An expanding tool kit of materials compatible with in-mould electronics (IME) is also being developed. This materials need to withstand thermoforming and moulding conditions including a one-off elongation event. Here too, conductive inks and adhesives were the first IME-compatible materials but the choice is now expanding to include transparent conductive films, sensors, actuators, and so on. We expect 2017 to be the year when IME applications hit the market afters year of false starts.

Stretch sensors find their niche

Stretch sensors are also finding use in a diverse array of applications. In fact, the industry is now in the brainstorming phase and we have already witnessed the identification of several promising niche applications beyond electronic textiles and robotic arms. These sensors come in a variety of formats and are based on different principles of operations. Some examples are shown below.

Pcb makers ready for stretchable electronics

Pcb manufactures are also developing processes to manufacture stretchable pcbs following the rigid island-stretchable interconnect approach which combines mechanical flexibility with the high performance of rigid electronics. Indeed, our team has seen numerous such companies all over the world prototyping samples and seeking ways to speed up the production process without compromising yield or circuit complexity. In parallel, manufactures are also developing ways to further thin PCBs or develop novel materials to create stretchable and/or conformable PCBs. Some examples are shown below.

Long tail of innovation in stretchable electronics

There is also a long tail of innovation on all types of stretchable electronic devices, including batteries, energy harvesters, displays, transistors, photovoltaics, and so on. Many such devices are still in the early proof-of-concept phase and device complexity often suggests prolonged development times. Nonetheless, they will, soon or later, form a part of this emerging frontier of electronics.

Overall, this new technological frontier is on the cusp of growth, becoming at least a $600m market by 2027. The industry however cannot be painted with a broad brush and success will be in the detail. Indeed, as the Stretchable Electronics 2017-2027 report reveals, some stretchable components will become success stories in the short- to medium-term, whereas others will remain largely an academic curiosity. It will also reveal that stretchable electronics will deliver compelling, at times enabling, value in some application sectors, whilst remaining an immature technology against many other options in other sectors.

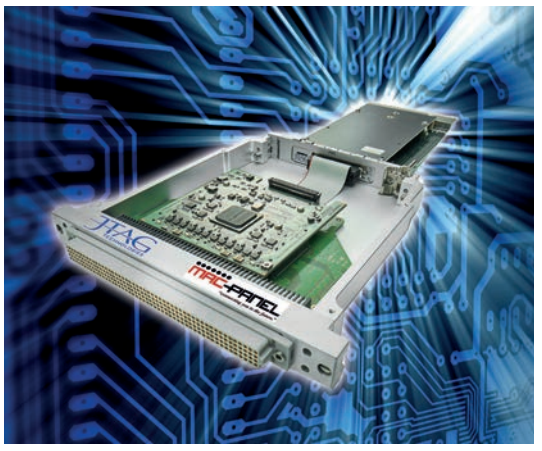
Rugged mini PCs withstand wide temperature range

Stealth.com models LPC-815 & LPC-835 wide temperature range Mini PCs are rugged, fanless computers that provide an extended operating temperature range and are designed for a variety of demanding environments and applications. Units operate in temperature ranges of -25 to 70C, beyond what is found in typical consumer operations. Units operate without noisy cooling fans, which could draw in dirt and dust potentially causing catastrophic failures. SSD (Solid State Drives) with options up to 1TB in capacity are also utilized to meet extreme environmental conditions including high vibration, shock and humidity specifications. Units fit in the palm of your hand measuring 150mm x 105mm x 49mm in size and weighs 0.86kg. Product has abundant I/O ports and configurable options.

SPARTON RUGGED ELECTRONICS

http://ept.hotims.com/65988-32

Signal conditioning module provides 'ideal world' connections



JT 2147/eDAK multi-function signal conditioning module allows 'ideal world' connections from firm's PXI and PXIe DataBlasters to the MAC panel 'Scout' connection system. Based on QuadPod architecture, product enhances firm's current DAK interface and has been specifically designed for robust high-integrity ATE systems. Product allows test system builders to simplify wiring tasks as well as retain improved signal integrity assured by the QuadPod's active interface.

JTAG TECHNOLOGIES

http://ept.hotims.com/65988-36

Test platform validates RF NB-IoT, CAT-M test cases

T4010S conformance test system includes RF NB-IoT and CAT-M validated test cases together in the Global Certification Forum (GCF). Test Platform 195 reached first position in the sum of validated GCF RF NB-IoT test cases and bands, as well as first position in RF overall test cases and bands coverage from Rel-8 to Rel-13. Test platform has validated RF NB-IoT test cases in all currently existing NB-IoT GCF bands and has become an essential test platform for RF NB-IoT GCF certification - providing validated test cases for bands 1,3 and 28.

KEYSIGHT TECHNOLOGIES

http://ept.hotims.com/65988-33

Software searches for compliance status of components

iGDM GreenData Manager (GDM) software add-on searches for compliance status of parts and components. Users can access iGDM online from anywhere with an Internet connection through GDM-Browser Edition or Hosted GDM. Product is suitable for manufacturers that are obligated to comply with RoHS, REACH and other environmental product regulations. Product qualifies parts for compliance in real-time during the design process by searching for RoHS and REACH SVHC compliance status within firm's multi-million parts database.

GREENSOFT TECHNOLOGY

http://ept.hotims.com/65988-34

Sensor-controlled monitoring option delivers quality assurance

SmartDetect quality monitoring option for firm's CrimpCenters is a sensor-controlled system that monitors the complete stripping process in real time and detects any contact of the stripping blade with the conductor. This allows for improved production quality without sacrificing performance. Individually adjustable system parameters allow the user to set the perfect combination for optimal detection and minimal scrap. Tolerance settings are simple to understand because they refer to percentages and physical units such as millimeters or inches, making the system very easy to use.

SCHLEUNIGER

http://ept.hotims.com/65988-35

Improving the lifetime operation of today's digital healthcare devices

By Andrew Caples, product marketing manager,
Embedded Software Division (ESD), Mentor Graphics

Introduction

Digital healthcare devices that enable remote patient care and provide increased mobility in hospital environments are seeing a significant increase in use and popularity. New hardware availability, the emergence of the Internet of Things (IoT), big data in the cloud, and the increased need for patient home monitoring are a few of the factors moving the industry forward.

When designing a portable medical/healthcare device, decisions on processor and component selection are dependent on a range of variables that include performance, price, quality and reliability. Of all these factors, reliability is perhaps the most important due to the critical nature of today's modern digital healthcare devices.

This article discusses the concept of usable product life as a key factor in the success of any digital health device. Product life can be extended by increasing the mean time between failures (MTBF). While there is data to measure the reliability of hardware components, often little attention is given to the role software plays in extending the usable product life of a device.

As pressure grows to condense development cycles and add software-based features, design complexity increases and the task of architecting reliability into the software design becomes even more challenging. Therefore, when starting a new project, early design considerations should include system architecture, the tool environment, as well as selecting the right operating system which can allow software developers to design in greater system reliability.

3-Stages of failure through lifecycle of connected health device

The most common models for predicting reliability of a portable health device include failure in time (FIT) and mean time between failures (MTBF). Failure models routinely focus on three stages in a component's lifecycle: 'Early Failure' – due to manufacturing errors that occur following production; 'Constant Failure' – which occurs while the product is deployed and in service; and 'Wear-out Failure' – which happens at the end of a product's intended lifespan (figure 1).

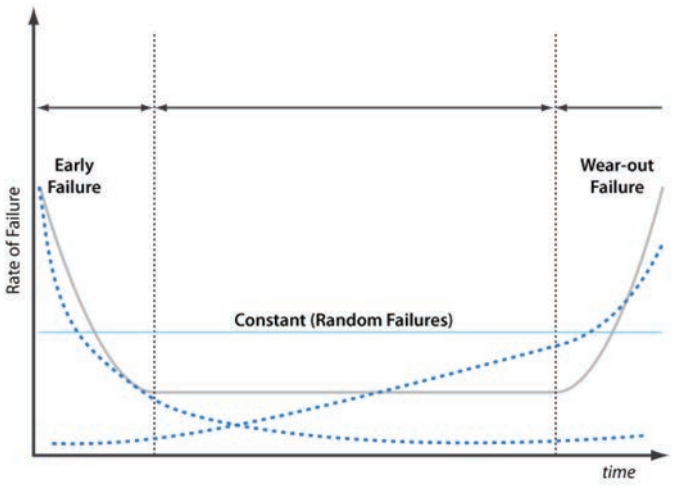


Figure 1: The potential for failure as indicated by the three stages of a component's lifecycle.

While a detailed explanation of FIT and MTBF go beyond the scope of this article, both models use temper ature and voltage as the key controllable variables to predict rate of failure. Basically, these are stress factors and collectively are known as acceleration factors. Controlling the failure rate while the product is in service directly correlates to controlling that product's acceleration factors. The models suggest prolonged periods of high operating temperatures and/or increase voltage will speed up the predicted rate of failure.

The models have proven to be strong indicators of device reliability and thus, they are very useful in predicting the failure rate. However, testing and modeling a device only indicates how much reliability is currently in the product – it does not improve product reliability itself. Any improvement in reliability must be designed into the product early in its development cycle.

Controlling power consumption & heat dissipation

Traditionally, CPUs in embedded devices operated at a single speed with essentially no options to control power consumption. When networking was introduced into embedded devices, the requirements to process data grew considerably. As a result, CPU manufacturers introduced more features into the silicon; networking engines, individual graphics and video IP blocks, DMA controllers, larger cache, and memory blocks all became common features for even low-cost processors.

As CPU speeds increased along with more features, power consumption and the ability to dissipate the heat generated became a major design limitation. High-end processors addressed this by offering Dynamic Voltage and Frequency Scaling (DFVS) to support operating point transitions to low-power modes as per the requirement of the system at any given time in order reduce both power consumption and heat dissipation.

In the past, the ability to change operating points based on system requirements allowed for greater control of power consumption and heat generation. Today, high-end MPUs, as well as low-cost MCUs, offer an array of power-saving features that include DFVS, idle and sleep modes, and clock and power gating (to turn off individual blocks of peripherals). While these features lay the foundation to manage power consumption and system temperature, the burden to implement these features shifts to the application developer. Effective design can mean the difference, in some cases, between a hardware system operating effectively through passive cooling, and thus avoiding the need for active cooling through fans, which in turn, adversely affects the MTBF of a system.

Software and SoC complexity

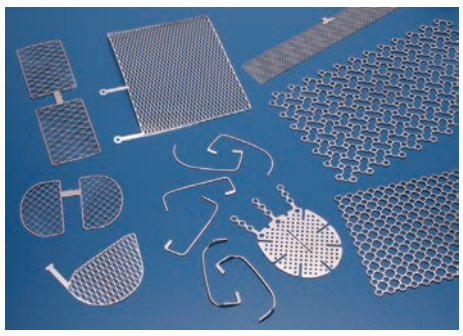
Modern System-on-Chip (SoC) architectures are designed to interface with complex external devices for transmitting, receiving, and storing data. The power consumed by the SoC increases when external devices are driven directly. With a focus on controlling power consumption, semiconductor vendors have introduced an array of features to control the frequency, voltage, and the operational state for not only the processor, but also individual devices and the blocks of devices.

As an example, individual peripherals or blocks of peripherals can be placed in low-power modes or be shut down completely to reduce power usage and heat dissipation. Operating point transitions can be used to reduce CPU clock frequency and/or the operating voltage. When placing the processor or peripherals in low-power states, it is common for the system to require complex software to respond to the event and place the device in a low-power state so that it can be returned to the initial operational state when required.

The steps required to transition to different power states vary depending on the complexity of the device. Consider an Operating Point transition to move the system to a lower frequency to reduce heat and save power. Software is required to determine the amount of power saved compared to the amount of power used to transition in to and out of a low-power mode. Device driver software for each

continued on page 14

Photo etching thin titanium components for medical apps



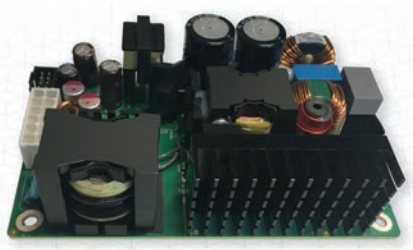
Firm specializes in the photo chemical etching of titanium, used in many medical implantation applications because of its low weight, strength and corrosion resistance. Titanium is inert and completely biocompatible. Firm supplies component parts made from titanium and other specialty materials such as nitinol, niobium, Elgiloy, tungsten and polyimide to the medical device marketplace. Parts range in thickness from .0005" and up.

TECH-ETCH

http://ept.hotims.com/65988-37

Convection cooled 250W ac-dc power supplies serve medical environment

PQC series of industrial/medical power supplies provides single and wide input ranges, rated at 250 watts of output power in an industry-standard open frame 3 x 5 inch, 1U footprint. The high-efficiency unit can deliver full power with free-air natural convection cooling up to 50°C.



Products provide a universal ac input voltage range from 90Vac to 264Vac with any input from 47Hz to 63Hz. Units employs optimal thermal management and high power efficiency up to 95%.

MURATA

http://ept.hotims.com/65988-38

Low viscosity conformal coating delivers 20cP viscosity

Multi-Cure 9452-FC conformal coating is formulated with a new technology as an alternative to thin, solvent-based conformal coatings. With a viscosity of 20cP, the 100% solids material provides a thin coating that is more environmentally friendly than solvent-based alternatives. Product's multi-cure, light and heat-curable film coating provides improved electrical insulation properties as well as humidity, thermal shock and corrosion resistance. Product is suitable for rapid conformal coating of pcbs and other electronic assemblies.

DYMAX

http://ept.hotims.com/65988-39

Ingestible electronic pill receives medical CE mark

e-Celsius ingestible connected device has received medical CE mark from the LNE Gmed certifying organization. Electronic pill allows core temperature monitoring of medical patients and is now commercially available for hospital use. The class IIb medical device enables monitoring of the body's core temperature, with continuous measurement of the patient's central temperature by gastro-intestinal tract. The disposable electronic capsule is coated in a biocompatible medical grade plastic. When swallowed by the patient it follows the intestinal transit. Every 30 seconds, the pill wirelessly transmits internal temperature measurements to a monitor called e-Viewer.

BODYCAP

http://ept.hotims.com/65988-40

Open frame pcb-mount power supplies are medically approved

NFM Series medically approved open frame printed circuit board mount power supplies provide 5W to 20W output power. Compact unit comes in 5W, 10W, 15W and 20W output power versions. The 2xMOPP medically approved products come in 85-265Vac input range, with corresponding outputs from 3.3Vdc to 24Vdc. Units provide low no-load power consumption of <0.5W.

BETADYNE

http://ept.hotims.com/65988-41

OEM driver for miniature positioning systems is compact, versatile

E-872 OEM driver for miniaturized piezo inertia positioning stages compliments the size of the ultra-compact inertia motor positioners it manages. Control is simple with step and direction input via TTL signals. The high 20kHz full step frequency delivers fast response. A version with 256 micro steps allow for extremely smooth motion with nanometer resolution. Applications include precision opto-mechanical alignment, bio-medical instrumentation and microscopy.

PHYSIK INSTRUMENTE

http://ept.hotims.com/65988-42

What is the future for IoT and industrial medical equipment?

By John Aymes, TCH Hardware

The Internet of Things (IoT) has made huge strides over the past half decade. While it may have started with smart watches and basic fitness trackers, the IoT has spread to all corners of the technology industry. Just last year, experts estimated an unprecedented market value of USD $157 billion. Others have predicted that the healthcare sector alone will produce $117 billion by the year 2020.

Hospitals and personal care are poised for a technological revolution. One of the most important aspects of healthcare is continuous and reliable data. But even with this realization, so much of the vital information hospitals need is collected manually, written down or even passed along via word of mouth. But when lives are on the line, a complex game of telephone doesn't seem the best choice of communication.

The IoT can solve this problem and set the healthcare industry on a better path. Recent breakthroughs in engineering have led to smart wheelchairs, allowing for improved maintenance and health monitoring. Tracking stretchers in and out of hospitals has lead to improved workflow and decreased patient wait times. Connected medical tools and sensors allow for real-time monitoring and data collection, increasing the accuracy of information available. Together, these improvements are paving the way for a better medical industry.

Wheelchairs

Wheelchairs have come a long way from their humble beginnings. While they started as a means of self-transportation, they have become medical hubs on wheels. The IoT is making this even more apparent and promises to add connectivity to the previously isolated mobile units.

Back in 2014, Intel released a proof of concept for a connected wheelchair, backed by none other than Steven Hawking. It took advantage of the Intel Galileo Development Kit in combination with Intel Gateway Solutions for IoT and a variety of sensors and monitoring equipment. Intel stated that the chair communicated data about the mechanical health of the chair as well as biometric data concerning the user. There were never any specifics released beyond this, and ultimately the prototype never went farther than a proof of concept. It did pave the way however for others who shared the idea.

A year later, AT&T partnered with Permobil to create their version of an IoT connected wheelchair. It featured information on seat positioning and pressure, guarding against possibly life-threatening pressure ulcers. In addition, it transmitted information about the battery and mechanical health of the wheelchair itself, allowing for predictive maintenance and thus more efficient care. As of 2016 there were still plans to bring the concept to market, although no official timeline is available.

Manual medical transport

Connected IoT devices are helping medical professionals as well, with custom solutions in the realm of medical transport. In Ohio, a hospital decided to come up with its own technological solution to reduce hospital wait times.

EMTs and medical responders often have a significant delay before they can move patients from the stretcher to the hospital bed. To collect data on the issue, Summa Akron City Hospital attached RFID tags to all of the stretchers coming into their facility and deployed an Impinj smart reader at the emergency responder hospital entrance. The tags are scanned when they come in and out, allowing the hospital to collect data on the wait times for EMTs. A logistics team then used this information to increase hospital efficiency, leading to decreased wait times for critical patients.

The IoT is also being used by responders before they even reach the hospital. Strokes are one of the most common causes of death worldwide, and treatment is extremely time-dependent. Unfortunately, starting treatment often has to wait until after a CT scan, in order for medical professionals to know what type of stroke to treat.

That's where Strokefinder comes in, a connected sensor array for transmitting and receiving microwave pulses. The pulses scatter off different tissues in unique patterns, and the type of stroke can then be identified. The pulse responses are recorded and transmitted to a computer for real-time data analysis, allowing for treatment to start on the way to the hospital instead of hours after arrival.

Prescription adherence

Prescription adherence is one of the most challenging parts of the medical profession. Patients don't always follow their regimen and schedule, and often don't remember their exact course of action for every single day. This unreliable information makes treating a patient more difficult, and can often lead to a lengthened and more expensive treatment. AdhereTech aims to fix this by providing a connected pill bottle. The container tracks when it is opened and uploads the information to a healthcare provider, ensuring accurate patient data. In addition, the bottle can send out reminders to the patient via text should they miss a scheduled dose. The technology is already in production and is proving itself useful in clinical trials.

Refilling prescriptions is also a challenge for patients. Continually dealing with different pharmacy representatives can become frustrating or intimidating, leading some patients to abandon treatment altogether. Walgreens has taken initiative to change this, by creating a smartphone app for re-ordering prescriptions. A patient can securely log in, scan the barcode on the medication, and generate a new order that is sent directly to the pharmacy's prescription system. It not only increases patient care and satisfaction but also generates less paperwork for pharmacy employees, which in turn leads to fewer human errors in the fulfillment process.

Cautionary tale: Security, digital piracy

The IoT has the potential to vastly improve medical care via connected devices and, by extension, more reliable information. Medical providers should heed caution, however: the technological progress brings with it, its own set of problems. There are numerous cases of IoT devices having large-scale security issues, the most publicized being the recent DDoS attack on Dyn.

If a hospital's connected devices are compromised, their own network could be attacked from within itself. In addition, hospitals are one of the most valuable targets when it comes to digital pirates, and more connected devices translate to more possible attack vectors. When increasing their connectivity, health institutions must also remember to proportionately increase their security.

The revolution of connected sensors has already transformed an assortment of industries, but we've just started to see the potential emerge for medical equipment. IoT devices can transform wheelchairs into mobile health-monitoring units, and lead to better maintenance and care. First responders are getting creative to find different ways to make patient care faster. Connected pill bottles are leading to more reliable prescription information for health providers. The progress does bring its own set of dangers, but with proper security protocols, the internet of things has the potential to transform the medical sector as we now know it.

For more information on hardware for medical electronic designs from TCH Sales Inc., go to http://ept.hotims.com/65988-43

Medical grade epoxy system is UV, heat curable

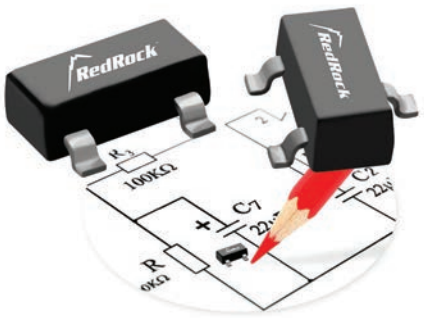
UV15DC80Med dual cure epoxy based system provides a primary cure using UV light along with a secondary heat cure that can be initiated at the low temperature of 80°C. System was formulated for medical device assembly applications, meeting USP Class VI specifications and passes ISO 10993-5 cytotoxicity testing. Product provides improved temperature resistance along with the ability to withstand sterilization exposure including liquid sterilants, radiation and even autoclaving. It requires no mixing, is solvent free and exhibits excellent physical strength properties.

MASTER BOND

http://ept.hotims.com/65988-44

Analog sensor boosts sensitivity in a small package

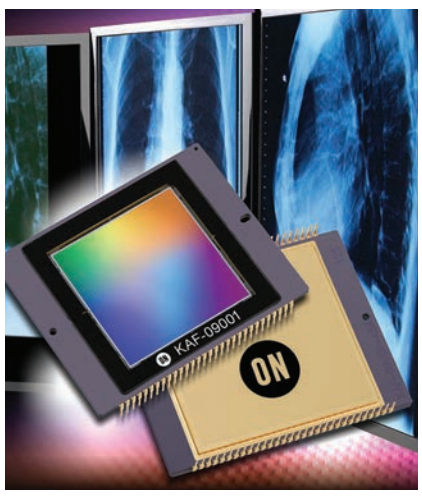
RedRock RR110 wafer-based TMR (Tunneling Magnetoresistive) analog sensor provides strong magnetic sensitivity, high directionality, small package size and is suited for medical devices. With minimal design effort, device can easily replace a complicated, costly, and vulnerable bare glass reed switch ladder like those often seen in fluid level sensing applications with a single sensing element. Highly linear response of device provides reliable functionality with a wide range of magnets across wide



activation distances. The sensor features high resistance to shock and vibration while the industry standard SOT-23 package provides a ruggedized package that can handle tough environments.

COTO TECHNOLOGY

http://ept.hotims.com/65988-45



High sensitivity CCD image sensor enhances patient safety

KAF-09001 image sensor incorporates an improved output architecture that supports a high sensitivity video mode, facilitating patient positioning while minimizing overall x-ray exposure. Device provides a resolution of 9 megapixels and high sensitivity, low-noise 12 micron (µm) pixels. Product's quad-output supports readout speeds up to 20MHz, providing a 10x increase in full resolution frame rate and up to 10 frames per second (fps) video preview when the device is operated with 3 x 3 binning.

ON SEMICONDUCTOR

http://ept.hotims.com/65988-46

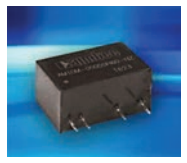
Reflective optical sensor boosts ambient light immunity

TT Electronics OPB9000 reflective optical sensor improves ambient light immunity that allows operation from dark rooms to bright sunlight. Versatile device can detect various types of media with as little as a 30% change in reflectivity. Robust industrial grade resin allows the sensor to operate at a wide temperature range from -40C to 85C, suitable for medical applications.

SAGER ELECTRONICS

http://ept.hotims.com/65988-47

Dc-dc converters boost I/O isolation, lower the RF impact



AM1DM-NZ and AM2DM-NZ series unregulated power supplies provide an extended momentary short circuit protection of 3 seconds and are built with reinforced insulation to achieve a high I/O isolation of either 6000Vdc or 4200Vac based on the application needs. To lower the RF impact on these devices for this design is an ultra low Isolation capacitance of typical 5pF. Specifically designed to meet strict medical safety requirements, the leakage current of these devices are extremely low with a maximum of 2µA.

AIMTEC

http://ept.hotims.com/65988-48

Digital healthcare devices

continued from page 10

peripheral must be written to support the transitioning of the device to the various low-power states offered by the hardware.

Software must be written to verify and log the state of each peripheral device before the transition: Is the device on or off? Is it in active or in standby? Can it be taken off line during the transition and returned without any loss of data or performance? Because devices must be taken off line in order for a transition to occur, software must be written to determine the length of time each active device can be taken off line and compared to the amount of time it will take for the transition to occur.

If a device uses the system clock as a reference, for example, establishing the baud rate for a UART, then a recalculation is required after the frequency transition. Complex devices such as Wi-Fi can require software to verify the status of TCP/UDP outgoing packet buffers and IP management queues to ensure they are empty before shut down.

This may require a look at the buffer descriptors for each protocol layer down to the DMA driver state. Both the amount of software and the complexity managing the power state of the system can be daunting to the software developer.

To address this, software must be designed from project inception to effectively use and manage the power-saving features embedded in the hardware in order to reduce heat dissipation. Without a software infra-structure that maps the silicon features to the software APIs, software developers must rely on their individual abilities to write both the low-level device driver software to control individual devices and the system software required to coordinate the CPU and peripheral blocks and the high-level software.

Correct operating system assures reliability

Based on failure predictability models, it can be argued that increasing system MTBF requires the proper management of power consumption (voltage management) and heat dissipation. The software complexity required for device and system management is often the barrier for the effective use of software as related to enhancing system reliability.

Selecting an operating system that provides a framework to manage power consumption for both the processor and individual devices allows software developers to architect software with the intent of controlling the acceleration factors that degrade system reliability.

To illustrate this underlying framework, the Nucleus® Real Time Operating System (RTOS) from Mentor Graphics will be used.

Nucleus provides an extensive Power Management Framework to provide efficient power management of portable medical devices. This framework enables direct mapping to the low-power features of the hardware (figure 2). The Nucleus Power Management Framework approaches the conservation of power usage and reduction of heat dissipation from four directions:

- **System and Device States to control peripheral power consumption.**
- **Idle CPU Management prevents the waste of expending energy.**
- **Hibernate and Sleep Modes allow the system to go off line to the degree that corresponds to the duration of the inactivity and restart time constraints.**
- **Dynamic Voltage/ Frequency Scaling (DFVS) focuses on the CPU core.**

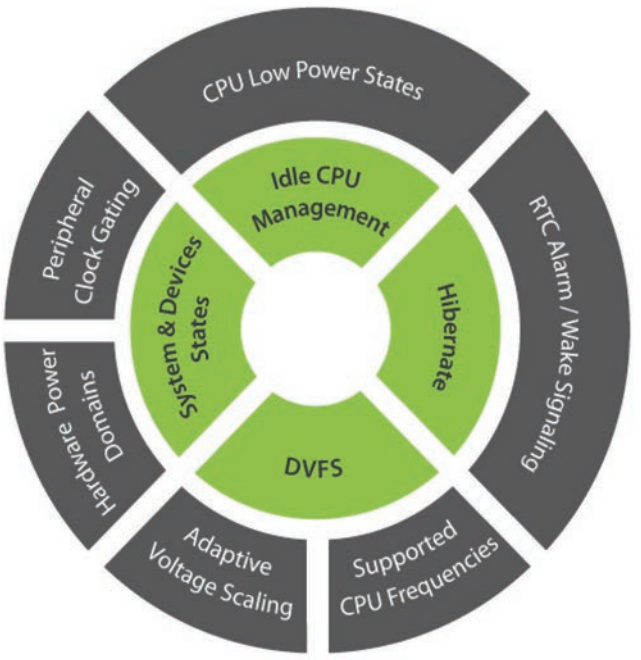


Figure 2: The Nucleus Power Management Framework takes advantage of the power-saving features available in today's hardware.

The Nucleus Power Management Framework also includes a device manager mechanism (figure 3) which requires a peripheral to register upon initialization, reports available power modes, and updates the device state. System and device sates are changed to manage peripheral power conservation and are tightly coupled with the core power controls through DVFS. These two components are choreographed by the device manager, which allows for a graceful power state transition of peripheral operation and CPU timing. Any alteration of one component which impacts another, results in a coordinated transition across all involved subsystems. Idle CPU management results in a temporary suspension of code execution when such execution produces no usable result. This feature is invisible to the application and results in no impact to system response time when an event requiring CPU resources occurs. Hibernate and Sleep modes provide controlled levels of sleep when an opportunity to go off line is presented. With the choice of a RAM-based or NVM-based system storage, recovery response time can be weighed against power saving, and the need to re-enter operation though a cold boot process. The code necessary to convert the high-level commands is built into the Nucleus Framework to provide software developers comprehensive control of the system.

Conclusion

As the trend in healthcare accelerates from hospital-centric to more of an outpatient mobile care model, today's digital healthcare devices (including wearables for ehealth and portable medical devices such as dialysis and patient monitoring) will play a prominent role. The reliability of these devices is becoming increasingly more important as the consequences of device failure in some cases can lead to severe or dire consequences.

As this paper discussed, highly reliable devices can be designed into medical embedded systems.

While many operating systems are currently available, a majority of healthcare devices require the determinism of a full-featured RTOS with strong capabilities in managing power consumption and heat dissipation – all to increase system reliability.

For more information on embedded software solutions for healthcare devices from Mentor Graphics, go to http://ept.hotims.com/65988-49

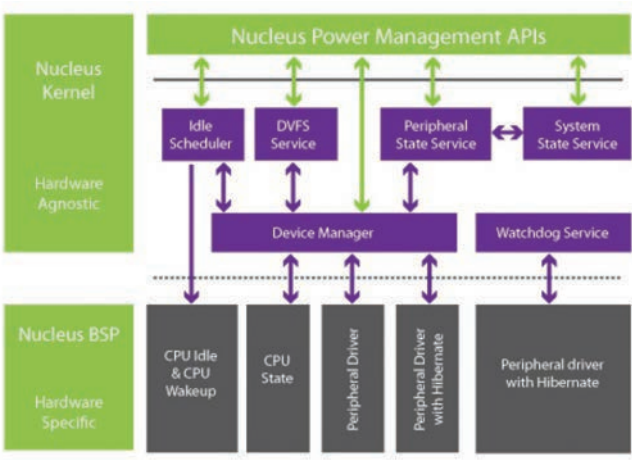
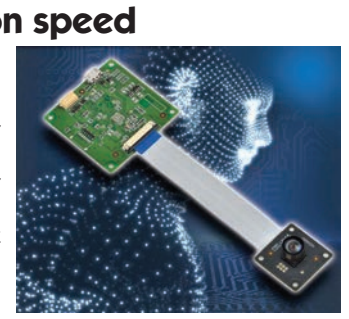


Figure 3: Nucleus power management APIs simplify use of power-saving capabilities.

Image sensors eclipse recognition speed of HVC systems



B5T HVC-P2 Multi-Function Sensor Modules provide a maximum recognition speed that is 10 times faster than previous Human Vision Components (HVC) system sensors. Devices provide OKAO Vision technology for recognizing human face expression, gender, age, gaze and blink into a camera module. Products can detect a human body four times per second, reliably keeping track of a person within a detection area without fail. Devices deliver long-distance and wide-angle detection type camera heads. Equipment embedded with the device can detect and presume attributes and conditions of a user in its vicinity without the user being aware of the camera. This detection ability allows the equipment to offer services based on that user's attributes.

OMRON

http://ept.hotims.com/65988-50

Photomicrosensors screw mount easily

EE-SX3162/3163/3164 optical sensor provides a 5mm slot width connector type photomicrosensors with easy screw mounting capabilities. This permits device installation anywhere inside an application without need for an additional pcb for sensor mounting. Product series comes with Photo-IC output type (Dark-on & Light-on), 3 types of mounting styles, and 2 power supply voltages (5V and 12V). For some specific applications a zener diode can be added on the output of the photomicrosensor to provide greater noise immunity (EE-SX3162-P1-Z and EE-SX4162-P1-Z only).

OMRON ELECTRONIC COMPONENTS

http://ept.hotims.com/65988-51

Automotive-grade power inductors boost performance in compact package

SRT8045 Series of magnetically shielded power inductors boost performance and a smaller package, measuring 8.0 x 8.4 x 4.5mm. Devices provide saturation current ratings up to 17.4 Amps and dc resistance as low as 7.7 m-ohms. Qualified to AEC-Q200 Grade 1 standards, devices come in five inductance values ranging from 1.4 to 22 µH. RoHS compliant devices come with matte tin over nickel over phos bronze terminations and provide a maximum reflow temperature of 260°C.

COILCRAFT

http://ept.hotims.com/65988-55

Snap action switch is sealed to IP67

WS series snap action switch is sealed to IP67 ratings and comes with the choice of a lever or plunger actuator option. Device is a single pole, double throw (SPDT), with termination options that include solder lug or pcb pins. UL listed devices provide a mechanical life of one-million life cycles. Product specifications include a contact rating of 01 = 1A @ 24Vdc; 2A @ 12Vdc; and 0.1A @ 125Vac.

E-SWITCH

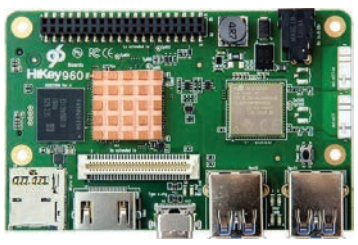
http://ept.hotims.com/65988-56

Sampling oscilloscopes comes with broadband probes, touchscreen

PicoScope 9300 family of sampling oscilloscopes includes two 25GHz models. The USB-controlled units provide high-integrity options for viewing and measuring RF and microwave signals, paths and networks. The 2 and 4 channel units support fifth harmonic capture for data up to including 10Gb/s and third harmonic capture up to 16Gb/s. These rates, and others in between, are increasingly found in Ethernet, Thunderbolt, USB 3.1, PCIe 4, Rapid I/O, e-SATA, OC-192 / STM-64 and OC-256.

PICO TECHNOLOGY

http://ept.hotims.com/65988-52



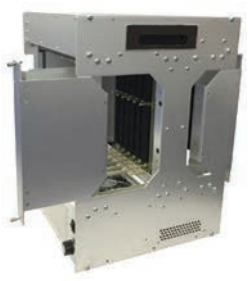
HiKey 960 Linaro dev platform provided in AOSP source

HiKey 960 development platform is based around the Huawei Kirin 960 octa-core ARM big.LITTLE processor with four ARM Cortex-A73 and four Cortex-A53 cores with 3GB of LPDDR4 SDRAM memory, 32GB of UFS 2.0 flash storage, and the latest generation Mali G71 MP8 graphics processor. Initial software support for the board is provided in the Android Open Source Project (AOSP) source tree based on the Android Common Kernel using the Linux 4.4 kernel release. Boards produced to the 96Boards specifications are suitable for rapid prototyping, hobbyist projects or incorporation into new systems for a wide range of applications.

HUAWEI

http://ept.hotims.com/65988-53

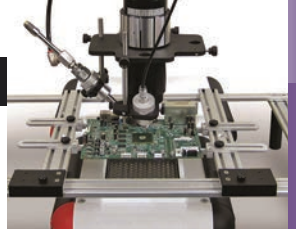
Development enclosure serves 3U, 6U or custom sized boards



VPXD1000R development enclosure for 3U, 6U, or custom sized boards provides sidewalls that can be removed, allowing a system to be enclosed for thermal testing and the walls to be taken out for ease of access to boards inside the chassis. Product holds up to eight backplane slots at a 1.0" pitch. Firm offers 3U and 6U backplanes in OpenVPX, CompactPCI Serial, VME64x and legacy CompactPCI and VME designs. The card guides can be adjusted in .2" increments to accept various slot pitches.

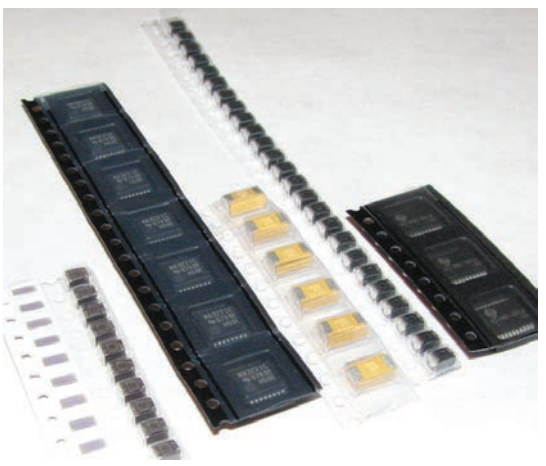
PIXUS TECHNOLOGIES

http://ept.hotims.com/65988-54



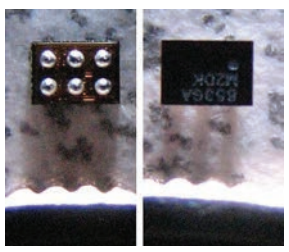
Top 5 things to know when moving from hand assembly to robotic assembly

By Duane Benson, chief technology champion at Screaming Circuits



A lot of factors go into the decision to hand build or outsource circuit boards. I hand build my own sometimes, simply because I enjoy the challenge. Of course most of the projects I design are for my own use, so timeliness isn't that important.

When I do design something that will go out to a customer, like my electronic business card holder, I will send the board through our shop. In those cases, quality is important, as is delivery, and the quantity is often too high to hand build. Machine building also allows me to use smaller and more complex parts.



That same decision — hand build or outsource — takes place in the heads of designers all over the country. When the decision is to outsource, there are a few important things to consider. Some things that work fine when hand soldering may stand in the way of quality, repeatability, and reliability when machine assembling.

Here are five of the most important considerations when changing from hand built to outsourced.

1. Use solder mask & silkscreen

A good solder joint needs the right amount of solder in the right place. Solder will tend to flow down bare copper, bleeding outside of the area it belongs, and down exposed copper traces and vias.

The main purpose of solder mask is to keep the solder where it belongs. It also protects the traces, but that's a longevity issue. Solder bleeding is a manufacturing and reliability issue. This isn't a problem when hand soldering. In fact, it can even work to your advantage when hand soldering really small parts. It gives you more room for your soldering iron to hit metal.

Not so with solder paste and machine assembly. Use solder mask.

2. Avoid the pseudo panel

Keeping small boards in a panel is the recommended best practice in the manufacturing industry. We appreciate it and, while not always necessary, can reduce your costs. We sometimes see what we call a "pseudo panel." This is a board where multiples of the board are put in the same PCB, like a panel, but unlike a panel, the boards don't have routing or V-score between them. Sometimes the designer will put a bunch of vias to outline the board, or just ask that we use a bandsaw to separate them.

That's a time consuming, expensive, and potentially damaging process. The vibration of the saw can crack solder joints, and, you're unlikely to get boards that are all the same size. Have small boards panelized by your board house.

3. Family panel (pseudo or not)

Similar to the pseudo panel is the family panel. A family panel is a case where a project is made up of several different PC boards, and they are all laid out together, as though they are one design. If the board isn't routed between to designs, you'll have the pseudo panel problem described above.

The bigger problem, though, comes with reference designators. We typically see family panels with duplicate reference designators. Each design, for example, will have its own C1, R1, Q1, etc. We use the reference designators as position identifiers/ If you have three different parts labeled R5, our machine programmers will have a problem with it. It's even worse if the values differ; on one design, C1 is a 0.1uf capacitor, while on another design, it's a 22pf cap.

If you're making a family panel, give each and every placement a different reference designator. One way would be to us extra digits. For example on one design on the family panel could have C100, C101, C102... The next would be C200, C201, C203, and so on.

And, don't forget the routing or V-score between the designs.

4. QFN — Hole in the middle

A common technique in the hand soldering world, for soldering QFNs and other parts with thermal pads underneath is to put a big via in the middle of the center pad. By doing so, you can stick a soldering iron and some solder down through the hole and get a good solder connection on the bottom pad.

This doesn't work with machine assembly. the solder paste will flow down and out the hole in the reflow oven. You'll end up with a poor connection (or no connection) to the thermal pad, and solder slop on the back side of the board.

5. Parts and the Bill of Materials (BOM)

When I build my hobby projects, I often get a bit carefree with the bill of materials. It's not good practice, but I do. I'll put a part in the BOM that I used before, and not check to see if it's still in stock. I'll put parts in the BOM with just the values and not any part numbers. Things of that sort require tribal knowledge, which only the designer has.

When building, sometimes I'll just grab a part that's close. If I need an 0805 1uf, 10 volt capacitor, I can grab a 16 volt, 25 volt, etc. I can even make an 0603 part work. You as the designer may know that something close will work, but an outside house can't know. You need to tell them exactly what the part is.

Before sending anything through our shop, I do clean up the BOM. In order for us, or any manufacturer, to build the boards, the BOM needs:

- A unique reference designator for each part placement
- The quantity of each part used on the board
- The manufacturer
- The manufacturer's part number
- Digikey part numbers can be used as well

The transition from hand building to outsourced machine building can be an intimidating one. But, with a few considerations, it can be an easy and rewarding transition.

For more information on prototype pcb assembly from EMS firm Screaming Circuits in Canby OR, go to http://ept.hotims.com/65988-57

Optically clear cured silicone enhances low temp serviceability

MasterSil 157 two component silicone system suitable for potting and encapsulation applications, provides low viscosity and low exotherm. Product boosts electrical insulation properties and can cure in sections beyond 1 inch thick. Product is serviceable over the wide temperature range of -175°F to +500°F [-115°C to +260°C]. Similar to traditional silicones, product is highly flexible with an elongation of 110-140%, enabling it to withstand rigorous thermal cycling and shock.

MASTER BOND

http://ept.hotims.com/65988-60

Terminal pins are fitted with cylindrical insulating sleeves

Six terminal pins and receptacles are fitted with cylindrical insulating sleeves for electrical isolation applications. Product lineup includes three header pins, two receptacles and one solder cup pin to suit a variety of uses. Insulated terminals are used to electrically isolate single pin interconnects from surrounding conductive components or elements in an assembly. The plastic sleeve provides insulation of the terminal for such applications where the pin/receptacle must pass through a conductive housing without coming in contact with it or where a pin/receptacle, installed on a board, needs to be protected from nearby conductive components.

MILL-MAX MFG.

http://ept.hotims.com/65988-61

Dual laser infrared thermometer is handheld

OS758-LS dual infrared thermometer is a high-performance, handheld is a non-contact temperature measurement instrument, providing adjustable emissivity, color backlit LCD, 60:1 distance to spot, hi/ low temp alarm, max/min/avg/ diff temperature monitoring and data storage. Unit comes with a microSD card slot (SD card included). Product's rugged design is shatterproof at 1 m (3.3') with an ergonomic rubber boot handle. A Type K thermocouple input is included for contact measurements, often used to verify emissivity. Unit's dual laser infrared delivers reliable non-contact measurement for instant troubleshooting while monitoring production lines.

OMEGA ENGINEERING

http://ept.hotims.com/65988-62

Pcb cleaners meet stringent regulatory obligations

Universal Flux Remover cleans high-temperature lead-free fluxes and solder pastes from printed circuit boards. Product is moderately strong, but not so strong as to attack plastics or components.

Universal Contact Cleaner is formulated for flushing dust and grime from electrical contacts, relays, switches and circuits. Product is non-conductive, fast-drying, non-flammable and improves materials compatibility.

Polar Flux Remover is an aggressive fluid suitable for cleaning heavy, aged fluxes found in pcb repairs. Products are compliant with all current environmental, health and safety regulations.

MICROCARE

http://ept.hotims.com/65988-63

Easy-to-apply waterproofing solution protects pcbs

NanoProof series of printed circuit board (pcb) waterproofing protection is easy-to-apply and protect pcbs from accidental water damage to IPX-7 (immersion in water at one meter depth for 30-minutes) and up to full barrier properties. No masking is required to apply, which reduced product returns due to device failures. Product's dry time ranges from five to 60 minutes at room temperature, with no cure required. The flexible coatings resist crackingflaking and does not require batch production.

ACULON

http://ept.hotims.com/65988-64

Lead-free solder alloy reduces voiding, tin whiskers

REL61 lead-free solder alloy addresses issues such as voiding, cost, durability and tin whiskers. Product has reduced voiding on BTC packages by more than 45%, increasing both thermal performance and solder joint integrity. Product delivers a low cost alternative to SAC alloys, with reliability and performance characteristics superior to SAC305 and other low/no-silver solder alloys.

AIM SOLDER

http://ept.hotims.com/65988-65

Thermal Imaging Camera serves electronics test, development

ETS320 thermal imaging camera for electronics testing in engineering benchtop environments, analyzes the thermal characteristics of electronic components and printed circuit boards (pcbs). Unit combines a high-sensitivity thermal camera with an adjustable, hands-free table stand to provide consistent, non-contact thermal testing through the entire electronics design, development and production process. Unit delivers more than 76,000 points of temperature measurement, detecting hot spots and identifying potential points of failure.

FLIR

http://ept.hotims.com/65988-66

Thermal Profiler collects data, compares to process specs

KIC SPS Smart Thermal Profiler for reflow, wave and curing improves thermal process data collection from a costly chore to a value-added function. Firm's Vantage network intelligence system is an ecosystem that automatically acquires and delivers insightful information from all the ovens in the factory in real-time to allow factories to produce consistent quality at lower costs. The software is retrofitable and can connect to the factory MES system. While the reflow oven produces an acceptable profile on each pcb, product collects the profile data and compares it to the process specifications. Within seconds, the new smart profiler also suggests an improved reflow oven setup.

KIC

http://ept.hotims.com/65988-67

Solder paste storage units deliver traceability

Model XSDC 601 solder paste storage cabinets for solder paste, brings both temperature control and 4.0 traceability, while eliminating the uncontrolled management of solder inventory. Refrigerated storage prolongs the shelf life of solder paste and upon delivery, it should be directly placed into refrigerated storage, typically <10°C. Generally, solder paste is stable at temperatures less than 25°C but if exposed to temperatures >30°C for extended periods of time may no longer perform as expected. Units, with network compatibility, maintain an internal temperature of 2 - 20°C with little energy expenditure. Constructed from dual wall insulated stainless steel, units incorporate 40KG capacity shelves and provide complete traceability of the storage conditions and environment history.

SUPER DRY

http://ept.hotims.com/65988-68

Fiber laser system expands capabilities

MLMe fiber laser system comes with a lightweight, ergonomic and manual front door supported by spring loaded retraction system. Product provides a fold-out, side panel touch screen, while delivering operator control and feedback as well as machine status at all times. Users can create custom part fixtures or utilize the high precision lab jack for focal height adjustment. Product provides a full view of the marking process through a large vertical safety window. A built in port is available for fume and dust extraction.

TYKMA ELECTROX

http://ept.hotims.com/65988-69

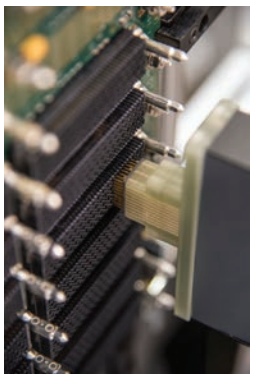
Inert atmosphere oven handles liquid flow solder masking

No. 930 electrically-heated, 500°F inert atmosphere cabinet oven is used for liquid flow solder masking under a nitrogen atmosphere. Workspace dimensions measure 38" W x 38" D x 38" H. 30kW are installed in Incoloy-sheathed tubular heating elements, while a 1500 CFM, 1-1/2 HP recirculating blower provides horizontal airflow to the load. Product provides 4" insulated walls, aluminized steel exterior, Type 430 stainless steel interior and an automatic door switch to shut off heaters and blower when the door is opened.

GRIEVE

http://ept.hotims.com/65988-70

Net-list testing goes beyond AOI, bed-of-nails test

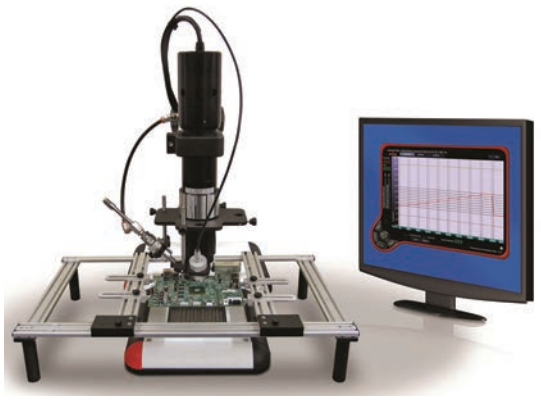


Net-list testing goes beyond AOI and bed-of-nails testing, ensuring all products meet customer specs and eliminates the risk of a bad printed circuit board reaching the end product. Test method provides 100% electrical testing of every connector contact point and every solder point throughout the entire signal path via a RoBAT S1 backplane fixtureless test.

ERNI

http://ept.hotims.com/65988-71

HALT/HASS thermal test system detects thermal defects



IR-TS Series of micro-focused HALT/HASS thermal test system includes a One Bench Top System and TS-2100 Cabinet System that thermally cycles key critical components and assemblies to detect defects. Using a non-destructive dual thermal stress screening process, based on a variation of HALT/HASS principles, product is able to focus the testing on suspected problem areas to safely screen out early field failures caused by design, environmental, production and structural defects.

PDR AMERICAS

http://ept.hotims.com/65988-72

Adhesive fixes, strengthens optoelectronic applications

DUALBOND OB786 adhesive is particularly suited for fixing components within seconds while ensuring precision and high strength in optoelectronic applications. After an irradiation time of less than one second, the build-up of adhesion is already significant; after five seconds, the compression shear strength on glass even reaches 18MPa. Product ensures good adhesion to other typical optoelectronic substrates such as aluminum, FR4, PPS, or LCP. The milky epoxy resin with medium viscosity cures under UV light at a wavelength of 365nm in layers of up to 1.5mm thickness.

DELO INDUSTRIAL ADHESIVES

http://ept.hotims.com/65988-73

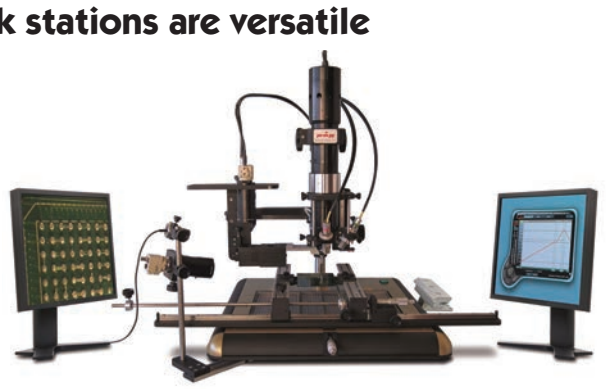
Alcohol/water-based flux enhances soldering results

EO-Y-003 is a hybrid flux containing as little as 10% alcohol, making it nearly a water-based product with enhanced soldering results. With all the properties of water-based fluxes, frost resistant product is low-consumption and easy to manage in terms of transport, storage and handling. Product exhibits a high 3.3% solids content. Developed for used in wave and selective soldering, product possesses a very broad range of uses. Product's soldering properties good, specifically with rise-through and circuit-board wetting. The process window is very broad with improved thermal stability.

EMIL OTTO

http://ept.hotims.com/65988-74

SMD, BGA rework stations are versatile



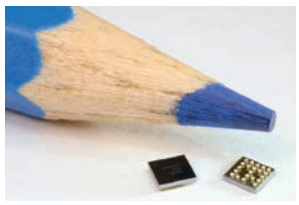
IR-E3 Evolution Series of SMD/BGA rework stations are versatile systems suitable for a very wide range of SMD/BGA/uBGA/CSP/LED applications on small-large sized pcbs. Product is available in three models – IR-E3S Standard, IR-E3G Gold and IR-E3M Micro Component/PCB Rework System. Model IR-E3 uses firm's patented Focused IR technology, utilizing Dual-band Visible IR Heating. Units are nozzle free, gas free, clean, simple and easy-to-use. Each model is designed for precise control to produce 100% yield of SMD/BGA rework without complications. The keys are accurate closed-loop thermal feedback and intuitive easy-to-use software.

PDR AMERICA

http://ept.hotims.com/65988-75

Semiconductors & ICs

Ultra-miniature Bluetooth chip suits IoT, portable devices



Bluetooth integrated circuit is ultra-miniature, making it suitable for the densification of functions in portable electronic devices and for the Internet of Things. Device has low energy consumption, thus increasing the autonomy of connected objects. Product's high-speed start-up capability improves the reactivity and the lifetime of, for example, electronic beacons. Device consists of more than 5 million transistors on a surface of about 5 mm2. Designed for maximum flexibility, product can work alone or in conjunction with various sensors.

EM MICROELECTRONIC

http://ept.hotims.com/65988-76

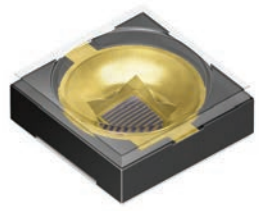
IoT-focused Wi-Fi network processor features ARM Cortex-M3 MCU

Texas Instruments CC3120 SimpleLink Wi-Fi network processor and Internet-on-a chip device is comprised of a wireless network processor and power management subsystems, features a dedicated ARM Cortex-M3 microcontroller. Device allows for optimal network flexibility and maximum connectivity for Internet of Things (IoT) solutions for a multitude of microcontroller applications. Device allows designers to run Wi-Fi and Internet protocols implemented in the ROM, which in turn runs its dedicated on-chip ARM Cortex-M3 network processor to significantly offload the host microcontroller and simplify system integration.

MOUSER

http://ept.hotims.com/65988-77

Infrared LED yields high-quality images for facial recognition



Oslux SFH 4796S infrared LED (IRED) for biometric security solutions comes with a specially designed variant for facial recognition. Device ensures uniform illumination of facial features for high image quality. Device provides a low-profile design that enables a narrow emission angle, which ensures the light generated hits exactly the point where illumination is required, so the overall system operates extremely efficiently. Devices are based on an internal reflector and a specially adapted, integrated lens; the flat component surface offers a significant design advantage in facial recognition applications.

OSRAM OPTO SEMICONDUCTORS

http://ept.hotims.com/65988-78

ICs enable 98% efficiency of power factor correction

HiperPFSTM-4 family of power factor correction (PFC) ICs serve applications targeting improved efficiency and power factor performance at both full load and light load conditions. Devices incorporate a 600V MOSFET suitable for 305Vac input and a high efficiency, variable frequency, CCM PFC controller in a single, compact, electrically isolated, heatsinkable package. Product family delivers high power factor, low THD and uniformly high efficiency across a wide output load range.

POWER INTEGRATIONS

http://ept.hotims.com/65988-79

SiC Power MOSFET comes in four-lead TO 247-4 package

Wolfspeed C3M0120100K silicon carbide power MOSFET provides 1000V, 120m-ohms, features C3M SiC MOSFET technology and is available in an optimized four-lead TO-247-4 package with a separate driver source pin. Device delivers 8mm of creepage distance between drain and source, high blocking voltage with low on-resistance, high-speed switching with low capacitances and fast intrinsic diode with low reverse recovery (Qrr).

RICHARDSON RFPD

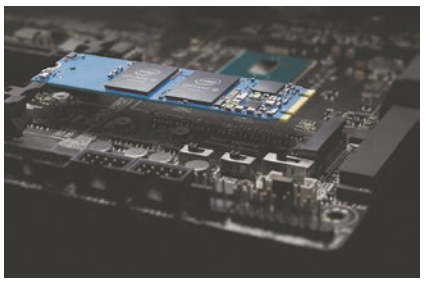
http://ept.hotims.com/65988-80

Platform evaluates functionality of 32-bit hardware modules

UMFT602A and UMFT602X hardware modules enable bridging of a FIFO bus to a USB3.0/1 host and are equipped with either HSMC or FMC (LPC) connectors. Devices provide a simple and straight forward platform on which to evaluate the functionality of the 32-bit FT602 devices, which can deliver up to 1920 x 1080 resolution at frame rates of 60fps, with up to 4 video input channels being made available. This should prove particular beneficial in relation to high performance multimedia applications, like streaming of video content captured by HD camera systems. Devices incorporate 2 parallel slave FIFO bus protocols - a multi-channel FIFO and a 245 synchronous FIFO. Through their respective integrated FT602 ICs, these modules support USB 3.1 Super Speed (5Gbits/s) as well as USB 2.0 Hi-Speed (480Mbit/s) data transfer rates.

FTDI CHIP

http://ept.hotims.com/65988-81



Memory module boosts launch speed for web browsing, gaming

Optane memory module allows designers to do more with their system, without sacrificing the value and capacity of a hard disk drive. Device launches web browsers, gaming devices and productivity apps up to 5x faster than a hard disk drive. Smart and adaptable device adjusts to computing habits with intelligent software that learns users computing behaviors.

INTEL

http://ept.hotims.com/65988-82

System in package supports wirelessly connected designs

SAM R30 System in Package (SiP) incorporates an ultra-low power single-chip RF microcontroller (MCU) with an 802.15.4 sub-GHz radio, providing multi-year battery life in a compact 5mm package. Device delivers design flexibility and proven reliability all in a small package, making it suitable for wireless applications. Device delivers ultra-low power sleep modes, with wake from serial communication or general-purpose input/output (GPIO) while consuming 500nA.

MICROCHIP TECHNOLOGY

http://ept.hotims.com/65988-83

Global semi revenue forecast at 12.3% increase

Worldwide semiconductor revenue is forecast to total $386-billion in 2017, an increase of 12.3% from 2016, according to Gartner Inc. Favorable market conditions that gained momentum in the second half of 2016, particularly for commodity memory, have accelerated and raised the outlook for the market in 2017 and 2018. However, the memory market is fickle and additional capacity in both DRAM and NAND flash is expected to result in a correction in 2019.

"While price increases for both DRAM and NAND flash memory are raising the outlook for the overall semiconductor market, it will also put pressure on margins for system vendors of smartphones, PCs and servers," says Jon Erensen, research director at Gartner. "Component shortages, a rising bill of materials, and the prospect of having to counter by raising average selling prices (ASPs) will create a volatile market in 2017 and 2018."

PC DRAM pricing has doubled since the middle of 2016. A 4GB module that cost $12.50 has jumped to just under $25 today. NAND flash ASPs increased sequentially in the second half of 2016 and the first quarter of 2017. Pricing for both DRAM and NAND is expected to peak in the second quarter of 2017, but relief is not expected until later in the year as content increases in key applications, such as smartphones, have vendors scrambling for supply.

Stanford University researchers develop new wave of electronics

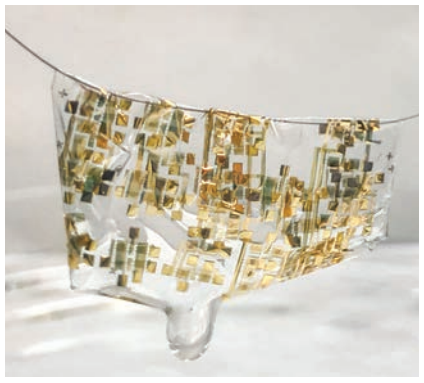
Flexible, organic and biodegradable semiconductor

A new semiconductor developed by Stanford researchers is as flexible as skin and easily degradable. It could have diverse medical and environmental applications, without adding to the mounting pile of global electronic waste.

By Sarah Derouin, Stanford University News

As electronics become increasingly pervasive in our lives – from smart phones to wearable sensors – so too does the ever rising amount of electronic waste they create. A United Nations Environment Program report found that almost 50 million tons of electronic waste were thrown out in 2017—more than 20 percent higher than waste in 2015.

Troubled by this mounting waste, Stanford engineer Zhenan Bao and her team are rethinking electronics. "In my group, we have been trying to mimic the function of human skin to think about how to develop future electronic devices," Bao said. She described how skin is stretchable, self-healable and also biodegradable – an attractive list of characteristics for electronics. "We have achieved the first two [flexible and self-healing], so the biodegradability was something we wanted to tackle."



A newly developed flexible, biodegradable semiconductor developed by Stanford engineers shown on a human hair.
(Image credit: Bao lab)

The team created a flexible electronic device that can easily degrade just by adding a weak acid like vinegar. The results were published May 1 in the Proceedings of the American Academy of Sciences.

"This is the first example of a semiconductive polymer that can decompose," said lead author Ting Lei, a postdoctoral fellow working with Bao.

In addition to the polymer – essentially a flexible, conductive plastic – the team developed a degradable electronic circuit and a new biodegradable substrate material for mounting the electrical components. This substrate supports the electrical components, flexing and molding to rough and smooth surfaces alike. When the electronic device is no longer needed, the whole thing can biodegrade into nontoxic components.

Biodegradable bits

Bao, a professor of chemical engineering and materials science and engineering, had previously created a stretchable electrode modeled on human skin. That material could bend and twist in a way that could allow it to interface with the skin or brain, but it couldn't degrade. That limited its application for implantable devices and – important to Bao – contributed to waste.

Bao said that creating a robust material that is both a good electrical conductor and biodegradable was a challenge, considering traditional polymer chemistry. "We have been trying to think how we can achieve both great electronic property but also have the biodegradability," Bao said.

Eventually, the team found that by tweaking the chemical structure of the flexible material it would break apart under mild stressors. "We came up with an idea of making these molecules using a special type of chemical linkage that can retain the ability for the electron to smoothly transport along the molecule," Bao said. "But also this chemical bond is sensitive to weak acid – even weaker than pure vinegar." The result was a material that could carry an electronic signal but break down without requiring extreme measures.

In addition to the biodegradable polymer, the team developed a new type of electrical component and a substrate material that attaches to the entire electronic component. Electronic components are usually made of gold. But for this device, the researchers crafted components from iron. Bao noted that iron is a very environmentally friendly product and is nontoxic to humans.

The flexible semiconductor can adhere to smooth or rough surfaces and biodegrade to nontoxic products.
(Image credit: Bao lab)

The researchers created the substrate, which carries the electronic circuit and the polymer, from cellulose. Cellulose is the same substance that makes up paper. But unlike paper, the team altered cellulose fibers so the "paper" is transparent and flexible, while still breaking down easily. The thin film substrate allows the electronics to be worn on the skin or even implanted inside the body.

From implants to plants

The combination of a biodegradable conductive polymer and substrate makes the electronic device useful in a plethora of settings – from wearable electronics to large-scale environmental surveys with sensor dusts.

"We envision these soft patches that are very thin and conformable to the skin that can measure blood pressure, glucose value, sweat content," Bao said. A person could wear a specifically designed patch for a day or week, then download the data. According to Bao, this short-term use of disposable electronics seems a perfect fit for a degradable, flexible design.

And it's not just for skin surveys: the biodegradable substrate, polymers and iron electrodes make the entire component compatible with insertion into the human body. The polymer breaks down to product concentrations much lower than the published acceptable levels found in drinking water. Although the polymer was found to be biocompatible, Bao said that more studies would need to be done before implants are a regular occurrence.

Biodegradable electronics have the potential to go far beyond collecting heart disease and glucose data. These components could be used in places where surveys cover large areas in remote locations. Lei described a research scenario where biodegradable electronics are dropped by airplane over a forest to survey the landscape. "It's a very large area and very hard for people to spread the sensors," he said. "Also, if you spread the sensors, it's very hard to gather them back. You don't want to contaminate the environment so we need something that can be decomposed." Instead of plastic littering the forest floor, the sensors would biodegrade away.

As the number of electronics increase, biodegradability will become more important. Lei is excited by their advancements and wants to keep improving performance of biodegradable electronics. "We currently have computers and cell phones and we generate millions and billions of cell phones, and it's hard to decompose," he said. "We hope we can develop some materials that can be decomposed so there is less waste."

Other authors on the study include Ming Guan, Jia Liu, Hung-Cheng Lin, Raphael Pfattner, Leo Shaw, Allister McGuire, and Jeffrey Tok of Stanford University; Tsung-Ching Huang of Hewlett Packard Enterprise; and Lei-Lai Shao and Kwang-Ting Cheng of University of California, Santa Barbara.

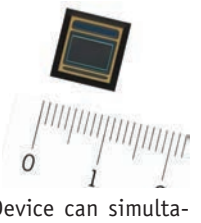
32-Bit Cortex-M4 MCUs are feature-rich

LPC546xx 32-bit microcontrollers (MCU) are flexible and scalable, while improving power consumption. Devices are powered by a 180MHz ARM Cortex-M4 core with up to 512 kBytes of on-chip flash and up to 200 kBytes of SRAM, plus a quad SPI Flash Interface (SPIFI) for expanding program memory. The ARM core includes a floating point unit (FPU), as well as a memory protection unit (MPU) that separates the memory into distinct regions to improve the reliability of an embedded system. Devices provide 21 communication interfaces, including 10 Flexible Serial Interfaces, plus Ethernet support, a TFT LCD controller, and two CAN FD modules.

NXP

http://ept.hotims.com/65988-84

Automotive CMOS image sensor delivers LED flicker mitigation, HDR



IMX390CQV type 1/2.7 state-of-the-art 2.45 effective megapixel CMOS image sensor for automotive cameras is equipped with an LED flicker mitigation (LFM) function that reduces flickering when shooting LED signs and traffic signals, as well as High Dynamic Range (HDR) function capable of 120 dB2 wide dynamic range shooting. Device can simultaneously mitigate LED flicker and capture in HDR, a capability made possible by firm's original pixel structure and exposure method. It also offers high-sensitivity performance capable of producing high-quality colour images even in light conditions as low as 0.1 lux, which is equivalent to moonlight.

SONY

http://ept.hotims.com/65988-85

Understanding IoT Acronyms and *and How to Compare Them*

By Matt Smith, head of engineering, Colorado offices, Cortet by CEL

As the Internet of Things (IoT) industry continues to expand, new information on emerging best practices, technical specifications and design considerations continues to flood the market. The purpose of this article is to help you navigate through the deluge of information and identify which technology choices will have the biggest positive impact on your upcoming IoT plans.

With that in mind, this piece will aim to help your decision-making process by explaining the existing technologies and attempting to demystify the ocean of IoT protocols. Below you will find a framework for categorizing the various technologies and explain some criteria on how to compare and evaluate these.

Oftentimes, it's hard to be sure of what items need to be, or even can be, compared to each other. New ideas and protocols are becoming available at a rapid pace and some companies are pushing technologies that aren't yet ready for prime time. This makes it confusing.

One of the most important decisions you may be facing is which communication protocols to choose. This decision impacts the hardware and what devices and functionality are available. Communication protocols need to be grouped together. Like puzzle pieces, only certain protocols can 'connect' to each other.

The communication protocols you need to know

The following is a list of the most important protocols you should be keeping an eye on. This list is based on multiple factors from CEL's own research, including performance, latency, interoperability, as well as current industry adoption levels.

If this list looks daunting, that's ok. This is the problem with the list. It is just a list. The protocols need to be organized in a way that allows a high-level understanding of the benefits and drawbacks of each. The next section gives a way to make sense of all of these. In other words, feel free to skip this list and start reading the next paragraph. Go on, it's ok. We won't tell anyone.

A framework for organization and comparison

With a list of critical protocols defined, the next step is to create an effective and efficient way of evaluating and comparing them.

We have organized these protocols into 'Protocol Stacks'. A Protocol Stack shows which protocols can build on top of other protocols. Like puzzle pieces, only certain protocols can 'connect' to (sit on top of) other protocols.

Protocol	Description
ZCL	"ZigBee Cluster Library". A set of application layer protocols for how devices like lights, sensors, and switches can communicate with each other.
ZigBee Pro	Mesh networking specification that specifies security, routing, and provisioning. The name comes from "Zig Zag Bumble Bee" due to the fact that the path of a bee and the path of a message in a mesh network can be similar.
ZigBee 3	Upcoming update to the ZigBee Pro specification.
802.15.4	Physical layer protocol designed for use by resource constrained devices. Focus is on allowing battery powered devices to have a long battery life by making the most common action take less energy. The name comes from an IEEE working group.
HTTP	"Hyper Text Transfer Language". The (application layer) language of the World Wide Web. This enables quick and easy data transfer using URLs to specify locations of resources.
IP	"Internet Protocol". Routing layer for the World Wide Web and most in-home computer networks.
WiFi AKA 802.11	Physical layer standard that allows devices to exchange data over wireless links. The "802.11" name comes from an IEEE working group.
Ethernet AKA 802.3	Physical layer standard that allows devices to exchange data over wired Ethernet connections.
dotdot	This is the ZCL application layer protocol modified to run over IP networks.
Thread 1.1	Mesh networking specification that specifies security, routing, and provisioning. Thread gives a method for mapping the protocols of low-power-devices to IP networks.
Thread 2.0	Upcoming update to the Thread 1.1 specification. This is targeted at commercial applications, and adds other new features.
GAP	Bluetooth Generic Access Profile. This describes how two Bluetooth devices can find and communicate with each other.
GATT	Application profile for Bluetooth devices. This specifies how specific information is exchanged.
Bluetooth Mesh Stack	In-development mesh networking specification that specifies security, routing, and provisioning for mesh on Bluetooth networks.
Bluetooth PHY	The physical layer that supports the Bluetooth stack and profiles.

The table shown below is populated with the protocols from our list above and organized into Protocol Stacks.

A Protocol Stack must be used as a whole, so stacks must be compared to each other, rather than comparing separate parts of different stacks.

Much of the confusion around IoT comes from not understanding what can be compared and what protocols can (and must) be paired together. Each Protocol stack consists of a three-layer model, as defined below:

Physical Layer — This layer describes how messages are physically exchanged. It describes what physical medium (cable, wireless) is used, what frequency (for wireless), and message encoding scheme. This is how physical, measured events are translated into bits.

Routing Layer — Now that devices have a way to exchange messages, there needs to be a set of rules for how to get a message from one device to another when the devices aren't close to each other. This layer explains how devices find each other and work together to get messages to devices that are not within range of the initiating device. The content of the message is unimportant for this layer. This layer focuses on delivery from point A to point B.

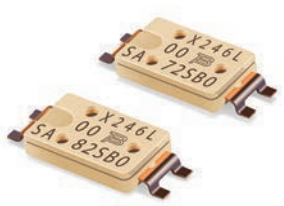
Application Layer — This layer explains the content of the messages. How do the bits translate into an action for a device? This layer describes what a 'turn the light ON' or 'DIM the light to 50%' message looks like. This allows devices to work together to take action and communicate.

	ZigBee Stack	IP Stack	Thread Stack	Bluetooth Stack
App Layer	ZCL	HTTP	Dotdot	GAP / GATT
Routing Layer	ZigBee Pro ZigBee 3	IP	Thread 1.1 Thread 2.0	GAP / BT Mesh Stack
Physical Layer	802.15.4	802.11 WiFi 802.3 Ethernet	802.15.4	BT PHY

For more information on hardware and software products that simplify IoT design from Cortet by CEL, go to http://ept.hotims.com/65988-86

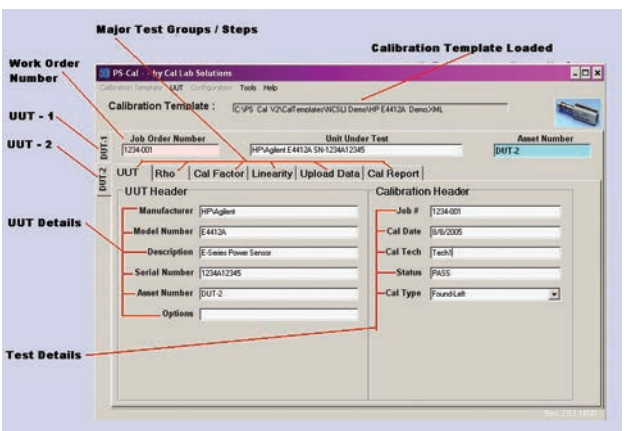
Miniature resettable TCO devices protect battery cells

Model SA series surface mount Miniature Resettable Thermal Cutoff (TCO) devices are resettable. Compatible with surface mount reflow soldering methods, devices are suitable overcurrent and overtemperature protection solutions for lithium polymer and prismatic cell battery packs. Devices can be soldered directly onto printed circuit boards. The low profile devices provide a maximum height of 1.09mm, delivering current capabilities from 6A up to 11A at 60C. Devices withstand humid environments and deliver high corrosion resistance from their bimetal mechanism.



BOURNS

http://ept.hotims.com/65988-87



T&M software supports RF power sensor calibration

Cal Lab Solutions PS-Cal Calibration Software allows fully automated RF power sensor calibration, supporting the widest range of RF power sensors from multiple manufactures with customizable procedures. Product has the ability to read and adjust EPROM data of most Anritsu, Keysight, Rohde & Schwarz, Boonton and Giga-tronics power sensors. Flexible standards allow the operator to use the instruments in the lab and the data is stored for easy manipulation.

TEGAM

http://ept.hotims.com/65988-88

ProductSource

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

products on review

Pre-configured IDF deploys, protects rack mount Ethernet switches

Pre-configured industrial distribution frame (IDF) deploys and protects rack mount Ethernet switches in industrial applications with up to 25% faster installation and 3X the typical cooling capacity. Smaller enclosure size and 316 stainless steel versions provide options for customers deploying one to five switches with different corrosion protection requirements. Product provides consistent equipment deployment with up to 25% faster installation than an IDF installation that is not pre-configured and 3X the cooling capacity over typical deployments, reducing downtime risk due to switch overheating.

PANDUIT

http://ept.hotims.com/65988-89

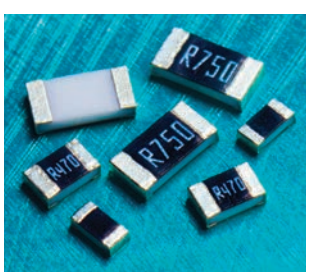
Coaxial cable assembly serves small, high frequency applications

Fixed length SMPM pre-configured cable assemblies support high frequency applications with 50 Ohm impedance requirements. Products boost performance up to 20GHz and are designed for high reliability requirements including military and aerospace applications. Products are terminated to industry standard 0.085 and 0.047 inch hand formable cables and come in standard lengths ranging from 3 to 48 inches and metric lengths from 100 to 2000 millimeters to compliment any RF design.

AMPHENOL RF

http://ept.hotims.com/65988-90

Low-ohm anti-sulfur current sense resistor



SR73-RT low resistance anti-sulfuration current sense resistors improves anti-sulfuration characteristics due to the use of a special high sulfuration proof inner top electrode material and are designed for use in harsh environments with a high level of sulfur contamination. Device lowers resistance values of 0.43Ω up to 10Ω and is available in a range of sizes from 0603 up to 1210 in ±1%, ±2% and ±5% tolerances. Power ratings will be offered up to 0.66 Watt with an operating temperature of -55°C to +155°C.

KOA SPEER ELECTRONICS

http://ept.hotims.com/65988-91

Industrial 15.0-inch LCD module is lightweight

NLT Technologies P/N NL10276AC30-53D thin and lightweight 15.0-inch diagonal LCD module with XGA resolution (1024 x 768 pixels) utilizes a slim LED backlight supported by optimized design of its backlight system. Device has achieved a module thickness of 6.3mm and weight of 640g, which are approximately half of conventional modules in the same size range. Device's LED backlight provides luminous efficiency, while requiring less power consumption. Device can achieve performance of 500cd/m2 luminance and 8.5W power consumption.

TIANMA NLT USA

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