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ELECTRONIC PRODUCTS & TECHNOLOGY

AUGUST 2020

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INSIDE

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Cover photo: Rebecca Blissett, Dorigo Systems
Photos (this page, from top): Dorigo; Getty Images; MicroCare

Selecting a CEM partner

Determining ideal partner to work with on your project

The search for a contract electronics manufacturer (CEM) can be scary, confusing, exhausting and an angst-filled process for the start-up OEM or new product developer. Even for long-tenured design houses, that may simply be looking for a fresh start or renewed support from a different perspective – the process requires some homework.

There is no doubt that asking all of the key questions, the right how, why and what, to potential manufacturing partners is critical to ensuring your vision and product come to fruition. In order to push products through to the finish line, it is essential for product engineers to be on the lookout for any red flags when choosing the right manufacturing partner.

There are lots of firms that can just solder products to printed circuit boards, but there is also a bevy of CEM talent out there that specialize in turn-key services, including engineering and helping you develop and bring that product to market. For most CEMs, the most rewarding part of their job is really seeing a concept become reality.

As a customer, the importance of having open transparency with your contract manufacturer cannot be overstated.

There are varying degrees of CEMs to choose from – depending on what level of service you require. Some specialize in low volume, high mix manufacturing, while others can manage three or four different products produced in very large volumes.

CEM qualities

What are some qualities that an innovator should be looking for in a manufacturing partner? Well, if they have graduated from the garage or basement design shop, and they're really looking for someone who can actually start proving they are capable and the design is repeatable in a manufacturing environment.

Going local

So what's the advantage of aligning with a local CEM, situated right in your Canadian backyard, versus, say offshore. For starters, you will likely be personally welcomed into the CEM's facility, where you can see what your product goes through and will be able to see every iteration of it. Best of all - CEMs can take your brand new design that's fresh out of quality control and say, "it's ready let's plug it in together - let's see if it works."

It is obviously important to develop a level of trust based on the CEM's actions, seeing their actual facility, allowing them to showcase their capabilities. A facility tour provides the upstart OEM an opportunity to see operations, their workspace, what they can do, and their capabilities. This also provides really good transparency of what you might be getting into.

Transparency

The importance of having open transparency with your CEM cannot be overstated. The customer's knowledge of the manufacturing structure must be absolutely clear about how things are proceeding. As many Canadian OEMs are aware, there is expert quality and expertise available to them overseas and in China, but if you don't end up with that – it can be a very, very risky place to do business.

The creator's journey is never an easy one, working through the innovation process from discovery to designing and refining a prototype, and finally in the factory. The tools, resources and personnel are out there. If you are not sure where to begin your search for a CEM, then this issue of EP&T will help. Embedded within some great content relating to contract manufacturing in Canada, you will also find our first annual listing (Pg 20-25) of CEMs and EMS providers countrywide.

Good luck in your pursuit. **EP&T**

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EP&T
ELECTRONIC PRODUCTS & TECHNOLOGY
Canada's information leader for electronic engineers and designers

AUGUST 2020
Volume 42, Number 5

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EP&T is published eight times per year by
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Suite 400
Toronto, ON M2H 3R1
Tel (416) 442-5600
Fax (416) 510-5134
www.annexweb.com

SUBSCRIPTION RATES
Canada – $58.50 one year;
$94.00 two years
USA – $134.00 (CAD) per year
International – $183.50 (CAD) per year
Single copy – Canada $15

CIRCULATION
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Tel: 416-510-5183
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ISSN 0708-4366 (print)
ISSN 1923-3701 (digital)

PUB. MAIL AGREEMENT NO. 40065710
Return undeliverable Canadian addresses to: EP&T Circulation Department,
111 Gordon Baker Rd. Suite 400,
Toronto, ON M2H 3R1

PRINTED IN CANADA

Funded by the Government of Canada | Canada

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NEWSWATCH

WEARABLES

GOOGLE ACQUIRES SMART GLASSES FIRM NORTH

Google has acquired Kitchener-Waterloo-based smart glasses maker North. The value or terms of the deal were not disclosed.

Founded as Thalmic Labs in 2012, North emerged with an optimistic vision for the future in which technology becomes an invisible, helpful part of our everyday experience, according to the firm's three founding partners - Stephen Lake, Matthew Bailey and Aaron Grant.

The technology behind the firm's battery-powered smart glasses, branded as Focals, can receive and send text messages, order Uber rides and display the time and weather.

"This technology is seamlessly blended into your world: immediately accessible when you want it, but hidden away when you don't," says a blog entry post by the firm's founders.

From its inception, the firm's focus was on new forms of interaction with Myo, a gesture based input device that directly coupled neuro-muscular impulses into signals computers could understand. In 2018, the team shifted its attention to Focals, everyday smart glasses with direct retinal projection and prescription compatibility.

"Over the last while, it became clear that aligning with Google would significantly advance our shared vision," the blog entry read. "This acquisition is a terrific fit for North and, importantly, we're staying here in Kitchener-Waterloo. We're proud to have grown our company in the Kitchener-Waterloo region and are thankful for the tremendous support we've received from the community. We are looking forward to remaining in the region with Google."

Tech giant Google recently acquired Waterloo-based North, makers of Focals smart glasses, capable of receiving and sending text messages.

SEMICONDUCTORS

US/CHINA STRUGGLE OPENS DOOR FOR CANADA

BY GORD HARLING CEO CMC MICROSYSTEMS

Governments around the world are recognizing the fragility of supply chains, not only to pandemics, but also to political stresses. No ecosystem is more critical than the global electronics supply chain. All industrial sectors from healthcare to cleantech depend on semiconductors – the enabling components of electronics manufacturing. While the bulk of the semi manufacturing is done in Asia there are several North American suppliers including Global Foundries, Intel, Samsung, and soon, TSMC in Arizona. The COVID-19 crisis has exposed the urgent need for a resilient semiconductor supply chain grounded in a sound geopolitical environment.

Canada is in a unique position, with economic, financial and political systems, a highly trained workforce, and an excellent reputation internationally as a country that is open for business. In the past we were host to Gennum and Nortel semiconductor fabrication facilities in Ontario, EG&G Optoelectronic and Mitel (now Teledyne) in Quebec, and LSI Logic and Micralyne (now Teledyne) in Alberta.

IBM Microelectronics in Quebec still packages the most advanced computer chips in the world and is now taking on new optical component technologies required for 5G. There is a solid foundation of industry experience and a talent pool for firms to draw from.

It is time for Canada to become the premium location for semiconductor and advanced electronic manufacturing. With access to capital, right place for the next major investment in manufacturing. Canada wouldn't have to start from scratch, given the complexity of the manufacturing process it has become common for the industry leaders to collaborate on manufacturing process development, we could negotiate with a partner for their manufacturing knowledge as part of the investment.

Is it time for Canada to become the premium location for semiconductor and advanced electronic manufacturing?

AUTOMOTIVE TECH

LEDDARTECH ACQUIRES SOFTWARE FIRM VAYAVISION

LeddarTech, a Quebec City-based leader in ADAS and AD technology, has acquired sensor fusion and perception software company VayaVision Sensing Ltd.

LeddarTech supports Tier 1-2 automotive system integrators with an open automotive and mobility sensing platform, including its LiDAR-based LeddarEngine. There is an industry consensus that level 3 to 5 autonomous driving applications require multiple sensors and sensor combinations of LiDAR, radar, and cameras. Sensor fusion development significantly increases the customers' time-to-market, cost, and risk.

The integration of VayaVision technologies, products and expertise enables LeddarTech to accelerate time-to-market while significantly reducing customer development costs and risks with a sensor fusion and perception stack that scales from a single sensor to multiple sensor combinations and is hardware and operating

Top photo: North; Rawf8 - Getty Images/iStockphoto; Vayavision

system software agnostic.

MANUFACTURING SUPERCLUSTER, INDUSTRY PARTNERS INVEST IN CANADA

Next Generation Manufacturing Canada (NGen), a Hamilton ON-based, industry-led organization leading Canada's Advanced Manufacturing Supercluster, has announced a collaborative funding effort worth $28.8-million to support nine cutting-edge projects across Canada. NGen's contribution of $11.3 million is leveraging an additional $17.5 million in investments from 27 industry partners.

The projects, which combine Canada's manufacturing strengths with new and emerging technologies, were selected for NGen funding by a panel of independent experts. Twenty-four of the industry partners are small and medium-sized companies.

"The advanced manufacturing projects we support combine some of the best in knowledge, technologies and production capability that Canada has to offer," said Jayson Myers, CEO, NGen. "Collaboration allows Canadian companies to create leading edge solutions for Canada that can then be leveraged to capture new market opportunities around the world."

IOT

ROGERS & U OF CALGARY ADVANCE INNOVATIVE IOT RESEARCH

Rogers Communications and the University of Calgary announced a five-year agreement to advance innovative Internet of things (IoT) research in support of Canadians, and Canadian businesses. Together they have established the Rogers Internet of Things Chair with research led by Dr. Steven Liang, PhD, a renowned researcher at the Schulich School of Engineering.

"This initiative will bring ground-breaking IoT research and innovation to Canadian businesses and Canadians overall," said Dean Prevost, president, Rogers for Business. "This exciting research is critical to developing the applications and IoT business solutions necessary to transform industries, support small businesses, and drive our economy when it's needed most."

Liang will focus on IoT research in the areas of energy, smart cities, transportation, and workplace safety including COVID-19 related solutions.

ENTREPRENEURS

TECH INNOVATORS RECEIVE GOV'T SUPPORT

As one of the largest tech and research hubs in Canada, Ottawa-based tech entrepreneurs are the recipients of a total FedDev Ontario investment of nearly $11.2 million to support their scale-up and growth.

Three leading tech firms in the region: Lytica Inc., Solace Corp. and You.i TV - have demonstrated the ability to harness the transformative power of digital technology to support industries across the Canadian economy, according to Karen McCrimmon, Member of Parliament for Kanata–Carleton. "These technologies support skilled jobs and economic growth, and allow the region to be more resilient in the face of COVID-19," she says.

Lytica Inc. uses artificial intelligence (AI) to provide real-time market insights to help companies find competitive prices and suppliers for electronic components.With the $1.08-million FedDev contribution, Lytica will transition its current web-based portal to a Software as a Service (SaaS) model, enabling customers to integrate Lytica's pricing analysis tools into their existing procurement software. **EP&T**

*Visit **ept.ca** for the latest new products, news and industry events.*

Photo: NGen; Lytica

Summit Nanotech greens-up lithium extraction process

B2B energy innovator offers enviromental solutions to industrial problems

As most designers recognize – Lithium-ion batteries are light and compact. Compared to other rechargeable batteries Li-ion has high energy density and low self-discharge rate. You should know that Lithium-ion now powers the majority of modern portable electronic devices from mobile phones to hybrid and electric vehicles.

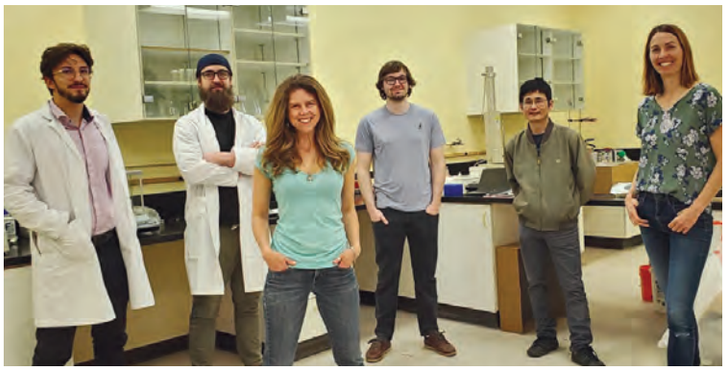
Thus, the proliferation of mobile devices, gadgets, and e-vehicles has created skyrocketing demand for lithium. It is estimated that by 2025, lithium demand will increase to five times today's levels. To be sure, lithium-ion technology has the potential to mitigate climate change by displacing the use of fossil fuels and reducing CO_2 emission, but its mining and extraction practices do have a negative environmental impact.

For these reasons, I was keen to acquaint myself with a firm that uses clean extraction practices. I recently had the opportunity to speak with Amanda Hall, CEO and founder of Summit Nanotech, a Calgary-based start-up that is striving to transform the mining industry, allowing it to use more sustainable, efficient, and effective processes.

Unique technology

"This company was born from experience gained in the oil, gas and potash mining sectors in Western Canada. Lithium extraction is very much like oil extraction, except that have we thankfully have no hydrocarbons in our brine," says Hall.

Hall's team has developed a technology that extracts lithium from raw brine, creating a high purity lithium chemical to sell to battery manufacturers. They are doing this using electronics such as sensors, control panels, and automation systems to make their machines more reliable and optimize performance. The arrangement of modules being deployed depend on the makeup of the brine at different sites. All this, using no fresh water.



Amanda Hall, (centre and bottom right) CEO and founder of Summit Nanotech is striving to transform the mining process of lithium.

"The best lithium on the planet is found in desert environments. Cutting out the use of fresh water is really important for meeting government regulations," explains Hall. "Our process reduces costs and decreases chemical waste by 90%."

The firm's website touts that its process is the most "green lithium extraction technology in the world." No small feat, and one that Hall says is at the core of who they are as a team.

"We are part of what feels like a movement towards a better future. As scientists, we feel responsible for creating the change now that is required to meet future energy needs. It will be a transgenerational journey, but we feel privileged to be part of this chapter in the overall story," she adds. Summit Nanotech has earned some serious praise and awards very quick, emerging just two years ago.

Government support

"The very first recognition based award I won was as a finalist and a leading female innovator through the Women in Cleantech Challenge run by MaRS in collaboration with Natural Resources Canada. The government gave me about $900,000 in cash and in-kind support," says Hall. In this way, Summit Nanotech worked out of the CanmetENERGY government lab in Devon, Alberta, providing them a world-class lab at their fingertips. Shortly thereafter, they were listed as one of the top 30 most promising start-ups in Canada, capturing second place at an Energy New Ventures competition, and first place at Inventures for the Smart Cities, Vibrant Communities Event.

"In the midst of all the attention we were receiving was even more important activity. We were getting customer traction, and we were getting our technology third-party validated," says Hall. "I read a quote to my team this morning from Richard Feynman: 'For a successful technology, reality must take precedence over public relations, for Nature cannot be fooled.' To me, public relations is a bonus, but the results of the tech development is paramount."

They haven't been without challenges either. Last year, the firm was focused on building a process for its lithium mining customers when they realized that they were creating a technology that did not have a strong enough product-market fit.

"We pulled out of the lab, went back to the whiteboard and did another round of customer interviews to see where we had gone off track," explains Hall. "Luckily we were able to back up enough to come at it from a different angle and now we have a process that our customers want." Hall says that this is one of the most important lessons she can convey – "Continuously perform product-market fit assessments to stay on the critical path to revenue."

Start with good lawyer and accountant

Summit Nanotech has chosen well with its home base, as Alberta professionals are well-versed in observing ESG (environmental, social, governance) standards, along with being a province full of resource extraction experts. As for sharing some of her personal-wisdom to other entrepreneurs, Hall stated: "Get a good lawyer and a good accountant from the start to set you on the right path. Negotiate everything to get lower costs up front. Also, don't take no for an answer. When someone says 'no', use it as an opportunity to learn what you need to do to get a 'yes' next time." She also suggests that entrepreneurs put a strong human-centric purpose at the core of their company.

"It will be your guiding north star when difficult decisions arise, and they will arise."

To learn more about Summit Nanotech, go to www.summit-nanotech.ca **EP&T**

Sohail Kamal *is EP&T's West Coast correspondent. sohail@nextgear.ca*

Photo: Summit Nanotech

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ELECTRONIC PRODUCTS & TECHNOLOGY

– PRESENTS –

CONTRACT ELECTRONICS MANUFACTURING (CEM) PROVIDERS IN CANADA

ELECTRONIC MANUFACTURING SERVICES GUIDE 2020

SOURCING
CEM PARTNERS

CONTRACT MANUFACTURING

A coast to coast list of CEMs – page 20

Photo: Industryview - Getty Images/iStockphoto

Dorigo Systems sets new CEM standards

Industry 4.0 ready Burnaby BC facility underscores its plan, vision. **BY STEPHEN LAW, EDITOR EP&T**

Walking through the doors of Dorigo System's new facility immediately grabs your attention, as the blue archway encircling the doorway opens up into a grand two story entrance filled with an abundance of natural light. One could say that this beacon represents a bold and aggressive step for this prominent contract electronics manufacturer, which recently opened its doors to a brand new, state-of-the-art facility within the Glenlyon Business Park in Burnaby BC.

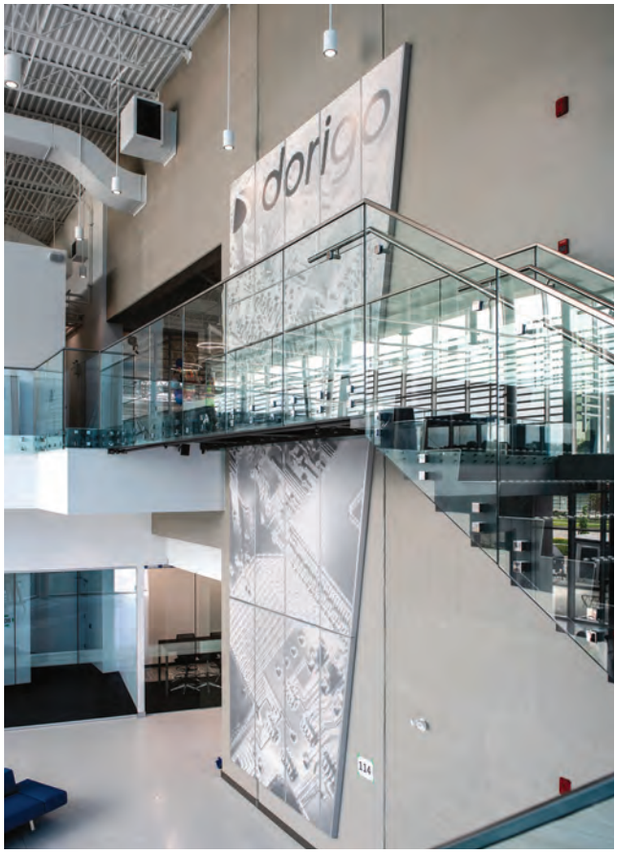
The 105,000-square-foot building was designed by renowned Vancouver architect, Chris Bozyk, and was built by the highly-respected Beedie Development Group. The new layout of the space was designed to optimize speed of production, while maintaining the highest quality standards, according to Dorigo president Mark Pillon, P.Eng., who founded the firm in 1988.

"Our vision is to operate a world-class facility for years to come," he said "We can now provide the most innovative electronics manufacturing services to our growing OEM customer base in the Pacific Northwest using the best people, technology and processes all in one location."

The new custom-built corporate campus is able to handle virtually any project required by OEMs and industry innovators, who are bringing new products to market, according to Dorigo's VP operations Alex Chassels. While supporting its current and future customers' longer term growth plans, this step forward creates the structural framework from which Dorigo can adhere to its strategy of the three-Cs.

"This facility helps us leap forward into a truly seamless customer experience using communication, collaboration and commitment," enthused Chassels. "We are capable of delivering Dorigo's Seamless Customer Experience now and into the future."

> ***"This facility helps us leap forward into a truly seamless customer experience using communication, collaboration and commitment"***
>
> ***– Dorigo Systems VP Operations Alex Chassels***



Below: Dorigo's grand two-story entrance is filled with an abundance of nautral light.

Photo: Dorigo Systems

Industry 4.0 communications

What you can't see, but it is clearly interwoven into every space of Dorigo Systems, is the advanced digital technology supported by Industry 4.0 communications. Dorigo's Seamless Customer Experience leans into the use of these technologies to share more detailed, reliable and up-to-the-minute information with customers than ever before. Industry 4.0 significantly boosts productivity, reduces costs and improves product quality services.

"This technology lets us check on production at every step of the process improving on-time delivery and quality. It even eliminates waste in the process," states Chassels.

The entire building uses the latest smart building technologies to heat, cool and light the facility for optimal use and enjoyment by Dorigo's employees while deploying green

Dorigo's state-of-the-art facility uses the latest smart building technology to heat, cool and light the building.

technologies. Walking up the two story staircase to the main foyer provides customers with a grand view of the surrounding area along with the open office space designated for Dorigo's customer service teams.

"Leveraging Industry 4.0 significantly boosts our productivity, reduces costs and improves product quality services for our customers," says Chassels.

The site's Industry 4.0 connected technologies include:

- Complete, high speed, and broad-spectrum connectivity.
- Digital interfaces with over 40 screens for viewing factory performance, casting area meetings and ensuring all staff are aligned with our focus areas.
- Full integrated environmental controls from View glass self-shading windows to smart power controls to minimize powers usage and other environmental controls to ensure we consistently meet all IPC requirements.

The building also features platform based solutions for business intelligence and communications. These include the roll-out of the FactoryLogix manufacturing execution system, along with updated business analytics systems that obtain live data on Dorigo's performance to its customers' expectations and the firm's own internal measures.

"We are using technology that lets us check on production at every step of the process improving on-time delivery and quality – systems focused operating design," Chassels notes. "Our purpose built lines for rapid/quick turn and higher standard run productions. There isn't a project we can't handle."

Photo: Dorigo Systems

The Burnaby BC campus is employee-centric, offering amenities such as this staff lounge.

Boardroom overlooks production

As customers step past the reception area into the main conference room they are greeted

Dorigo Systems founder and president Mark Pillon, P.Eng.

with a broad view overlooking the production floor. The conference room windows provide a panoramic view of the expansive manufacturing space, which supports several automated surface mount assembly production lines along with current precision electronics manufacturing services all on one level. Dependability, speed and flexibility are some of Dorigo's goals for the custom-built infrastructure.

"From automated SMT assembly of the latest microBGA components to selective soldering of high pin count connectors, our highly skilled team and industry-leading equipment will be able to handle virtually any project required by established corporations to industry innovators," states Chassels. "We can support them all."

Alex Chassels, VP operations.

The campus also features an employee- centric building, offering amenities that include: training and meeting rooms, recreational spaces, smart lighting (electrochromic glass), bike storage and ample parking.

"At its core, Dorigo Systems is flexible and nimble. It has always been our mindset regardless of the building in which we operate," beams Chassels. "As we continue on our growth path, we are committed to being agile by ensuring the right processes are used at the right times. I am also a firm believer in individual accountability and ownership, which ensures all team members have the ability to make the necessary decisions and retain the needed flexibility."

Vision includes growth

Looking out onto the production floor can provide a strong sense of Pillon's vision. Abundant space for growth and meticulous design in work spaces and equipment placement take Dorigo Systems to a new level of electronics manufacturing excellence never before seen in the Pacific Northwest.

"Mark (Pillon) is an entrepreneur at heart and understands that the future Dorigo goes beyond manufacturing by creating a truly seamless and interactive experience for customers based on a digital framework and a core of highly skilled teams to provide a niche/customized customer experience," says Chassels. "It has always been Mark's vision to operate a world-class facility for years to come."

Workplace cubicles are spacious and bright with natural lighting.

The facility's boardroom overlooks the production area.

With an existing staff count around 100, Dorigo recently expanded its business development team, as well as adding new representation in the United States. The new facility now focuses its outreach to all of North America, not just the Pacific Northwest. These efforts will be supported by the recent addition of experts in data analytics and systems optimization. The firm also created customer experience teams, who will support the firm's Seamless Customer Experience.

"Sophistication must be with purpose. For the past two decades, companies have moved their manufacturing operations overseas or partnered with CEM's in lower cost regions.," says Chassels. "With the new breed of manufacturing technologies, the unit cost draw of overseas wilts dramatically. The sophistication of our building is a representation of our progress to closing the productivity and overhead gap."

As for the current vibrancy of BC's product-based tech community, Chassels says, "BC has always been a leader in product-based technology but with a rhythmic ebb and flow based on overall market conditions. As we enter the phase of digitization and Industry 4.0 we are seeing a blossoming of product technology ideas in BC and we are poised with our new site and customer focused direction to win regional customers here and throughout North America." **EP&T**

Photo: Dorigo Systems

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Do I need project management support at my contract manufacturer?

Consider NPI, ongoing production, project management, quality planning, oversights and RFQ. **BY KAETHE HENNING**

Given the many hurdles to bring a product to mass production, it can be considered a minor success to get to the point of contract electronic manufacturer (CEM) selection. Going through a robust request for quote (RFQ) process and choosing a CEM partner is one of the most important decisions you will make on the path to production.

In the CM selection process, there are steps you can take to begin to build trust, while also taking into consideration that the CEM has its own revenue targets and the need to make a profit. Mutual trust and a good business relationship go a long way towards ensuring smooth production runs. Just as critical is gaining an understanding of the CEM's processes and capabilities, which is usually accomplished through in-person visits. Having a plan in place to manage your new product introduction (NPI) process at your CEM – including how to address any challenges that will arise – is key to ensuring the mitigation of cost, quality, or schedule issues (and, for the purposes of this blog, specific to offshore manufacturing). Which begs the question, "Do I need onsite project management support at my CEM?"

To evaluate this question in light of your product and company, it's important to start with some perspective of how things may (or may not) go. Here's a potential challenging example, for something as simple as glue, which represents a simple element to the whole project.

Build case scenario

Let's say the CEM finds out they can get a cheaper price for the glue used for boxes of your packaging if they switch glue vendors. If you have not specified that vendor change for the glue requires your approval, they may go ahead and change the glue without you knowing. Then, if the boxes all delaminate or fall apart in shipping because the new glue doesn't hold up to the same temperature/humidity standards that are quality tested, you have an entire shipment that needs to be recalled and boxes rebuilt. Not to mention possible damage to those units that were in transit, missed deliveries to all those buyers, and very unhappy customers. This could be a huge problem.

Your plan for managing your production is incredibly important. To break it down, there are three basic scenarios for production oversight:

- Have the CEM (solely) manage production with no additional onsite oversight
- Have the CEM manage production with your team onsite on a part- or full-time basis
- Have the CEM manage the process with oversight from a partner or third-party (with your team onsite during key milestones).

Scenario 1: CEM-Managed Production

This approach may work if you are building an uncomplicated product and have done your due diligence (i.e., undertaken a competitive CEM selection search, audited the factory, met with the management team, selected a trusted CEM that has prior experience in your industry or with analog products, and signed an manufacturing service agreement (MSA) with terms you and your lawyers are happy with). In this case, your CEM should be capable of managing your production without you needing to be present.

You are paying for a service to produce your product, so the expectation is that this partner should be able to deliver the devices according to your desired outcomes. However, "hope is not a method" as the adage goes, so you should expect to do a lot of preparatory work to ensure the quality of the end product and that there is no confusion throughout the process. Specifically, you can take steps to:

Have a manufacturing service agreement (MSA) with clearly defined terms that dictate acceptable quality levels (AQLs), yields, payment terms, delivery dates and penalties, and so forth.

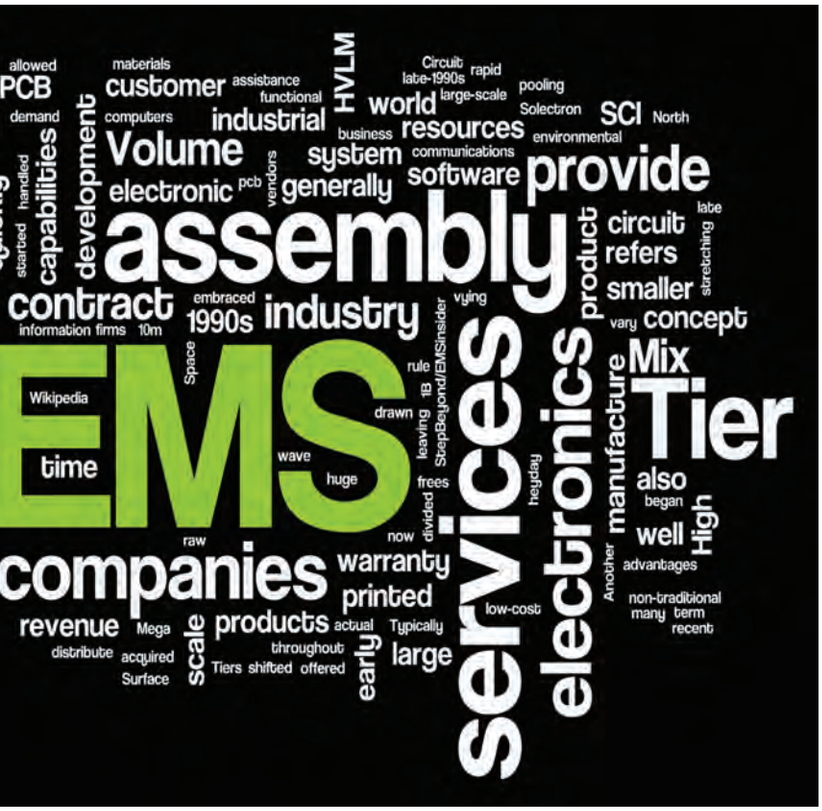
Invest in an independent third party audit of the CEM, so you have a report of the capabilities, testing equipment, etc, and a record of any areas of concern.

Work with your CEM partner to review (or develop) your quality and test plans and related standard operating procedures (SOP) documentation. This will ensure that corners are not cut, or, define who is responsible if they are.

Insist upon proper quality control procedures pertinent to your product. These can be developed by you or developed by the factory. If developed by the factory, you should make sure shipment inspections are in place to ensure quality requirements are met.

Scenario 2: CEM-Managed Production with Company Team Member Onsite (on a part- or full-time basis)

For a company that has experienced internal resources (supply chain manager(s), VP of manufacturing, head of operations, etc) available to be onsite, this scenario may be ideal. You know your product best, you understand the expectations of the quality you want. You have developed the testing protocols throughout the R&D, product design & engineering, and prototyping phases. You have an in-depth knowledge of your Bill of Materials (BOM), including which components are generic, assigned, or consigned, know which component sources are risks or need secondary and tertiary vendors, and when a risk-buy or spot-buy will be necessary to achieve the PO date targets. You know how to identify a shoddy third party vendor and have the ability to require the CEM to provide an alternative. The list could go on, but you get the idea.



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Scenario 3: CEM-Managed Production with Outsourced Production Oversight

This is an ideal scenario for a number of reasons, specifically as it relates to addressing cost, quality, and schedule concerns. If your team is lean, having a team member overseas at your factory on a full- or part-time basis may not be feasible. From a budgetary standpoint, the travel costs alone will quickly add up.

Another critical aspect is the day to day communications with the CEM. The phrase 'lost in translation' exists for a reason. Having a partner who can understand and speak both the native language of the CEM, as well as English, will certainly help you to avoid simple translation and communication challenges that can very quickly escalate into full blown issues. From a time-zone perspective, having someone onsite who can address questions and issues in real time is going to save valuable cycles in terms of schedule.

Finally, there are the 'unknown unknowns'; the things you cannot predict. A global pandemic is a prime example. If you can no longer get to your factory, having a partner who can represent your interests and act as your eyes and ears (and sometimes hands and feet) on the ground will certainly provide peace of mind and confidence that you'll be able to meet your goals. With this type of arrangement, it is still strongly encouraged that a member of your team go to the factory (if possible) during key milestones as you know your product best and will want to have input and visibility throughout the process.

Conclusion

The decision you make about how to manage your production comes down to your team make-up and the type of product you are building. If you have a simple product and trusted CEM, or if you have the resources, expertise, and capabilities to manage internally, then outsourcing production oversight to a partner may not be necessary. But, if you are lacking those internal resources and capabilities, it's important to have the security of a trusted partner in order to ensure that you can meet your cost, quality, and schedule goals.

Dragon Innovation helps companies launch complex products by strategizing and executing their manufacturing from prototype through ongoing production. EP&T

Kaethe Henning *is director of business development, Dragon Innovation Inc.*
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The tangible value of blockchain for OEMs

Blockchain technology expands horizons for manufacturing industries. **BY AUGUST ELECTRONICS**

Quite simply, blockchain is a means of recording and verifying information.

It may be thought of as a database spread out over several locations where timestamped records are continuously accumulated and linked to previous records (or blocks).

Although blockchain is currently just in the early phases of adoption there are several reasons for OEMs and their supply chain partners to consider exploring implementation of this powerful technology.

For manufacturing industries, blockchain technology expands horizons – the landscape is wider, the potential is huge for sourcing materials, creating product designs, and producing finished goods. Blockchain reduces the distance between you and your end-user and makes mass customization more practicable.

Experts believe that blockchain technology can decrease costs, enhance productivity and access to global markets for products and services, especially when combined with 3-D printing. In this post, we discuss some of the benefits of adopting blockchain technology.

Build ethical manufacturing relationships

Blockchains are meeting spaces to create and develop digital relationships and as such are invaluable in creating intelligent smart manufacturing contracts. A smart contract is a digital pact that executes automatically, instantly and without the need for intermediaries, when prearranged conditions are fulfilled. It holds each party accountable for their role in the contract.

Such contracts are nimble, accurate, quick, secure and credible. They lessen the likelihood of errors, and allow the smart contract to auto-execute when terms are met. The secure technology and the basic nature of the blockchain will not allow the other party to default.

Over time, such smart contracts build reputations and relationships between suppliers and their clients based on mutual trust. The visibility and transparency offered by blockchains allows manufacturers to uphold ethical business practices by identifying unscrupulous supply chain constituents.

Supply chain fraud

According to the Blockchain Research Institute, global supply chain fraud amounts to about $300-billion annually. This damage and the related risk of counterfeit goods and materials can be significantly reduced by using blockchain to monitor the movement of materials and goods from their point of origin through a supply network.

Versatility

A 2016 Deloitte study highlighted the versatility of blockchain technology, with companies having diverse perspectives on the main drivers for adoption:

- its ability to improve systems operations;
- its advanced security features; and
- its potential for "enabling new business models and revenue streams".

All these advantages are indispensable for an OEM looking to operate on a global scale.

The study also noted that many companies in the manufacturing and consumer products industry were expected to invest about $5 million in blockchain technology starting 2017. This is a solid indicator of industry confidence and expected value.

Multi-industry manufacturing

Blockchain is relevant for manufacturers across diverse industries. For example, the Internet of Things (IoT) is a growing industry with connected devices, transportation, and even homes. Manufacturing for IoT is technically and operationally complex. As blockchain emerges it has the potential to help manufacturers securely connect and manage a large number of distributed devices. In the upstream oil and gas industry, exploration and production can benefit greatly from blockchain to handle enormous amounts of data to ensure safety, efficiency and transparency.

As blockchain continues to advance and develop, OEM's should consider the merit of integration. Driving increased efficiencies will strengthen ROI and market share expansion for their respective business. Not only could OEMs realize the benefits of this innovative approach, but suppliers and end-user would also reap its benefits.

Linking CEMs, OEMs and customers

Blockchain is making way for more collaborative interactions in manufacturing between suppliers, Contract Electronics Manufacturers (CEMs), OEMs, and end customers. Through streamlining the supply chain, regulatory compliance, quality control, and shipment tracking, blockchain's automation can enhance trust between business partners, while optimizing manufacturing costs and data traceability.

OEMs, CEMs, and end customers' combined value from adopting blockchain technology are just starting to be realized. The integrity of design, materials, and processes are assured and become verifiable at any stage in the product lifecycle. Long lead times and non-value-added costs associated with manual processes are significantly reduced. Risks associated with fraud, part counterfeiting, intellectual property, and human manipulation can also be mitigated.

End-to-end insight along the value chain allows for cross-company tracking of products in the manufacturing lifecycle from design to warranty, allowing for streamlined manufacturing and higher customer service levels. Electronic manufacturing product lifecycles tied to blockchain technology have the potential to become more transparent, reliable, and secure for stakeholders to quickly verify the source and authenticity of their products or any of its components. With more OEMs exploring the possibilities of implementing blockchain technology, it's no surprise that the manufacturing industry will soon see some exciting changes. **EP&T**

August Electronics *is a Calgary-based CEM providing end-to-end electronic manufacturing services. https://aeicm.com/*

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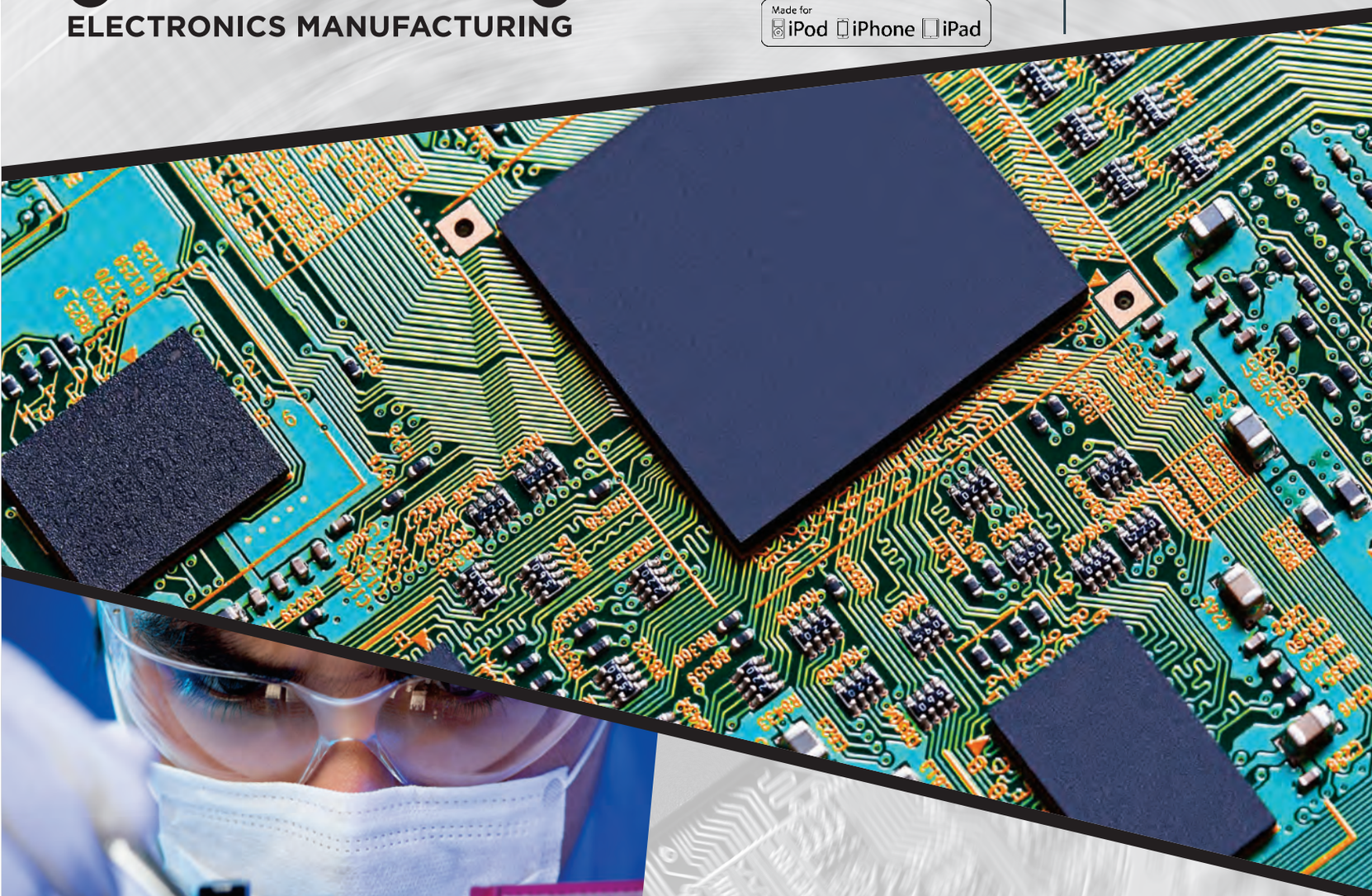

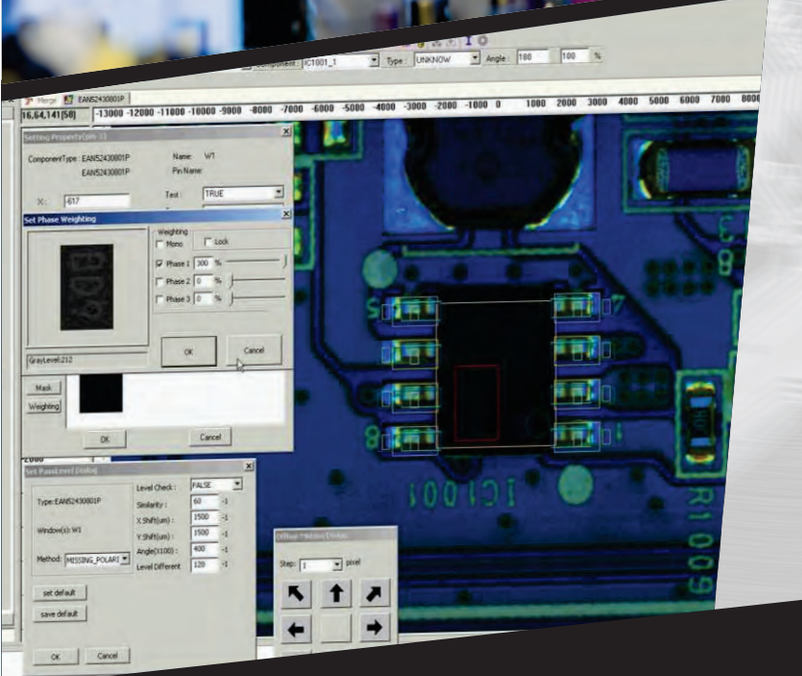

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Untold hidden risks and costs of outsourcing offshore

Maintaining electronics manufacturing services in Canada brings multiple upsides. **BY ANGELA TAHARA**

'Murphy's Law'. Anything that can go wrong, will eventually go wrong. As a certified professional purchaser (CPP) for 15-years in the high tech electronics industry, and now the business development manager at Selcom Industries, I have the pleasure of been in this industry and on both sides of the fence to really evaluate best practice scenarios.

As a CPP, one must communicate and serve production, engineers, quality, sales, corporate, financial and the all-important customers. To make any adjustment, a risk assessment is presented.

Ultimately, the internal stakeholders agree on the course of action and in this instance, this course was to go offshore to save on the bottom line of the product. We added carrier costs and insurance of shipments to the vendor's request for quote (RFQ), and considered how much to bring in at a time with buffer stock should a shipment be held up at customs.

> ***In most cases, a great communicative local vendor will negotiate and come up with your best strategy***

Batch sizes were determined by engineering and corporate. It was deemed a viable course for our stable product.

'Murphy' stepped in on the third shipment. The reputable carrier had lost a large shipment and it was not to be found. Three months later we were reimbursed the cost of the shipment from the carrier, but that was the least of our problems.

Best practice scenarios need to be evaluated when communicating with all factions of the 'build' process.

Within a few weeks we were out of stock and this is what transpired:

- We could not deliver to our clients - and customer dissatisfaction is the result, relating to unknown losses.
- Rush order from overseas vendor, which added cost to product.
- A few components were not available and partial shipment had to be made, adding extra shipping fees.
- Overtime hours to catch up once the new shipment arrived adds internal costs.
- Implement a permanent contingency plan to overstock should this ever happen again.
  - This removed the corporate and engineering team's ability to be short-term reactive should there be engineering changes. This brinks risk of dead stock and added costs.
  - No longer a JIT (just in time) inventory.
  - Our component vendor pipeline commitment extended much farther, risking further costs.
  - Keeping this new gross amount of inventory on hand tied up cash flow, plus company credit limit - adding hidden internal costs
  - Financial statements had gone from healthy to horrendous and several cuts had to be made elsewhere within company - adding hidden corporate costs.
  - Forced to restructure smaller shipments, creating additional shipping and insurance fees.

What we all know is time is also money, and a factor that I didn't include above. You can imagine the time it took to maintain an offshore vendor with this contingency plan.

Ultimately, we returned most projects to a local vendor. Not all EM's are alike, but there are some exceptional ones out there that have the right capacity, skilled personnel, turnkey solutions, quality, equipment and will tailor make strategy to get your bottom line where you need it without the unnecessary stress points.

In most cases, a great communicative local vendor will negotiate and come up with your best strategy.

By throwing 'Murphy' into your evaluation equation, you can address efficiency and all the needs of your company's stakeholders, from your customers, engineers, production, quality and right through to the corporate balance sheets. **EP&T**

***Angela Tahara**, CPP, business development, Selcom Industries Inc., Burnaby BC. http://www.selcom.com*

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This guide is designed to serve our OEM readership base as a helpful source to locating a contract manufacturing partner in Canada.

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The future of contract manufacturing

Digital tools, reliable partners yield competitive advantages. BY PAUL DOSSER

Throughout the COVID-19 pandemic, many Canadian contract electronic manufacturers (CEM) have and continue to play an important role in rapidly producing technology and equipment critical to fighting COVID-19, from ventilators and electronic dispensers for hand sanitizers and soaps, to remote temperature monitors, electronic door controls for limiting access to areas and more.

As Canada re-opens from the COVID-19 quarantine and many sectors shift to moving innovation beyond the pandemic, contract manufacturers are ramping up while seeking ways to continuing to improve efficiency and reduce costs. Most Canadian CEMs are very upbeat, anticipating that the next few years will be busy.

The big challenge that CEMs face today is that there is no perfect forecast from end-customers. Many contract manufacturers are challenged with short or no lead-time orders from their end-customers, so the need to quickly find product in stock is critical. That side of the industry is growing, as new and existing customers develop innovative products. An example of this trend is the large growth of new customers and technology in the Waterloo/Kitchener area in southwestern Ontario. What we see is further creation of services and capability in serving small to mid-size end customers which have short time to market needs with high mix, lower volume requirements. Some have created separate dedicated facilities for meeting those needs, some adding to their current structure, or investing in new, larger facilities with those services all under one roof.

Production area of quick-turn specialists Microart Services in Toronto.

> ***"In order to turn product quickly or when forecasts change, contract manufacturers need to be nimble and adapt quickly. Creating a solid supply chain with dependable partners is critical."***

In order to turn product quickly or when forecasts change, contract manufacturers need to be nimble and adapt quickly. Creating a solid supply chain with dependable partners is critical to contract manufacturers' ability to quickly administer to their customers' needs and keep their business. For example, more than 400 contract manufacturing-related businesses across Canada work directly with Digi-Key, tapping into its broad inventory position. Digi-Key's newer digital tools acquire the product quickly and efficiently - reliably delivering a broad selection of products (10.2-million products globally) and high levels of inventory (2.2-million in stock and available for immediate shipment within 24-hours to Canada) along with continuity, consistency.

Contract manufacturers remain in a unique position, as they support a variety of end-customers of all sizes, different industries, technologies and varying product and production complexities. Digi-Key's contract manufacturing customers continue to innovate and leverage digital transformation to get ahead of these challenges and drive continued success. Here are just some examples:

Microart

Based in Toronto, Microart Services Inc. is a leading quick-turn contract manufacturer with nearly 40 years of experience. Led by CEO Mark Wood, Microart employs 300 people in a new 42,000-square-foot facility, focusing on building pcb assemblies. The firm specializes in small companies looking for quick-turn to yearly builds to forecast, but the key for Microart is taking on business that was not forecasted. In any given month, they serve about 300 different customers and build about 1,100 unique boards. As the pandemic spread around the world, Microart increased production of pcbs for use in contactless Purell equipment that automatically dispenses hand sanitizer.

Microart remains in the midst of a digital transformation, adapting to future demands along with increased efficiency and cost savings. Behind the scenes, Microart has implemented Digi-Key's API solutions to improve speed, efficiency and accuracy, as well as reduce costs in receiving pricing and availability. The faster Microart

Photo: Microart Services Inc.

can receive accurate pricing and availability from its supply chain partners, the faster they can turn an estimate around and secure new business.

To improve overall efficiency Microart has implemented two new technologies on its production floor:

- X-ray counters dramatically speed up de-kitting from the floor and ensure all components returned to stock are accurately counted. This also translates to more efficiency on the production floor as shortages are exponentially reduced.
- Smart carts: Common parts are now stored on the production floor and can be retrieved without having to access the inventory area. All parts taken are scanned out and scanned in on return for full traceability.

Family owned Digico in Montreal has more than 40-years of experience.

Digico

A family-owned contract manufacturer based in Montreal, Digico Fabrication Electronique Inc. has more than 40 years of experience specializing in the manufacturing of complex electronic material including printed circuits, cables and harnesses, coating, testing according to customer specifications and electromechanical integration. Led by President Jacques-Étienne Côté, Digico specializes in new product introduction (NPI) builds – a key focus for start-up companies, as well as established companies looking for fast entry into the market. Digico partners with many medical end-users, and it is the first Canadian manufacturer of electronic products to receive an ISO 13485: 2003 certification related to the medical field. As an industry leader, Digico has invested in digital technology to connect and automate its ecosystem. The firm's investment in technology and certifications also drives full traceability of each item produced, which is critical in the medical device, security and automotive industries. Digico's strong set-up process prior to production is key to driving efficiency and cost containment.

Digico values the strong relationships it has built with customers and distribution partners. As Digico's top supplier, Digi-Key has worked to meet the CEM's specific needs, from adding key manufacturers to supply chain solutions. Digico's advanced processes, digital technology, strong team and reliable distribution partners have helped the firm maintain its speed to market, while continuing to build and maintain strong customer relationships.

The Burnaby BC-based location for Creation Technologies.

Photo: Digico; Creation Technologies

Creation Technologies

Creation Technologies is a global product development and electronics manufacturer with three out of 10 locations based in Canada. This global footprint, along with Creation's global ERP system, customer-focused teams, multiple levels of engineering support, supply chain management and A&D experience set Creation apart from other contract manufacturers. The team is always striving to improve efficiency with its lean journey through digital technologies, and the firm's Canadian footprint allows close proximity to major U.S. cities on the east and west coasts, where many clients are based. The firm strives to provide the best total solutions, and lifetime partnerships with its customers.

Over the years, Creation has been active with key acquisitions allowing them to bring local support to many major markets in North America. Digi-Key has received preferred status as a supplier to Creation in supporting their end customers with new design and product development in the firm's growing technical support area, NPI phases and vast prototype to production capabilities with a large array of certifications. Digi-Key also actively supports Creation's online supplier portal that drives quick component status for end-customers.

Whether CEMs specialize in quick-turn NPI, established products with annual volume, or both, it's important to have component distribution partners and to set up supply chain programs which provide reliability and scalability. Digital transformation is no longer an option – it has become a necessity in a world where both financial budgets and available human resources continue to shrink. The future is bright for contract manufacturers who are embracing new technology and making the digital transformation shift. **EP&T**

> ***"In order to turn product quickly or when forecasts change, contract manufacturers need to be nimble and adapt quickly."***

Paul Dosser *is vice-president of business development at Digi-Key Electronics, one of the world's largest, full-service distributors of electronics components. https://www.digikey.ca/*

A controlled dispensing system improves benchtop cleaning results, reduces cleaning fluid waste and enhances worker safety.

Cleaning printed circuit boards at the benchtop

Various options dissected for application within electronic production environment. BY EMILY PECK

Benchtop or manual cleaning is an important step in the assembly of printed circuit boards (pcbs). Whether it be during initial manufacture, for touch-up during post-reflow assembly or for rework and repair, it is critical that you properly clean pcbs before moving on to the next step in the manufacturing process. Before shipping brand-new or repaired circuit boards out the door, manufacturers must remove all contaminants including adhesives, fluxes, fingerprints or other materials.

Anything left on the board that isn't meant to be there may negatively affect the performance of the board. This is why so many companies consider pcb cleaning a mission-critical process. If the cleaning is not effective, the finished product simply will not function reliably for the required life of the product. Better cleaning directly translates to more reliable pcbs, which means better finished consumer and industrial electronics in the market.

There are three primary methods and tools used to clean circuit boards at the bench top: Dip and brush, aerosol sprays and dispensing tools.

Dip and brush method

The dip and brush technique typically uses an acid brush and a pump bottle of IPA (Isopropyl Alcohol). Most pcb cleaning experts do not recommend this type of cleaning because it often results in a cross-contaminated pcb.

For instance, if you spot-clean flux residue from a section of a recently soldered pcb, you dip an acid brush into the cleaning fluid on the spring top of the pump bottle. Then you brush around the soldered areas. The cleaning fluid dilutes the flux on the pcb, but it only spreads the contamination without actually removing it. Often the diluted flux relocates elsewhere on the pcb including under neighboring SMT components. Some of the flux also makes its way onto the brush. As the cleaning fluid evaporates, it leaves the flux residue on both the pcb and the brush.

The brush is now a source of contamination as it drags deactivated flux back into the pump bottle. Also, the pump bottle valve gradually clogs with flux residue and fails to re-seal. This allows the dirty cleaning fluid on the top of the pump bottle to slip back into the bottle itself. All this adds contamination to the next board when using the cleaning fluid and brush again.

If you must use the dip and brush method, it is best to clean and rinse

Most PCB cleaning experts don't recommend the dip and brush cleaning method.

Photos: Microcare

the whole board with clean fluid. Also, be sure to replace the dirty fluid in the pump bottles frequently. Clean the pump bottles, including the bottle valves, prior to refilling them. Also, replace the brushes often to avoid cross-contamination.

Dip and brush cleaning offers little in the way of process control. Some technicians apply more pressure in cleaning than others. Some use too much fluid, and some barely wet the board. Improvised cleaning typically results in inconsistent cleaning results.

As circuit boards become more densely packed and tighter spaced, it is increasingly difficult to use the dip and brush method and still meet pcb cleanliness standards. Quality cleaning requires pure, fresh solvent, which cannot be easily achieved with a pump bottle and IPA.

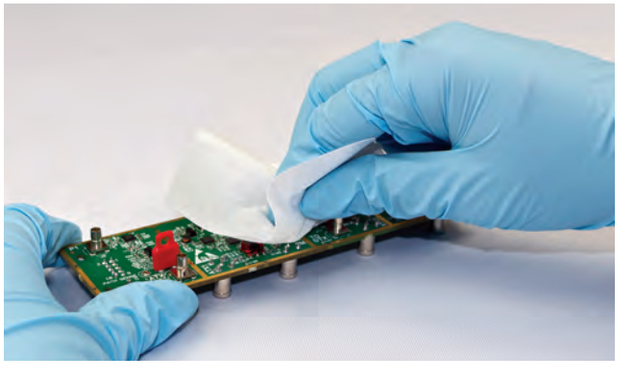
Aerosol sprays

Aerosol cleaning solves many of the problems related to the dip and brush method. Aerosol sprays prevent the introduction of new contaminants by providing a steady stream of uncontaminated fluid throughout the cleaning process.

However, dispensing directly from the can doesn't allow any real cleaning control. A fan of fluid sprays out over a wide area, resulting in a messy and expensive waste of cleaning fluid. Plus, spraying directly from an aerosol can exposes technicians to excess cleaning fluid fumes which makes for an unpleasant work environment.

Adding a straw attachment allows for more control and delivers the fluid with pin-point accuracy under low-mounted or tight-fitting components. This reduces waste and fumes, but any cleaning power relies solely on the pressure of the fluid to blast out trapped contaminants. Similar to the dip and brush method, aerosol sprays do not have any real process controls and results vary widely depending on operator use.

Dispensing directly from the can doesn't allow any real cleaning control.



Drying the board with a lint-free wipe helps remove contaminates under low-standoff components.

Photos: Microcare

Wet, scrub, rinse and dry

Successful pcb cleaning requires four steps. Wet, scrub, rinse and dry. First, wet the board with a pure cleaning fluid to loosen the contaminant. Second, scrub the circuit board with a brush to remove hard-to-remove particulates or oils. Third, rinse away the contaminants with more cleaning fluid. Finally allow the board to air-dry or dry the board with a lint-free wipe.

The dip and brush method allows you to wet and scrub, but makes it impossible to rinse the contamination from the board, so the board looks poorly manufactured and often remains sticky with fluxes even after cleaning.

The aerosol spray method also allows wetting, but doesn't provide any scrubbing power. A solution is to outfit the aerosol spray can with an attached brush. The cleaning fluid flows through the brush head and allows for good scrubbing of dirty areas.

One of the most important steps for successful pcb cleaning is the rinse. Quality rinsing is essential to quality cleaning. If you can't rinse, you can't clean. It is important to ensure that all flux residue washes off the board, otherwise you'll redistribute it back onto the board.

Controlled dispensing system

When used properly, a controlled dispensing system improves benchtop cleaning results, reduces cleaning fluid waste and enhances worker safety. With a dispenser hose attached to an aerosol can of cleaning fluid, the technician has better control of how much and where the cleaning fluid is dispensed. They spray cleaning fluid exactly where they need it without overspray, reducing wasted fluid.

The dispensing system typically includes options for brush and syringe attachments. They help get under low surface mounted components for more thorough cleaning. The cleaning power of the fluid is augmented by the scrubbing action of the brush. Contamination loosens and rinses away with little effort and minimal cleaner. Technicians typically use up to 60% less cleaning fluid when they use a controlled dispensing system.

Plus, using a dispensing tool reduces landfill waste. The system uses every drop of fluid inside the aerosol can. It is more environmentally friendly to dispose cans that are not partially filled with residual fluid. In addition, a dispensing system enhances worker safety. Since the dispensing tools are closed systems, technicians do not pour fluids from pails or drums. This reduces the risk of spills and fire hazards. It also limits worker exposure to fumes.

Using a controlled dispensing system also offers consistent cleaning. The entire cleaning process can be standardized and documented to meet ISO or other quality requirements. For benchtop cleaning effectiveness and safety, a cleaning fluid dispensing system is a simple, yet effective way to help protect workers and deliver consistently clean and reliable circuit boards. It cleans more boards with less cleaning fluid which produces cost savings, quality improvements and environmental benefits.

Prepare for cleaning success

Modern pcb cleaning is a mission-critical process. If not done correctly the pcb will not function reliably for the required life of the product, resulting in field failures.

To clean pcbs effectively and reliably at the benchtop, it is important to use the four-step cleaning process of wet, scrub, rinse and dry. Also consider using an appropriate cleaning fluid and a controlled dispensing system to produce consistently clean pcbs. **EP&T**

Emily Peck *is a senior chemist at MicroCare, LLC, which offers benchtop and vapor degreasing electronics cleaning solutions. For more information, visit www.microcare.com.*

Pandemic's impact

COVID-19 will force five years of manufacturing innovation into the next 18-months. BY ANNA-KATRINA SHEDLETSKY

The environment in which electronics manufacturers are building has changed rapidly in the last couple of months. As under-resourced teams face the challenge of solving COVID-19 problems, they'll need technology that gets to the very root of these issues: solving for distance. Between solutions that leverage the power of the cloud for visibility and automation that optimizes work, necessity will drive invention: manufacturers will do five years of innovation in the next 18-months (Fig.1).

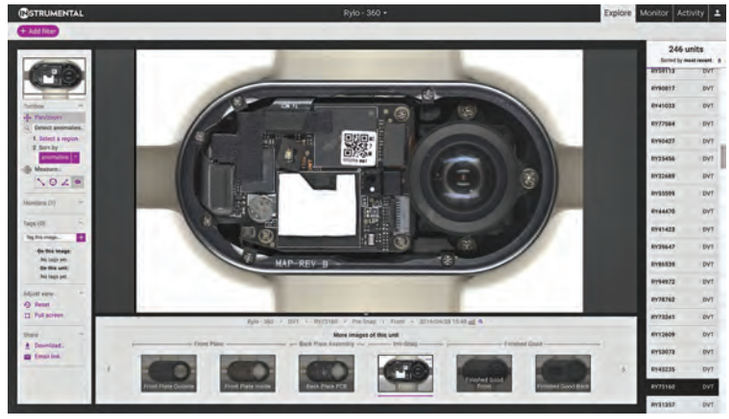


Fig. 1. As COVID-19 forces electronics companies to change their manufacturing strategies, solutions like Instrumental are in increasing demand for its ability to enable remote work during development and production. Instrumental's software, depicted above, provides engineers with eyes into the factory via product images that get processed with AI to surface defects.

Fig. 2. Instrumental enables teams to detect manufacturing defects with AI from anywhere in the world.

Aggregating data

Cloud databases are uniquely suited to help manufacturers aggregate data across multiple on-premises systems, something that enables reduced travel and distance during COVID-19. To date, the manufacturing industry has lagged behind in the adoption of cloud technologies – favoring on-premises solutions as the 'safer' place for sensitive manufacturing information. Despite lingering unfounded security concerns, the benefits of the cloud have become too good to ignore and even before COVID-19 mindsets had started to shift. By aggregating their data in the cloud, companies get real-time data for remote oversight, aggregated and comparative intelligence across global factories, suppliers, and business units, and the ability to leverage technologies to solve pressing problems.

Adoption of cloud data unlocks technologies like AI, which is especially helpful considering the massive amounts of data that needs to be processed in order to make remote work productive in manufacturing. Instrumental, a manufacturing optimization platform that leverages AI to help electronics companies catch defects in development and production, creates remote work benefits with the cloud. The firm's instrumentation captures images as units get assembled and leverages the cloud to make them available in real-time to globally distributed teams.

This visual data record enables engineers to use Instrumental's AI to surface unanticipated defects in minutes during development and catch quality shifts in real-time during production without stepping foot in the factory. AI tests can also be pushed to the line from anywhere using the cloud, which means teams can continually improve quality and core metrics like rework and scrap costs from home. Implementing cloud data and leveraging AI solutions that have ROI should be a top priority for both manufacturers and the brands that build at them. In the short term this data enables some level of oversight and normalcy in a world where engineers cannot travel, and in the long term it will pay dividends for manufacturing optimization of products and processes (Fig. 2).

Opportunity in automation

Electronics manufacturing is a highly manual process. Hundreds of pairs of hands touch phones and laptops during assembly. These products are developed, ramped and run over months, not years – investment in automation for products with such short cycles doesn't pay off. Line space is at a premium, so before COVID human operators were placed at 0.6m intervals – that spacing will need to be significantly increased in order to meet guidelines to reduce virus transmission. Couple the spacing issues with PPE requirements, and the increased cost to keep human assembly safe creates an unprecedented opportunity for stronger returns on investment for automation.

While manufacturers may initially be hesitant to take on large capital intensive projects like automation right now, the payoffs of a workforce that doesn't take breaks and doesn't get sick will be appealing to those with strong capital positions – enabling acceleration in efficiency during this time that will cut costs and boost bottom lines.

Necessity to drive adoption

If you talk to folks in the manufacturing industry, you'll find that many have been burned by falling for the promises of buzzwords over the past decade. This has left a general aura of suspicion around new technologies for leveling up – though technology investment in manufacturing remains high when there is a pressing need.

Today's need is great – manufacturers will be looking for solutions that directly solve their pain points, can be implemented quickly (days and weeks, not months), and have the potential for long-term, post-COVID-19 impact. Solution providers are adapting and many are ready to meet this demand.

COVID-19 requires the modernization of manufacturing. Since the problem of 'distance' can't be solved without the adoption of technology, we're going to see many years' worth of innovation in the next 18 months. Many of these solutions will bring greater efficiency, lower costs, and less waste, enabling them to outlast the pandemic and pay for themselves quickly. **EP&T**

Anna-Katrina Shedletsky *CEO & founder, Instrumental Inc.*
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Photo: Instrumental Inc.

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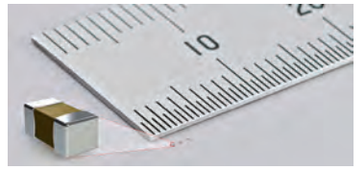

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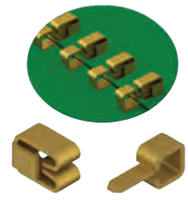

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SAMTEC

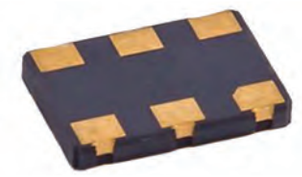
2.40mm Compression Mount Connector performs to 50GHz and is primarily for use in the high-speed

digital test market, such as stripline applications. Device is vertically mounted to the printed circuit board and attached in place by two 0-80 UNF screws eliminating the need for soldering to the test points. Microstrip design is in development.

www.samtec.com

CLOCK OSCILLATORS ARE ULTRA-LOW-JITTER

RALTRON

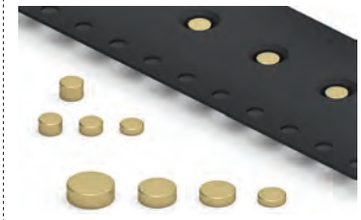


CL2520 LVDS ultra-low-jitter clock oscillator family is suitable for high frequency digital signal processors (DSPs) in optical applications. Devices support optical modules commonly used in networking and data center applications. These include quad small form-factor pluggable (QSFP), octal small form-factor pluggable (OSFP) and C form-factor pluggable 2 (CFP2) optical transceivers, as well as Ethernet, metro and long-haul. Housed in a small 2.5 × 2.0 mm package, devices cover a frequency range from 6MHz to 175MHz.

www.raltron.com

LOW-PROFILE TARGET DISCS SAVE VERTICAL SPACE

MILL-MAX



1593-X, 1618-X, 1625-X, 1656-X SMT series of low profile SMT disc shaped terminals save vertical space. Devices come with diameters of 1.98mm, .3mm, 3.18mm and 3.964mm respectively. Each series is precision machined from brass and comes standard with a 10u" hard gold finish with a nickel under-plate and is available in four heights from .64mm to 1.4mm in .254mm increments. Custom sizes are achievable via firm's high-speed precision-machining processes. Thicker gold or other materials are also available as plating options.

www.mill-max.com

HIGH-CURRENT RELAYS BOOST CAPACITY

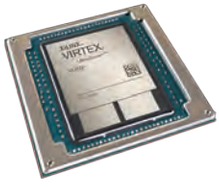
OMRON

G2RL power relay series includes extra high-capacity 23A model that consists of single-pole relays for high-current load switching and high ambient temperature operation. Devices provide 23A switching - a 44% increase over the product family's high-capacity 16A rating. Units are rated for operating temperatures up to 105-Celsius and have a long life of 100,000 operations. Low profile devices come with a height of 16.7mm and clearance and creepage distances of 8mm.

www.ia.omron.com

FPGA MEETS DEMAND FOR COMPUTE, MEMORY, FAST DATA MOVEMENT

XILINX



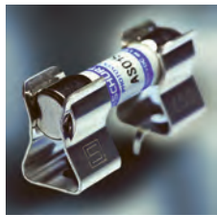
Virtex UltraScale+ VU57P FPGA is engineered to address the ever-increasing demand for compute, memory, and fast data movement. Device delivers adaptable compute capability, maximum throughput and high-speed data transmission to fulfill key application needs across data center, wired communications and T&M markets. Device delivers 20X higher memory bandwidth and 75% lower power vs. DDR4, along with 2X faster data movement with support for the latest optical standards enabled by 58G PAM4 transceivers.

www.xilinx.com/products/silicon-devices/fpga/virtex-ultrascale-plus-vu57p.html

CLIPS FOR 10.3MM FUSES COME WITH M5 SCREW OR RIVET MOUNTING

SCHURTER

CSO series high-performance series fuse clips for 10.3mm diameter fuses, includes an M5 screw and rivet mounting option in addition to M3, and versions for solder or through-hole mounting. Devices provide



improved material properties suitable for applications with voltages up to 1500Vac/Vdc and currents up to 32A. Devices are characterized by a strong clamping force due to the use of a special copper alloy. The clamping effect results in minimal power dissipation.

http://www.schurter.com/datasheet/CSO

MASK CONDITION CHECKER INSPECTS METAL STENCIL OPENING

SEIKA MACHINERY

Sawa SCI-MCC (Mask Condition Checker) system is designed for metal stencil opening inspection. Unit checks metal stencil cleanliness easily in a simple, cost-effective system. System performs a full inspection of solder residue and particle deposit on metal stencil openings after cleaning. Unit will detect solder residue and particles that are too small to detect visually. Product can be used to inspect all of the openings in a specified area. Additionally, each mask can be traced by a registered control number.

www.seikausa.com

INFRARED ARRAY SENSORS DELIVERS 64 THERMOPILE ELEMENTS

PANASONIC

Grid-EYE Infrared Array Sensors are surface mountable and feature 64 thermopile elements in an 8x8 grid format that detect absolute temperatures by infrared radiation. Product is able to provide thermal images by measuring actual temperature and temperature gradients. Device enables detection of multiple persons, identification of positions and direction of movement, almost independent of ambient light conditions without disturbing privacy as with conventional cameras. The built-in silicon lens provides a viewing angle of 60°.

http://industrial.panasonic.com

2KW PFC SWITCHING POWER SUPPLIES SERVE INDUSTRIAL DESIGNS

ABSOPULSE ELECTRONICS

PFL 2K-E/110-F6W switching power supply is suitable for rugged 2kW industrial applications that require power factor correction (PFC). Unit uses field-proven PFQ 900 technology to deliver a compact, light-weight cost-effective solution with high system reliability and power efficiency. Product employs active power factor correction to convert 230Vac (195-264Vac) to an 110Vdc/18A single output. Custom input/output voltages are available on request. Device complies with EN61000-3-2 and EN61000-3-12 directives for low input harmonic distortion. Hold-up time is 5ms min at nominal input for 5% drop of the output voltage.

www.absopulse.com

POWER MANAGEMENT ICS BOOST ENERGY SAVINGS

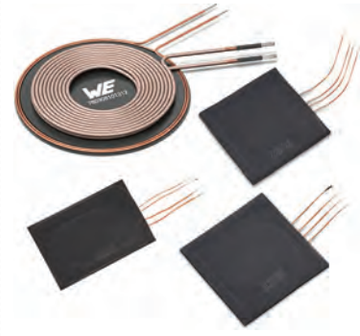
EMPOWER SEMICONDUCTOR

EP70xx family of power management ICs improve energy savings in data centers with enhanced point-of-load power performance. Device achieves the total integration of a triple output dc-dc power supply with no external components into a single tiny 5mm x 5mm package, attaining up to 10x higher current density, 3x tighter accuracy during transients, and 1000x faster dynamic voltage scaling than leading competitors. With a single footprint, no external components, extensive programmability, a wide range of current and output configurations, power designers can proliferate the device across nearly all designs and platforms.

www.empowersemi.com

WIRELESS POWER TRANSFER COIL COMBINES CHARGING FUNCTION & NFC

WÜRTH ELEKTRONIK

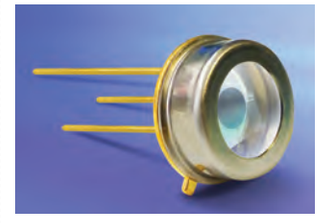


WE-WPCC WPT/NFC wireless power coils combines wireless power transmission with the Near Field Communication (NCF) standard thus enabling, for example, the combination of a charging station for smartphones with identification and payment functions. WE-WPCC 760308101311 high power coil with 400W output and a 'flat' version, two coils delivers respective heights of 2.8mm and 3.1mm are only half as high as those of other transmitter coils (WE-WPCC 760308101411 and 760308101410).

http://www.we-online.com

EUV PHOTODETECTOR HAS 2.5MM CIRCULAR ACTIVE AREA

OPTO DIODE



SXUV5 extreme ultraviolet (EUV) photodiode has a circular active area of 2.5mm diameter. Device delivers enhanced responsivity in the 1nm to190nm wavelength region, and is specially designed to be highly stable over long periods of time when exposed to high-intensity EUV energy. Product is housed in a windowless, TO-5 package to allow for responsivity at wavelengths shorter than 150nm. Unit includes shunt resistance of 20 MOhms (minimum) and reverse breakdown voltage of 5 Volts (minimum) to 20 Volts (typical).

https://optodiode.com

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Going green as we reboot the economy

BY MADELEINE CLÉROUX AND AURY HATHOUT, ENVIROPASS

As you know, the COVID-19 crisis has badly hit the Canadian economy. Restaurants, bars, stores, offices, and even some so-called 'non-essential' factories have closed temporarily... and sometimes for good. The economy has to recover, as it did after the 1929 stock market crash and the 2008 economic crisis. Technologies can play a fundamental role in this, especially when it comes to exporting Canadian high-quality electronic devices. To this end, many markets, such as the European Union, China, or California, are continually updating and creating new product environmental laws. Most of these regulations are mandatory, therefore can't be eluded when rebuilding an export-oriented economy. Here are some of the latest ones.

Recently implemented regulations

Most electronic and electrical products contain hazardous substances. These substances are typically harmful to both our health and the environment, hence regulatory amendments and new laws to reduce the usage of these chemicals.

EU RoHS with 10 substances: The EU RoHS regulation, restricting the use of certain hazardous substances in electrical and electronic equipment (EEE), has been modified multiple times. Since a significant amendment in 2019, a total of 10 substances, with the addition of 4 phthalates, are restricted in most EEE:

- Lead (Pb) and its compounds
- Cadmium (Cd) and its compounds
- Mercury (Me) and its compounds
- Hexavalent chromium (Cr 6+)
- Polybrominated biphenyls (PBBs)
- Polybrominated diphenyl ethers (PBDEs)
- Butyl benzyl phthalate (BBP)
- Di-n-butyl phthalate (DBP)
- Di(2-exthylhexyl) phthalate (DEHP)
- Diisobutyl phthalate (DIBP)

EAEU and UAE RoHS: Armenia, Belarus, Kazakhstan, Kyrgyzstan, and Russia (EAEU RoHS), as well as the United Arab Emirates (UAE RoHS), have recently enacted RoHS-like regulations, with deviations from EU RoHS.

REACH of 209 SVHCs: Four new EU REACH Substances of Very High Concern (SVHC) were added in June 2020 (chart 1).

Among other things, REACH (Registration, Evaluation, Authorization and restriction of Chemicals) imposes the obligation to communicate any SVHC contained in a product, above certain thresholds.

Eco-design in external power supplies: Since the EU Directive 2009/125/CE on *ecodesign requirements for energy-related products*, various regulations have been impacting the several product categories:

- External power supplies
- Electronic displays
- Electric motors
- Light sources and separate control gears
- Power transformers

Eco-design dedicates to producing sustainable goods in terms of resources and energy. Eco-design assesses and seeks to limit the potential environmental impacts of a product throughout its life. Energy efficiency is an essential requirement of all EU eco-design regulations.

Resulting from Directive 2009/125/CE, the regulation (EU) 2019/1782 on External Power Supplies came into effect in April 2020, with energy efficiency targets, as illustrated in chart 2.

On top of the previous updates, some brand-new requirements are shaking the electrical and electronic industry.

Eco-design, again! Two new significant eco-design rules will come into force in 2021:

- On Electronic Displays, under the regulation (EU) 2019/2021 which sets :
  - –Energy efficiency rates in standby, on and off modes;
  - –Marking of over 50g plastic parts; and
  - –Design obligations for repair and reuse. This last requirement must include the availability of spare parts, their maximum delivery time, and access to maintenance information.
- On Electric Motors, per the regulation (EU) 2019/1781, which also requires:
  - –Energy efficiency targets three types of engines ranked according to their efficiency: IE2, IE3, or IE4. For every engine, a maximum value is established, depending on the number of poles in the motors.
  - –Product information, which includes the efficiency level, the number of poles, the rates input frequency (Hz), and other eco-design details.

RoHS with 12 substances? On top of the ten above-mentioned restricted substances, seven have been under investigation for potential inclusion:

- Beryllium & its compounds
- Cobalt Dichloride & Cobalt Sulphate
- Diantimony Trioxide (flame retardant)
- Indium Phosphide
- MCCPs
- Nickel Sulphate & Nickel Sulfamate
- Tetrabromobisphenol A (TBBP-A)

MCCPs and TBBP-A were recommended this spring. If accepted, at least 12 substances may be restricted under RoHS by 2023. These product compliance requirements suggest that the world is betting on a greener economy.

Most recently, Canada, Finland, and the Netherlands have joined forces to develop a circular economy. For instance, the three countries committed to hosting three events and discussing the benefits of a circular economy for the future in the context of climate change. The circular economy concept consists of constantly reusing and recycling the same materials. Both the eco-design and the reduction of hazardous substances in electronic products contribute to a more circular economy by enabling better recyclability rates. EP&T *www.enviropass.ca*

NEW SUBSTANCES	WHERE USED (EXAMPLES)
Vinylimidazole	Paints, lacquers, surface treatment
Methylimidazole	Adhesives, plastic foams, metal products
Dibutylbis (pentane-2, 4-dionato-O,O')tin	Adhesives, sealants, thinners, paint removers, and other applications
Butyl 4-hydroxybenzoate	Cosmetics, personal care products, pharmaceuticals

Chart 1

	PO ≤ 49.0 W	PO > 49.0 W
AC-AC external power supplies, except low voltage and multiple voltage output external power supplies	0.21 W	0.21 W
AC-DC external power supplies, except low voltage and multiple voltage output external power supplies	0.10 W	0.10 W
Low voltage external power supplies	0.10 W	0.21 W
Multiple voltage output external power supplies	0.30 W	0.30 W

Chart 2

SUPPLY SIDE

VIRTUAL INSTRUMENTATION

NI UNVEILS NEW VISUAL IDENTITY

Austin TX-based virtual instrumentation leaders National Instruments (NI) unveiled an updated brand identity including a new logo, visual identity, enhanced digital experiences and a brand campaign recognizing and celebrating the contributions of the engineers and enterprises who 'Engineer Ambitiously' every day.

Now known simply as NI, the company is recommitting itself to connecting the bold people, ideas and technologies required to push our world forward. And to share the stories of those who aim higher and go bigger, NI has launched Perspectives, a new experience with a message from NI CEO Eric Starkloff.

"At the heart of NI is our commitment to empowering engineers as they work to solve the problems of today, tomorrow and the next 100 years," said Carla Piñeyro Sublett, CMO at NI. "Our customers are making their mark on the world. They inspire us all with feats of brilliance and innovations that will impact this planet and beyond. And our updated brand identity reflects their story and is a reminder and celebration of their contributions to society and of their unwavering ability to engineer the extraordinary."

SCHLEUNIGER GROUP ACQUIRES US-BASED CIRRIS SYSTEMS

After many years of cooperation, the Schleuniger Group has signed an agreement to acquire Cirris Systems Corp., based in Salt Lake City, Utah, on the basis of an asset deal. The transaction is expected to be concluded in the third quarter of 2020 and the new company Cirris Inc. will take over most of the assets of Cirris Systems Corp.

"With the acquisition of Cirris, Schleuniger is further extending its market lead in testing of cables, harnesses and connectors," says Christoph Schüpbach, CEO of the Schleuniger Group. "Together with adaptronic Prüfsysteme and Schleuniger Test Automation, both located in Germany, we have now fully realized our strategic main direction of 'Best in Test' and our ambition to be the global number one in technology, application and industry coverage."

The purchase of Cirris represents an important investment in a key growth segment for Schleuniger, further expanding the group's broad testing portfolio following the January 2018 acquisition of a controlling majority stake in testing equipment manufacturer adaptronic Prüftechnik GmbH of Wertheim, Germany, as well as the May 2015 purchase of test automation solutions provider Cirris Solutions GmbH (now Schleuniger Test Automation GmbH) of Jettingen, Germany.

Photo: Schleuniger Group; Aerial Technologies; Weller Tools; BlockMaster

PRODUCTION MATERIALS

AIM ADDS BRAZIL FACILITY

Montreal headquartered manufacturer of solder assembly materials for the electronics industry AIM Solder, recently opened a new wholly-owned facility in Manaus, Brazil.

AIM has been successfully supporting the electronics industry in Brazil for several years. This new stocking facility, which represents the only legitimate source of AIM products in Brazil, enables the company to deliver on its promise of offering innovative soldering solutions directly to the growing Brazilian market.

"AIM Solder continues to aggressively invest in strengthening our support network and supply chain for our customers," says David Suraski, executive VP at AIM Solder. "This investment in Brazil, in addition to recent expansions in Mexico, Europe and Asia, are further proof of AIM's dedication to continually expanding its global footprint."

AERIAL TECHNOLOGIES APPOINTS CEO

Montreal-based Aerial Technologies, pioneers in sensing intelligence, has announced the appointment of Steve Sifferman as CEO.

Sifferman brings more than 25-years of executive and product leadership to his new post, having successfully built and led several wireless-related companies. The appointment occurs at a booming and critical moment in the firm's evolution, according to a company statement.

"I'm excited to work with Steve as we establish Aerial as the global standard for Ubiquitous Sensing Intelligence to the Smart Ecosystem," says Dr. Sam Heidari, chairman of the board. "With his industry expertise and proven leadership, Steve is spearheading Aerial's transition from a patented technology to a widespread global and commercial success."

An early soldering gun from Weller in 1959.

Steve Sifferman, CEO of Aerial Technologies.

SOLDERING PIONEERS

WELLER TOOLS MARKS 75 YEARS

Weller Tools, a global leading brand in hand soldering solutions, announced that 2020 marks the company's 75th anniversary. In 1945, the company invented hand soldering and has continued innovating, bringing the world into the next-generation of soldering with its latest technologies.

Hand soldering has been around for thousands of years; however, it wasn't until 1941 that a transformer-based instant heating soldering method was developed by an American radio repairman who was tired of waiting for his soldering gun to heat up.

Carl E. Weller had to wait until after WWII ended in 1945 to get his Weller Manufacturing Company running. In 1960, Weller in the US patented the 'Magnastat' soldering iron that used a magnetic component to regulate the temperature at the iron's tip.

BLOCKMASTER LAUNCHES NEW WEBSITE

BlockMaster Electronics, supplier of terminal blocks for electronic designs, recently launched a new website to make it easier for customers to select and order its products. The website features an entirely new selection guide that includes a quick visual selection of the primary BlockMaster terminal block and hardware families on the new home page.

From there, site visitors are see a table for the selected product family, providing a complete product listing.

*Visit **ept.ca** for the latest Supply Side stories..*

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PRODUCT SOURCE GUIDE

AD INDEX

Canadian Women in Electronics

Exploring diversity through women in the Canadian electronics engineering and industry profession

Renn Scott, MA, interaction design, senior director of UX, ID & Data Vis at Myant Inc., a Toronto-based smart textile & e-textile computing firm. She is also founder & chief designer of Daily Goods Design LABS. Scott is a strategic design thinker and user experience architect with a passion for creating innovative user experiences and forward-thinking product designs. A prolific inventor with over 100 patents, she has more than 15 years of experience at companies such as IBM and BlackBerry in leadership roles.

How did you first become interested and involved in engineering?
I came upon a role within a tech company purely by chance, at the time I was a freelance graphic designer, I came from working within an agency environment. I was hired to train a dev and trainer how to use design software that could be used to create user interfaces and design assets. Upon working just a few days with the team they decided they needed me based on seeing the skills that I had being very different from theirs.

Q **How has your role or career path evolved over the years?**
I have gone from generating visual assets and ui components to leading and managing teams that define overall product and user experience strategy for hardware and software related projects. My role, especially the past 5 years has been to help companies understand how to develop products from start to finish thinking about the people that they are designing for, and helping them understand how to evaluate and incorporate feedback along the way.

What is your message to female engineers seeking to take on leadership roles?
Find people that can support you, be accountable to them and vice versa. This

Throughout 2020 EP&T explores the topic of diversity in the industry through a series of articles called Viewpoint; stories designed to get readers thinking about gender equity in the engineering profession, allowing others to maybe see their surroundings through a new lens.

is something that I can't say I've been that successful in doing, so perhaps this is a message to myself and the role that I can and need to play for others.

Can gender imbalance in the engineering industry be solved?
Of course, any problem can be solved based on an understanding of people's wants and needs. A metaphor of this could be a door that we go through each day that doesn't open properly. Instead of walking through it each day we could pause and see what we can do to make it work properly. Maintenance and repair for everything we encounter and use on a daily basis is always needed, as is the need for asking others what their experience is and how they may fix something given the opportunity to do so.

What key words of advice do you have for employers seeking to create a supportive environment for women?
Work environments need to be diverse and inclusive. Companies need to quantify where they're at in terms of the people they have and a culture to support them. Attracting, supporting and promoting equally without bias is important and this isn't happening.

How can we measure?
Educate and have managers across an organization evaluate why individuals that have been promoted were chosen and why mentoring or a focus on other team members that are peers has or has not happened. In each case, you can see why some people have been able to move forward and why others are held back. This over time is critical if we want to see success.

How can we educate and enable?
Create individual, team and group objectives that have to be met over a month, 3, 6 months and so on. At each stage have individuals communicate personal messages of their experience and what they learned and have been able to do because of this.

What do you communicate and share?
Using social media to share your success and failures in this area is also key. If you're not inclusive but you have this as a goal, sharing this as an objective can mean that people that can make an impact will choose to join your organization taking on a role that perhaps no one else internally can. We need to think about who can help us make an impact and how we can support them to do so. Ultimately we know in many cases those that say they're inclusive are those only paying attention to dollars and the business impact this has to them. In either case we start to move the needle as the saying goes and true leaders in this area can create momentum in organizations regardless of being able to convince everyone it's the right thing.

What impact does the lack of female role models in higher level positions have on aspiring female engineers?

A The culture and society in which you grow up in of course influences what you believe you can do. A lack of female role models in higher level positions means girls and women will be discouraged from pursuing STEM degrees and entering or remaining in related occupations. I believe we need early intervention in school STEM programs. If we educate and enable younger generations we can change what is ingrained gender biases and stereotypes. Old dogs can learn new tricks, but it's the younger tech savvy generations that can share on a larger scale through social media their successes increasing opportunities for women. We need to help kids and teens understand the opportunities they have and the role they can play individually and as a collective. As women age we can then support them as entrepreneurs through capital support.

*For more **Women in Electronics**, check out ept.ca*

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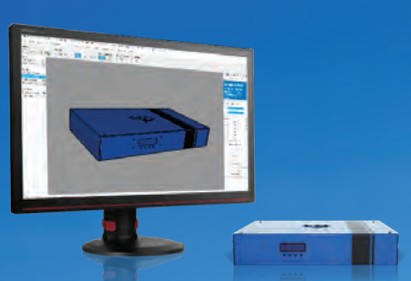

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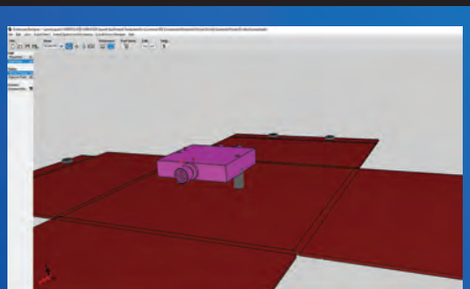

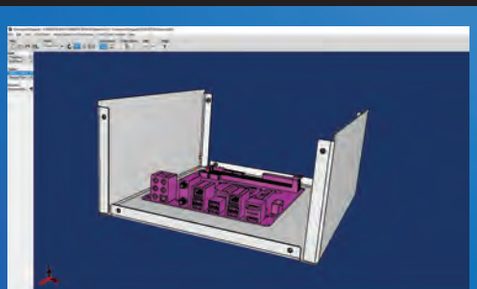

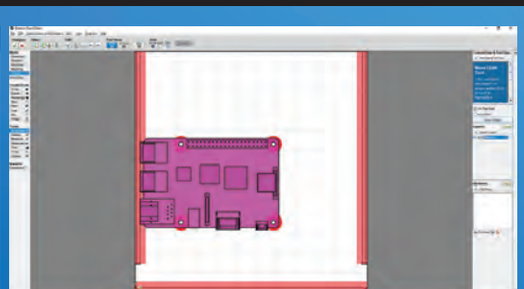

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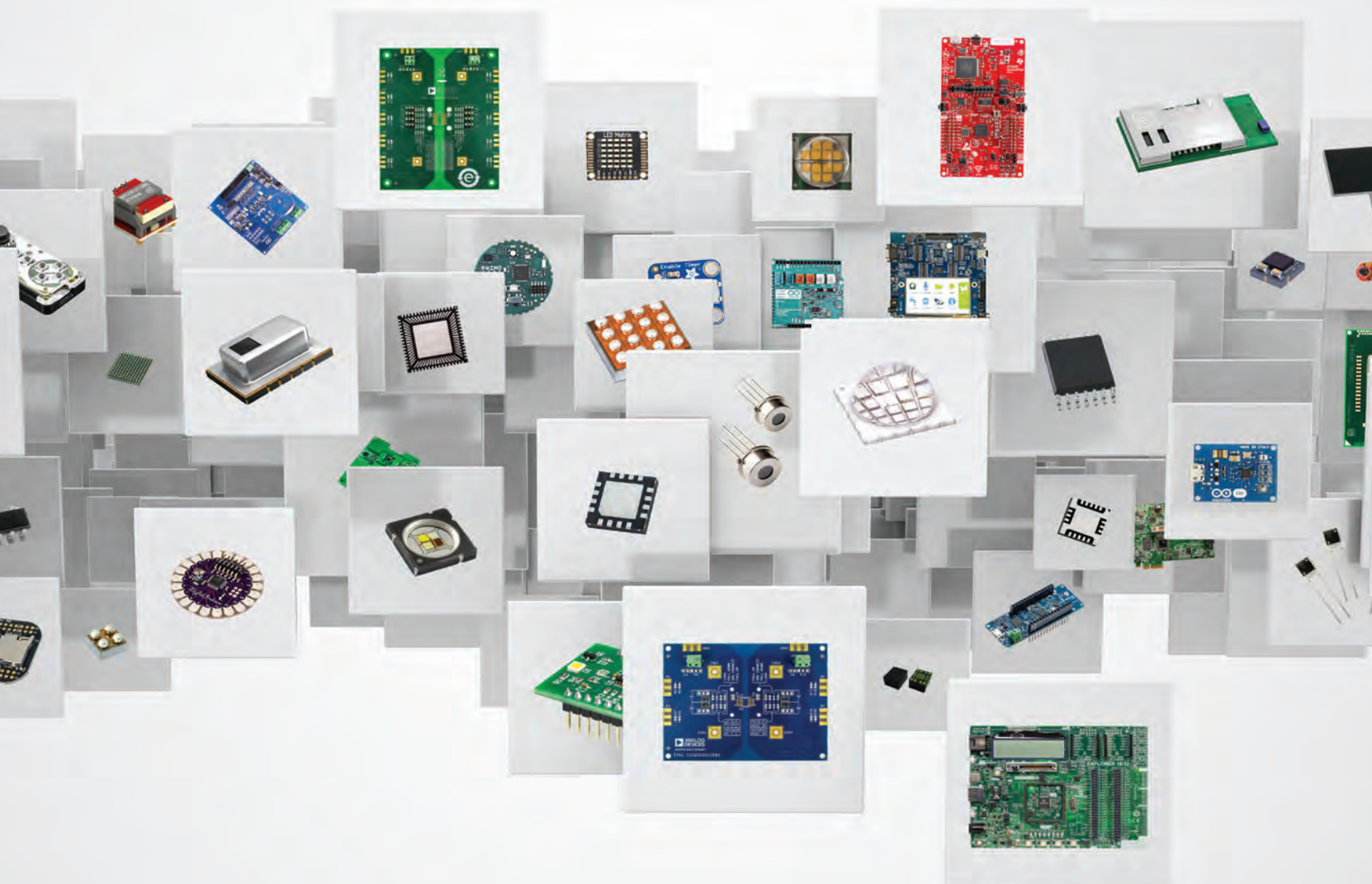

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