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SEPTEMBER 2023

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INSPIRATION STARTS HERE



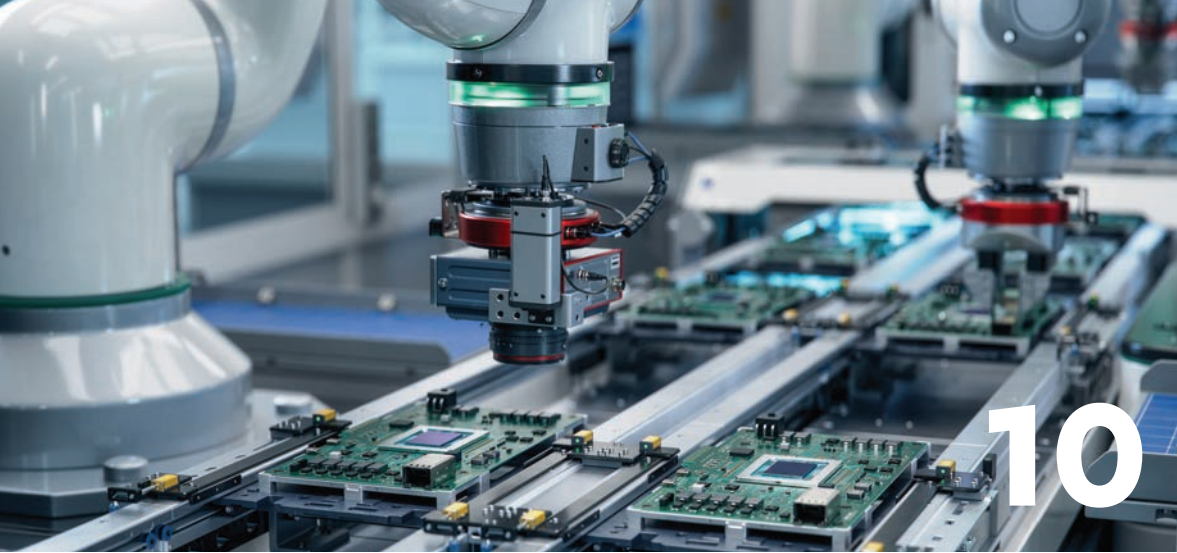
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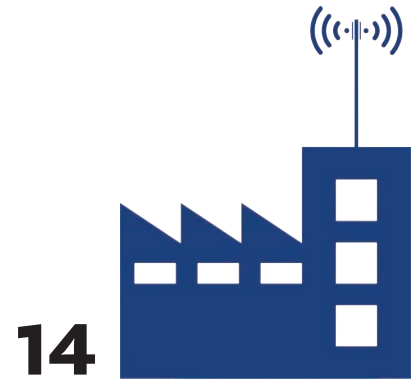
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Industry 4.0 encompasses multiple technologies, innovations, trends, subsectors and sensors.

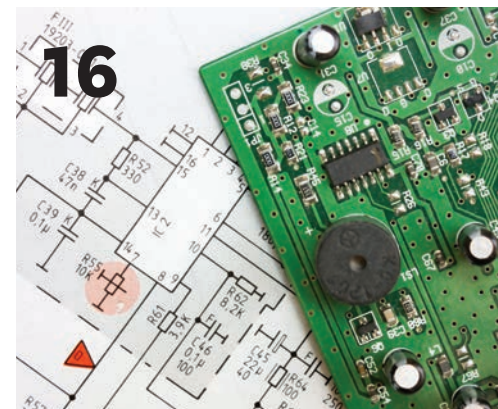
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Tech talent is migrating on Canada's job landscape



In the ever-evolving realm of technology, Canada's innovative approach to attracting and retaining

foreign tech talent is yielding remarkable results. A recent report, jointly released by the Technology Councils of North America (TECNA) and Canada's Tech Network (CTN), seems to reinforce that theory, as it sheds light on the shifting dynamics of tech occupations in the country.

Between April 2022 and March 2023, a substantial influx of 32,115 new tech workers migrated to Canada. These migration patterns underscore the effectiveness of Canada's immigration-friendly policies and a labour cost advantage, drawing talent primarily from countries like India and Nigeria. This surge in migration aligns with Canada's efforts to bolster its tech workforce, positioning the nation as an attractive hub for tech professionals on a global scale.

Intriguingly, the report identifies Mississauga as the most appealing city for top tech talent, followed closely by Montreal and Waterloo. Ontario itself boasts the largest tech workforce in the country, yet smaller provinces like Saskatchewan and Newfoundland and Labrador are experiencing rapid growth, showcasing year-over-year increases of 16.3%. Notably, this expansion is seen in locales such as Windsor ON (28% growth), Cape Breton NS, and Timmins ON, as tech workers seek new horizons away from major metropolitan areas in favor of more rural settings.

Yvonne Pilon, vice-chairman of TECNA, underscores the importance of understanding migration movements to serve

Canada's burgeoning tech industry effectively. Pilon emphasizes that addressing the radical shortfall in tech workers necessitates comprehensive insights into workforce dynamics, ultimately supporting Canada's innovation and technology ecosystem.

Comparatively, while Canada has experienced a net loss of tech talent to the U.S., the margin is relatively narrow, with only 1,672 workers crossing the border. Remarkably, this statistic underscores Canada's competitiveness in tech employment opportunities, especially considering the significant population disparity between the two nations. Furthermore, Canada is successfully attracting American talent, particularly from Northeastern states, as well as major cities like Washington D.C., Boston, Chicago and Philadelphia. The report reveals that the average compensation for U.S. tech occupations stands at \$175,600 CAD (\$133,500 USD), while Canada offers an average of \$100,400 CAD (\$73,897 USD) for comparable roles.

A recent development in Canada's tech landscape is a new program initiated by Immigration Minister Sean Fraser. This landmark initiative will welcome 10,000 highly skilled professionals holding H1B visas into Canada's tech ecosystem. Chris Albinson, CEO and president at Communitech, lauded this initiative as a pivotal step in fortifying Canada's reputation as a premier destination for tech talent. The program, coupled with the Toronto-Waterloo corridor's magnetism for tech professionals, is poised to elevate Canada's tech ecosystem to new heights, Albinson said.

Bolstering these findings is a recent industry outlook report from BDC, underscoring Canada's

tech ecosystem's rapid growth trajectory. With these insights, it becomes evident that Canada is poised to give its southern counterpart a run for its money. Amid a global talent shortage, the influx of tech workers not only meets the demand for skilled professionals but also paves the way for a promising future for Canada's tech occupation workforce.

The report's methodology draws upon labour market data and encompasses a wide range of sources, meticulously collected, analyzed, and visualized by eIMPACT. The term 'tech talent / occupations / workers' encompasses various roles within the tech sector, such as software developers, network and computer systems administrators and information security analysts. The migration findings from April 2022 to March 2023 offer insights into Canada's evolving tech landscape:

Industry Workforce by Province and Territories

(1-Year Percent Growth):

- Saskatchewan (16.3%)
- Newfoundland and Labrador (16.3%)
- Manitoba (15.4%)
- Nova Scotia (14.3%)
- Alberta (14.3%)

Canada's burgeoning tech landscape is underpinned by a forward-thinking approach to attracting and retaining top talent. As the global tech sector faces challenges and opportunities, Canada's ability to adapt and innovate through strategic immigration policies and growth initiatives positions it at the forefront of the tech industry's evolution.

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EP&T

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LEGAL

SETTLEMENTS MADE IN ELECTROLYTIC & FILM CAPACITOR CLASS ACTION SUIT

Four proposed national settlements totaling CAD \$21.94 million for the benefit of class members have been reached in class actions alleging price fixing and related conduct on behalf of Canadians who purchased electrolytic and film capacitors and products containing electrolytic and film capacitors.

ROHM, Fujitsu, KEMET and Nichicon (the Settling Defendants) have separately agreed to pay CAD \$450,000, CAD \$465,000, CAD \$6,200,000 and CAD \$14,150,000 respectively for the benefit of Electrolytic Settlement Class Members. KEMET and Nichicon have also agreed to pay CAD \$325,000 and CAD \$350,000 respectively for the benefit of Film Settlement Class Members.

To be a member of these class actions, one must have purchased an aluminum and tantalum electrolytic capacitor or a product containing an aluminum and tantalum electrolytic capacitor between September 1, 1997 and December 31, 2014 or have purchased a film capacitor or a product containing a film capacitor between January 1, 2002 and December 31, 2014.

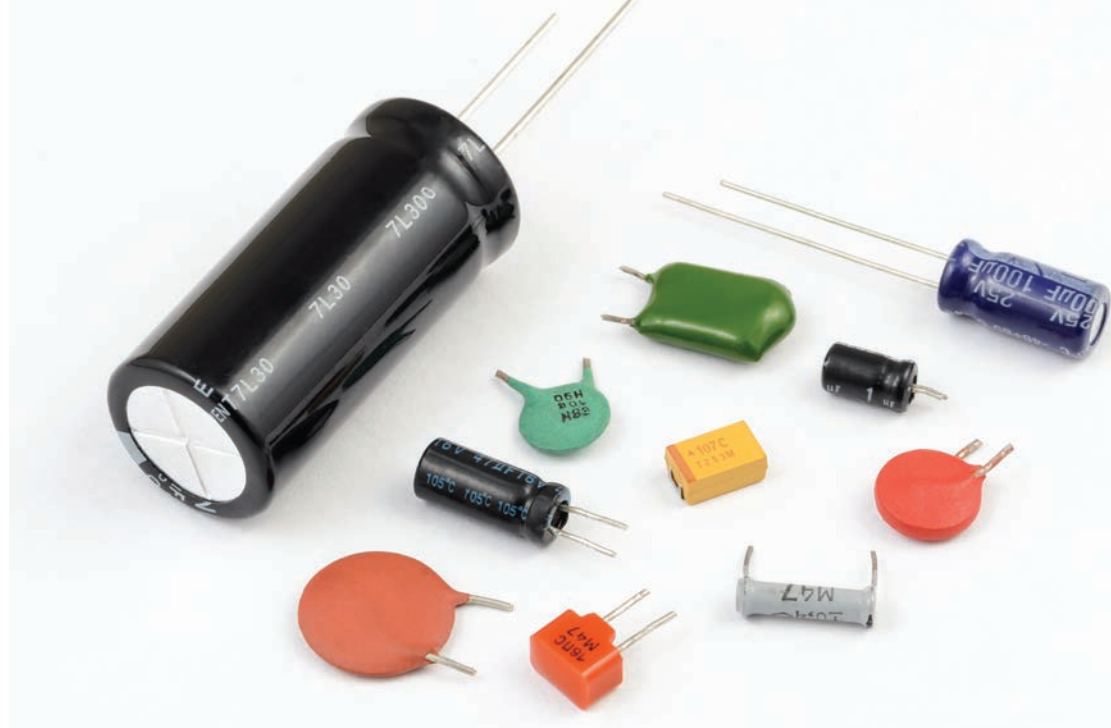
In addition, the Settling Defendants have agreed to provide cooperation to the plaintiffs in pursuing their claims against the non-settling defendants.

The settlements are not admissions of liability, fault, or wrongdoing, but are compromises of disputed claims. The settlements must be approved by the courts before they become effective.

Because the class actions are still ongoing and other settlements may be reached, the ROHM, Fujitsu, KEMET and Nichicon settlement amounts will not be distributed to class members at this time.

A process for the payment of claims to class members, which is subject to court approval and will be on further notice to the class, will be put in place later.

For more detailed information, visit www.capacitorclassaction.ca.



Class actions are ongoing and other settlement may be reached between offending vendors. eateceatum, quos nis.

START-UPS

VENTURELAB LAUNCHES HARDWARE ANGEL NETWORK

Amid the frenzied high tech energy of the Collision Conference in Toronto this summer, ventureLAB unveiled its Hardware Angel Network (HAN), a hardware and deep-tech focused investor network supporting pre-seed and seed stage start-ups in the country at York Region's pavilion.

The network catalyzes investments in the Canadian hardware and deep-tech sectors by providing opportunities for mutually beneficial partnerships, syndication of deals, and collaboration on due diligence to support investment in early-stage Canadian companies throughout the ecosystem.

"We're at the peak of the hardware revolution and it's only fitting that we now take a step forward to strengthen the ecosystem with the launch of the hardware and deep-tech network,"

ventureLAB COO Matt Skynner moderates a panel during the launch of the group's Hardware Angel Network at Collision in Toronto this June. Other panelists are Raymond Chik and Julia Elvidge, and Claudio Rojas, of the National Angel Capital Organization.

said Matt Skynner, Chief Operating Officer at ventureLAB.

"The Hardware Angel Network is committed to supporting start-ups in their investor journey and we look forward to playing a role in connecting them with unique industry leaders, hardware investors, academia, non-profit organizations and more. Building the right environment is the utmost priority of our network, to create a space for startups to thrive, grow and scale locally, and compete globally."

Tailored to the needs of hardware start-ups, the Hardware Angel Network will offer curated select investment opportunities of high potential to support foundational companies who are building transformational products and solutions that have global impact.

This initiative also aims to bridge the divide for Canadian hardware and semiconductor companies looking to raise critical funds to develop state-of-the-art technologies.

With HAN, companies can validate and prototype their technology through ventureLAB's Hardware Catalyst Initiative lab to de-risk and accelerate their development process, making them more attractive prospects for investors.

"As a member of this Network, I'm excited about connecting with amazing Canadian homegrown start-ups and on their deep-tech journeys. It's a joy to offer my support and share my experiences in building deep-tech start-ups to those who need them most," said Raymond Chik, an angel investor.



ENVIRONMENTAL

INFINEON LEVERAGES RECYCLABLE PCBs

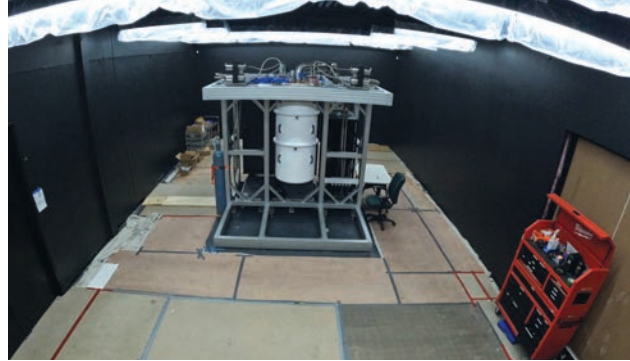
Taking another important step towards a greener future Infineon Technologies AG has introduced Soluboard, a recyclable and biodegradable printed circuit board (pcb) substrate based on natural fibers and a halogen-free polymer. The product was developed by UK start-up Jiva Materials and helps to reduce the carbon footprint of the electronics industry.

Soluboard's plant-based pcb material is made from natural fibers, which have a much lower carbon footprint than the traditional glass-based fibers.

The organic structure is enclosed in a non-toxic polymer that dissolves when immersed in hot water, leaving only compostable organic material. This not only eliminates pcb waste, but also allows the electronic components soldered to the board to be recovered and recycled. By using Soluboard for its demo and evaluation boards, Infineon is making another important contribution to the testing of sustainable designs in the electronics industry.

"For the first time, a recyclable, biodegradable pcb material is being used in the design of electronics for consumer and industrial applications," said Andreas Kopp, head of product management discretés at Infineon's Green Industrial Power Division. "We are also actively researching the reusability of discrete power devices at the end of their service life, which would be an additional significant step towards promoting a circular economy in the electronics industry."

"Adopting a water-based recycling process could lead to higher yields in the recovery of valuable metals," said Jonathan Swanston, CEO and co-founder of Jiva Materials. "In



IBM's Quantum System One aims to accelerate quantum computing research in Quebec.

addition, replacing FR-4 pcb materials with Soluboard would result in a 60% reduction in carbon emissions – more specifically, 10.5 kg of carbon and 620 g of plastic can be saved per square meter of pcb."

Currently, Infineon is using the biodegradable material to reduce the carbon footprint of demo and evaluation boards – but is also exploring the possibility of using the material for all boards to make the electronics industry more sustainable.

QUANTUM COMPUTING

IBM AND PINQ² TO ACCELERATE QUANTUM COMPUTING IN QUEBEC

IBM and the Platform for Digital and Quantum Innovation of Quebec (PINQ²) recently broke ground to install Canada's first IBM Quantum System One. The partnership aims to accelerate quantum computing research in Quebec.

The 127-qubit, utility-scale system is anticipated for completion before the end of this year and can be used to help accelerate advanced quantum research into application development to tackle complex and pressing global challenges. PINQ² will be the exclusive operator of the quantum computer, with the collaboration furthering PINQ²'s goal to strengthen Quebec's position as a leader in quantum technologies. With the partnership, PINQ² aims to build and enhance Quebec's world-renowned innovation ecosystem, foster talent development, drive industry advancement, facilitate scientific research, and support small and medium-sized enterprises (SMEs) on their quantum computing journey. Leveraging the ecosystem of DistriQ, the quantum innovation zone of Québec, PINQ² consolidates its position as a quantum laboratory, strengthening its capabilities to drive groundbreaking research and computing in financial services and sustainable development.

PINQ² is a non-profit organization founded in 2020 by the Ministère de l'Économie, de l'Innovation et de l'Énergie du Québec (MEIE) and the Université de Sherbrooke.

HARDWARE

DIGIKEY SEEKS TO ENABLE HARDWARE START-UPS

DigiKey has partnered with GroupGets to launch the "Get MADE" crowdfunding initiative, a collaboration that promotes and funds hardware creators. This program will allow start-ups to get hardware funded, produced and sold on DigiKey's website.

GroupGets is a crowd purchasing platform for group buying technology products that helps businesses and individuals launch their products by promoting, funding and distributing electronic devices across the world. Through the "Get Made" program, GroupGets and DigiKey will cross promote qualifying devices through content, design, distribution and partial funding through DigiKey. Upon successful funding, GroupGets will work with the creators to manufacture the platforms and then DigiKey will list the platforms for sale on its website.

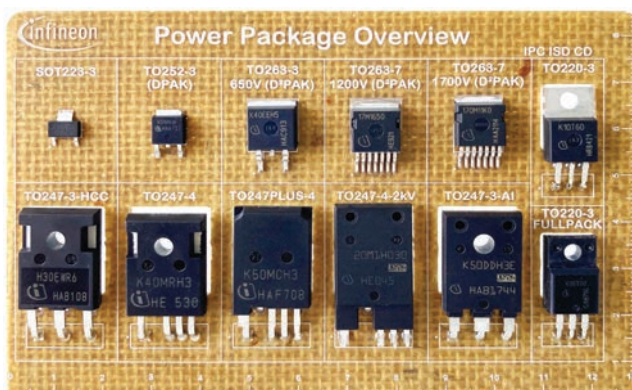
"The 'Get MADE' program stemmed from the longtime supply partnership between DigiKey and GroupGets and became a call to action to further support makers trying to enter the market," said David Sandys,



senior director of technical marketing at DigiKey. "By partnering together, we can bring interesting new solutions to market and fuel innovation in the hardware space."

"I made GroupGets to originally 'hack minimum order quantities' and put every maker on an equal level playing field with big technology companies," said Ron Justin, co-founder of GroupGets. "We've been a DigiKey fan since we were electrical engineering students in college and are proud to be further supporting the maker community through assisting them in their funding goals, as well as with production and distribution."

Interested creators can learn more





Ron Glibbery, Peraso CEO (standing), Alexander Tomkins, Peraso CTO.

about eligibility requirements and apply at www.groupgets.com/getmade.

WIRELESS

PERASO POISED TO PLAY BIG ROLE IN 5G

Peraso Inc., a Canadian semiconductor company born out of CMC-enabled academic research, is poised to play a big role in 5G wireless communications.

The firm was founded in 2009, based on research in University of Toronto's Faculty of Applied Science and Engineering by Professor Sorin Voinescu, and his students.

In the mid-2000s the group's work in the then-new high-frequency 60 gigahertz (GHz) band was well ahead of its time, at a time when cellphones didn't have the capacity to process the vast amounts of data we all take for granted today, according to Ian McWalter, former CEO of CMC Microsystems and now a member of Peraso's board of directors.

"We were there at the start to support Sorin's grad students with CAD tools," recalls McWalter.

It would be another 10 years before the wireless industry caught up with the solution offered by Peraso. In the meantime, under the guidance of CEO Ron Glibbery, the company's forward-looking work caught the interest of a venture capitalist who had his own CMC connection.

"mmWave chips were too expensive to build, and adoption was hard. We had to wait until technology got more mature and became a more viable solution. That's what we're seeing now," says Imed Zine, a former employee of CMC, who later started

Roadmap Capital, an early investor in Peraso.

"Now mmwave is becoming a new Radio (NR) for 5G and Peraso will be a major player in that market. They're shining examples of the success you can have with semiconductor-based devices. It shows we have good expertise here in Canada, and CMC is at the heart of that ecosystem."

In 2022 Peraso Inc. went public with a listing on the Nasdaq stock exchange. It is currently one of a handful of pure-play 5G companies publicly trading on that exchange.

WI-FI WORLD CONGRESS COMING TO TORONTO

The internationally renowned Wi-Fi World Congress and Expo Event North America (WWC) will make its first-ever Canadian appearance in Canada, taking place Sept. 18 – 20 in Toronto – bringing together industry leaders, entrepreneurs, innovators and experts from across the global Wi-Fi industry.

The WWC conference is hosted by the industry association Wi-Fi NOW and its community of more than 20,000 actively engaged Wi-Fi professionals from every industry segment.

"More than 500 world and Canadian Wi-Fi leaders including North America's top service providers, vendors and industry organizations will be part of the WWC," says Claus Hetting, CEO and Chairman of Wi-Fi NOW.

"Education, industry advancement and supporting the Canadian Wi-Fi business are the primary goals of the conference." **EPT**

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M SERIES MULTI COAX SOLUTION



Discover LEMO's new multi coaxial model with high frequency performance

LEMO is thrilled to announce the expansion of its field-proven M Series with a new multi coaxial configuration, named LM.232, available in size LM with up to 12x coaxial contacts. These new plugs and fixed sockets have been specifically designed to satisfy the most stringent high frequency connection requirements under very demanding environmental conditions. This new insert configuration integrates 12x coaxial contacts type 0R (50 Ohm), allowing the transmission of high frequency data up to 26.5 GHz with a low Voltage Standing Wave Ratio (VSWR). The coaxial contact is easy to mount, thanks to its crimp contact and retaining clip. It is designed to be terminated with flexible low-loss communication cable LMR-100A or MULTIFLEX 86

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BC tech group unveils award finalists

BCTIA awards recognize companies that have achieved exceptional success

BY SOHAIL KAMAL, WEST COAST CORRESPONDENT



The British Columbia Technology Association has proudly announced the finalists for the BC Technology Impact Awards (BCTIA), recognizing companies that have achieved exceptional success over the past year, while setting a high bar for innovation in the region.

“This year marks a big milestone for BC Tech, as we celebrate our 30th Anniversary alongside the companies who have made it their mission to make BC the best place to

grow and scale a tech company,” shared Jill Tipping, CEO of BC Tech, “It is exciting to see the impact that technology is having across industries and on the future of BC’s economy.”



**Jill Tipping, CEO
of BC Tech
Association**

The BC government recently presented its 2022 budget and its updated StrongerBC Economic Plan, promising bold actions to build a BC economy that is sustainable, innovative, and inclusive. These initiatives are set to solve urgent issues with a triple bottom-line impact aligned to people,

planet and prosperity. Many of the finalists work to solve these problems and pain points, for both government and private industry.

Upskilling and reskilling of talent

Innovation investment plays a crucial role in these plans, with support concentrated in areas such as cleantech, life sciences, agritech, manufacturing, and high-speed internet connectivity. Additionally, the government is investing in the rapid upskilling and reskilling of talent to fill the anticipated one million job vacancies forecasted over the next decade.

As the largest member-led technology non-profit in British Columbia dedicated to turning start-ups into scale-ups, the BC Tech Association is

also taking significant steps to encourage sustainable practices within the tech industry. It is fostering a culture of innovation by supporting companies that are keen to rise to the challenges of building BC’s low-carbon future, protecting people and communities from climate-related disasters, and creating an inclusive, sustainable, and connected economy that works for more people?

For instance, one of the highlights of the 30th Technology Impact Awards was the announcement of the five finalists for the Excellence in Industry Innovation award. This award recognizes the impact that technology innovation can have across industries and how it can positively affect company performance and competitiveness.



And, the potential winners are...

Winners in each category will be announced at the TIAs gala to be held on Sept 29th, 2023 at Parq Vancouver. Tickets can be purchased online at <https://wearebctech.ticket.ca>.

Company of the Year – Startup

- Active Witness - <https://activewitness.com>
- Airble Aviation - <https://airble.com>
- Blanka - <https://www.ethosnft.com>
- Ethos - <https://www.ethosnft.com>
- Knowbie - <https://www.getknowbie.com>
- myMomentum - <https://itsmymomentum.com>
- Newsly - <https://www.newsly.me>
- Origen Air - <https://origenair.com>
- VoxCell BioInnovations - <https://www.voxcellbio.com>
- WiiBid - <https://wiibid.com>

The 2023 Company of the Year – Startup Award is presented in partnership with Microsoft.

Company of the Year – Growth

- Fatigue Science
- Forward Security
- Ideon Technologies
- IKOMED Technologies

The 2023 Company of the Year – Growth Award is presented in partnership with Osler.

Company of the Year – Scale

- Aspect Biosystems
- DarkVision
- MineSense
- ScalePad

The 2023 Company of the Year – Scale Award is presented in partnership with Clio.

Company of the Year – Anchor

- East Side Games
- STEMCELL Technologies
- Trulioo
- Visier

The 2023 Company of the Year – Anchor Award is presented in partnership with Blakes.

Gamechanger – Climate Leadership

- Audette
- Invinity Energy Systems
- Semios
- Svante

The 2023 Gamechanger – Climate Leadership Award is presented in partnership with MDA.

Excellence in Industry Innovation

- AbCellera
- Cymax Group
- DarkVision
- inTime
- TELUS

The 2023 Excellence in Industry Innovation Award is presented in partnership with Accenture.

Gamechanger – Diversity & Inclusion

- CheckingIn
- C.O.D.E. Initiative

- Lighthouse Labs
- Thrive Health

The 2023 Gamechanger – Diversity & Inclusion Award is presented in partnership with PwC.

Excellence in Company Culture

- Binary Stream
- Pagefreezer
- Trulioo

The Excellence in Company Culture Award is presented in partnership with SAP

Gamechanger – Ambition

- Aspect Biosystems
- Charli AI
- INETCO
- LMI Technologies

The Gamechanger – Ambition Award is presented in partnership with AbCellera.

EP&T

<https://wearebctech.com>



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Taking an environmental audit of your design

BY CLAUDIA MCWILLIAMS, PROJECT MANAGER, ENVIROPASS EXPERTISE INC.



The electronics sector must prioritize sustainable practices with rising environmental concerns. Environmental audits enable businesses to observe applicable laws, lessen their carbon impact, and use ethical production techniques. In this article we will explore the significance of environmental compliance audits and their impact on promoting sustainable electronics in Canada.

Why audit?

Why Auditing Environmental Compliance in the Electronics? Audits are comprehensive assessments. Independent third parties conduct environmental compliance audits to evaluate an organization's adherence to environmental regulations, industry standards, and best practices. For the electronics industry, compliance audits focus on compliance with environmental laws and regulations related to waste management, energy consumption, hazardous substances, and recycling.

Companies can find areas of regulatory non-compliance, put corrective measures in place, and enhance their environmental performance by conducting routine audits. Compliance audits are also a risk-mitigation tool that assists organizations in avoiding negative legal and financial outcomes while preserving their standing as ethical businesses.

Applicable regulations

Here are examples of Canadian environmental regulations applicable to the electronic industry:

Canadian Environmental Protection Act (CEPA): CEPA is a federal law that

regulates the manufacture, import, sale, use, and disposal of substances that may pose risks to human health or the environment, including some used by the electronics sector, like lead and its compounds, other



Environmental audits provide management with a thorough overview.

heavy metals, or some plastic persistent organic pollutants. CEPA encompasses regulations and guidelines specific to different industries, including the electronics sector, such as the Prohibition of Certain Toxic Substances Regulations.

Provincial Environmental Regulations: In addition to federal laws, each Canadian province has its environmental regulations. These regulations may address areas such as air quality, water management, hazardous waste, and pollution prevention from the manufacturing processes of electronic devices. Examples include the Ontario Environmental Protection Act, the British Columbia Environmental Management Act, and the Quebec Environmental Quality Act.

WEEE Regulations: These e-waste regulations govern the management of electrical and electronic waste in Canada, certain US States, and the EU. WEEE establishes obligations for electronics producers, importers, and retailers, including the extended producer responsibility (ERP) for collection, recycling, and safe disposal of end-of-life electronic products.

The case of RoHS

RoHS Directive: While not a Canadian regulation specifically, these directives restrict the use of certain hazardous substances in electrical and electronic

equipment when exporting products to various markets like the EU, the UK, China, or Saudia Arabia. As a result, RoHS compliance is often adopted voluntarily by Canadian companies.

Who performs audits?

Experts with the required experience, knowledge, and skill in environmental laws and auditing procedures can conduct audits. Since no single profession is exclusive to environmental audit, there is a wide range of potential candidates. However, to guarantee professionalism, it is possible to become certified through provincial or federal organizations. Nevertheless, it is crucial to choose auditors with the necessary training, expertise, and experience to ensure the legitimacy and efficacy of the environmental audit process. ISO 19011 is the international reference of common auditing practices.

Here are some examples of credible international certifiers and standard publishers:

Environmental Careers Organization (ECO) Canada: ECO Canada provides the Environmental Professional (EP) certification encompassing multiple specialties, including environmental auditing. The EP designation signifies proficiency in environmental practices and standards, including auditing and compliance.

Quebec Association of


Environmental Auditing (AQVE): Standard Council of Canada has accredited AQVE to certify environmental professionals. AQVE offers the Certified Environmental Auditor (CEA) designation, which recognizes individuals with the knowledge and skills necessary to conduct environmental audits effectively.

The future of audits

As discussed above, environmental audits offer several advantages for organizations and the environment. They first give managers a thorough overview of a company's environmental performance, enabling them to prioritize sustainability activities and make educated decisions. Audits support innovation and ongoing improvement by establishing a culture of sustainability inside organizations.

But carrying out environmental audits can sometimes be difficult because it may take effort to find dedicated auditors. One may also find it challenging to address the corrective actions and make the necessary adjustments. Furthermore, organizations may run into pushback from stakeholders or have trouble accessing reliable data for auditing. It takes dedication to sustainability, teamwork with auditors, and the incorporation of strong environmental management systems to overcome these obstacles.

Nevertheless, environmental audits will remain essential to the Canadian electronics industry's efforts to be sustainable. Therefore, one can anticipate audits to broaden in scope as the sector develops to handle new environmental issues like e-waste management, circular economy principles, and greenhouse gas emission reduction. **EP&T** www.getenviropass.com

 *Enviropass Expertise Inc., Montreal, is an environmental compliance consulting firm.*

Manufacturing SMARTer

Dorigo Systems and Simon Fraser University forge innovative partnership to unlock potential of Smart factories

BY STEPHEN LAW, EDITOR EP&T

 Dorigo Systems, a Burnaby B.C. based contract electronics manufacturing firm, has embarked on a trailblazing collaboration with Simon Fraser University (SFU) to spearhead the integration of Industry 4.0 technologies within the electronics manufacturing sector. With funding support from MITACS, this innovative partnership aims to revolutionize production systems, while nurturing the next generation of engineers to thrive in the era of smart factories.

The focus of this collaboration between SFU and Dorigo is to prepare the next generation of engineers who will have the specific skill set needed to tap into smart factories. SFU's Mechatronic Department is driving

Human-robot interaction boosts efficiency, while fostering a more ergonomic work space

forward in creating a graduate program that will build a strong base of talent within the local economy.

"A few years ago, I noticed the opportunity to offer a new Masters of Engineering program in smart manufacturing and systems. As well, we wanted to create a research program or project on sort of a similar topic of industry 4.0," explained Dr. Edward Park, PhD, P.Eng. and Professor and Associate Dean, School of Mechatronic Systems.

Leveraging approval from federal government funding programs and existing relationship ties with Dorigo,

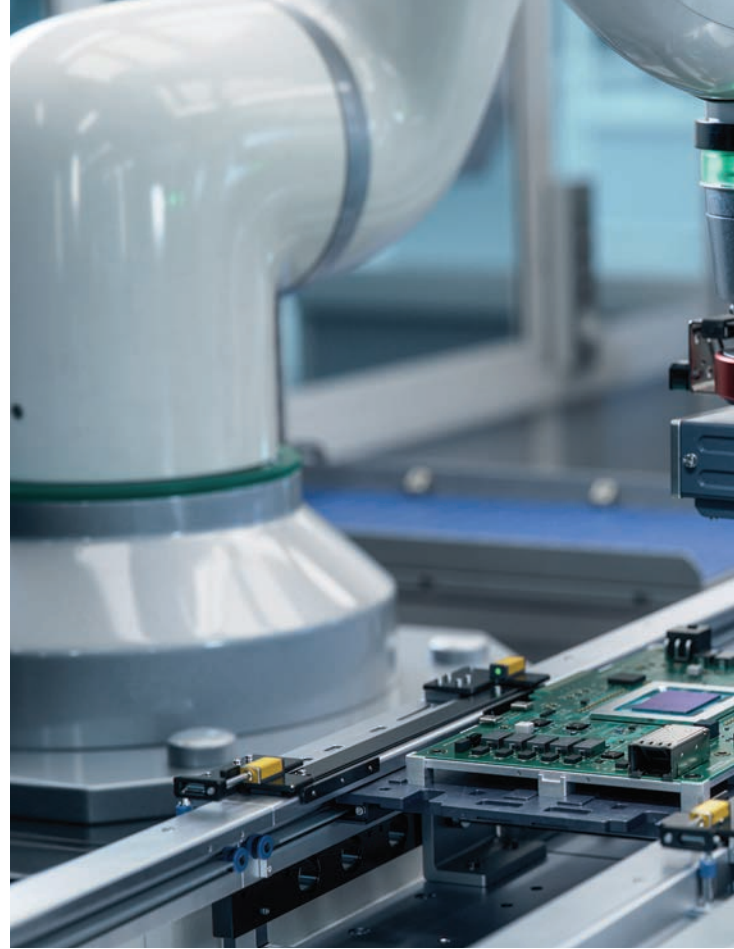
both parties began working closely together in terms of transforming the rigors of a production line into being more server industry 4.0 Smart manufacturing oriented, according to Park.

Opportunity in paradigm shift

The rise of Industry 4.0 has propelled the electronics manufacturing industry to the forefront of innovation. By fusing data-driven intelligence with manufacturing processes, a transformative potential to streamline and enhance operations has emerged. Recognizing the immense opportunities presented by this paradigm shift, Dorigo Systems and SFU have joined forces in hopes of reshaping the landscape of agile manufacturing.

The collaborative research leans into exploring and validating Industry 4.0 concepts across Dorigo Systems' manufacturing processes. By integrating advanced technologies such as artificial intelligence, Internet of Things (IoT), cloud computing, and big data analytics, this research aims to enhance productivity, flexibility, and agility within the electronics manufacturing value chain.

"There has been a lot of noise in the recent years regarding industry 4.0 and how it proposes to transform a lot of things. But, what does that really mean for us? I recognized some unique opportunities for CEMs like ourselves, where we deal with a lot of batch based manufacturing, not necessarily the traditional straight, long assembly line where we have all these workstations from one to the next - to the next," says SFU alumni Kin Leong, now senior project manager at Dorigo Systems. "We want to



add to that Industry 4.0 knowledge pool and this is where we see a lot of opportunities working with SFU in building this relationship."

SFU, renowned as Canada's top university for innovation in global rankings, has recently launched its Smart Manufacturing Hub, positioning itself at the forefront of cutting-edge research. This year, SFU has been named as Canada's top university for innovation in global WURI rankings in 2023.

As part of this new collaboration, SFU's Mechatronic Department is spearheading the development of a graduate program to equip future engineers with the specialized skill set required to harness the full potential of smart factories, enriching the local economy with a talent pool tailored to Industry 4.0 demands.

Partnership is key

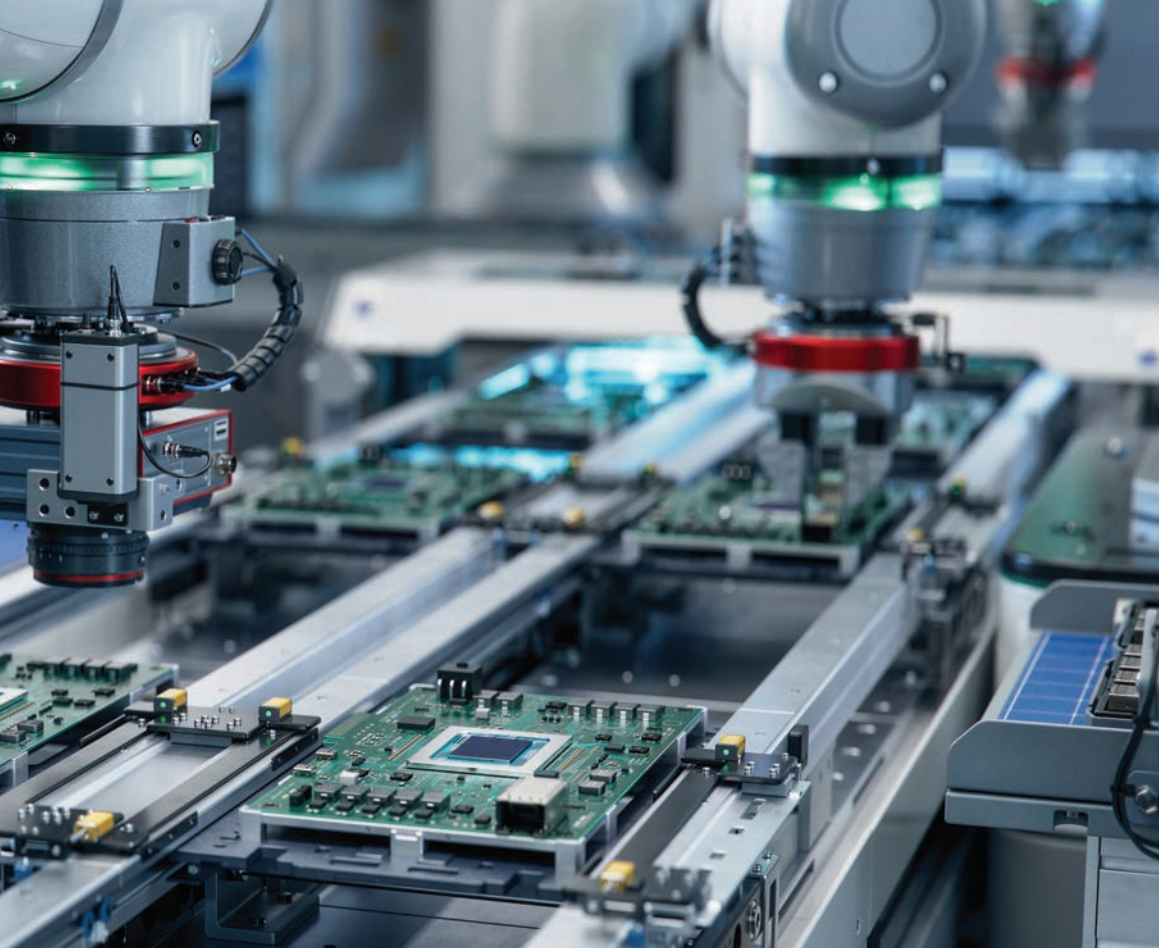
This collaborative effort seeks to optimize productivity, flexibility, and agility within the electronics manufacturing value chain, according to Leong.

"An essential part of industry 4.0 is incorporating such things as AI, new sensors and robotics and more," adds Park.

A key area of investigation revolves around the application of additive manufacturing in electronics production. Leveraging 3D printing technologies, Dorigo Systems and SFU

4.0

The collaborative research leans into exploring and validating Industry 4.0 concepts across Dorigo Systems' manufacturing processes.



are pioneering rapid prototyping and on-demand manufacturing of electronic components. By adopting additive manufacturing, the partnership aims to streamline production, reduce waste, and elevate design flexibility, thereby accelerating time-to-market and fostering innovation and sustainability.

“With 35-years of operational history behind us, we’ve learned a lot of things that didn’t work well, as well as those that do,” Leong says. “But, what does the next five, 10 or even 30-years look like for this industry? We’re in a very, very dynamic time right now, with emergence of a lot of new technologies. Not to mention how millennials and Gen X or Gen Z’s work very differently in a workforce. So, working with SFU students, and conducting this level research is really kind of exploring what some of the ideas out there that can have short term and long-term benefit for us at Dorigo.”

Additionally, the integration of collaborative robots, colloquially known as ‘cobots,’ is at the forefront of exploration. Dorigo Systems and SFU are jointly researching the optimal deployment of cobots on the assembly line, automating repetitive tasks, enhancing precision, and ensuring consistent quality. This collaborative human-robot interaction not only boosts efficiency, but also fosters a more ergonomic work environment,

amplifying the overall productivity of human operators.

By integrating advanced technologies, SFU’s research aims to enhance productivity, flexibility, and agility within the electronics manufacturing value chain.

Cutting-edge collaboration

“At Dorigo, we have a huge level of automation that we use, but there’s a whole half of the factory that is very manual and people based. Frankly, there’s nothing that beats the dexterity of a human being at this point. And, I don’t care that a lot of roboticists that will always disagree with me on that. But, I still see that in practical industry, especially in contract manufacturing, human beings are the most versatile and flexible in most agile resources,” enthused Leong. “Having said that, I think we can we actually bring collaborative, cooperative robots to that level. There is potential there, but that still needs work.”

The ramifications of this cutting-edge collaboration extend far beyond Dorigo Systems’ operations. As insights gained from this research influence and inspire the wider industry, the future of manufacturing is poised to be redefined. By embracing Industry 4.0 technologies and leveraging their joint expertise, Dorigo Systems and SFU are trailblazing a path towards greater operational

efficiency, sustainability, and competitiveness in the electronics manufacturing sector.

“From SFU side of things, it’s all about training the next generation of engineers and manufacturing engineers. It’s about developing a skill or training and deploying bright minds for a better future for Canada, and for BC. By doing so, we strengthen Canada’s innovation ecosystem and manufacturing ecosystem. This, of course, puts Dorigo at the forefront of all those things,” Park says.

Agile manufacturing

Through their joint efforts of leveraging cutting-edge research, Dorigo Systems and SFU are not only enhancing operational efficiency but also innovating new ways of manufacturing. As this transformative partnership continues to make strides, the synergy between both groups is setting new benchmarks for academic-industry alliances.

“This innovation strategy by SFU facilitates partnerships within the industry, and communities. So it allows innovation to thrive and provides multiple partnership pathways - so that our communities and industry can take advantage of innovation opportunities,” Parks states.

Operating a very fresh, state-of-the-art facility, Dorigo serves as a perfect testbed for the work that these engineers and engineering students are working towards.

“SFU is definitely taking a step in the right direction, because they’ve set up a kind of a miniature version of what we have. This allows a few students to utilize our facility as a huge test lab - test these ideas, concepts, algorithms, in real time on our factory. So, you know, this is this is the type of collaboration that I think is going to really benefit both sides and the industry as a whole,” Leong concludes.

“Electronics manufacturing needs to embrace smart factories, in terms of improving efficiency adding agility, enhancing quality control and flexibility. However, we have a shortage of skilled workers to make these transformations. So, that’s an area that where universities like SFU, and UBC can can come in and help by working in partnership - we can actually train these skilled people together,” Park concludes. **EP&T**

**35
years**

of operational history behind us, we’ve learned a lot of things that didn’t work well, as well as those that do

Patents or trade secrets

How should I protect my tech?

BY JOSÉE PHARAND, DIRECTOR OF IP, VENTURELAB



Choosing between patent protection for your invention or keeping it as a trade secret is an important decision that can have a long-lasting impact on your company's success. As such, it shouldn't be made lightly. The earlier you consider the pros and cons of each type of intellectual property protection (IP), the more assured you can be that your tech will be well protected.

Are patents the key to an IP strategy?

Patents can be a very powerful form of IP protection. A well-crafted patent gives you the right to keep anyone else from making, using or selling your invention until the patent expires, typically 20 years from its filing date. A strong patent portfolio can give you a leg up on your competitors, act as a bargaining chip in negotiations and litigation, and contribute to your bottom line. Patents can be expensive, however, with typical drafting and filing fees ranging from \$10K to \$30K per patent, depending on the complexity of the invention and the patent strategy you choose. In addition, you must pay maintenance fees periodically to keep your patent alive.

It's also important to note that patents are jurisdictional; you're only protected in the countries or regions where you have a valid patent. If you only patent in Canada, for example, anyone outside of Canada can make, use and sell your invention anywhere else in the world. A robust patent strategy that covers numerous countries can cost hundreds of thousands of dollars in filing, prosecution and maintenance costs. There are tips and tricks you can use to help minimize the costs of patent protection. I always recommend using a patent agent to help you set out the best patent strategy for your business.

Trade secrets protection can also be very important to your business. Trade secrets protect any information



that has value for your business as long it's kept a secret. This can include things like processes you use to make your product, data you've collected, and know-how that you and your employees have developed over the years. Anything you know or do that would give your competitors an edge against you if they learned about it can be considered a trade secret. Since they don't have to be registered like a patent, the costs to protect your trade secrets can be a lot less than patenting, though you should think about what measures you must take to keep your secret from getting out.

If you have a very high value secret that requires a lot of security, you may have to spend money on things like physical protection to (i.e. security systems, monitoring, etc.) and cybersecurity (perhaps you need to provide employees with secure laptops for work, for example) to keep it from getting into the wrong hands. You should also ensure that any disclosures you make are under non-disclosure agreement (NDA). For example, if you need to share your trade secret with a supplier in order for them to understand your needs, you should have them sign an NDA. And, remember that your secret is only as safe as the

Every firm's IP strategy should be built around its unique business objectives; your available IP budget also comes into play.

security of those you share it with, so make sure you understand who you're sharing your secret with and how well they will be able to protect it.

How Do I Choose?

There are several factors that should be considered when deciding whether or not to use patents or trade secret protection for your IP. Consider patent protection when:

- You have an invention that can be reverse engineered. If you're building a semiconductor chip that can be examined and analyzed, for example, trade secret protection won't help you. In this case patent protection would be more appropriate.
- You're working in a field where everyone is working towards the same end goal. Relying on trade secret protection would be ill advised in this case since anyone who independently comes up with your trade secret is free to use it and to publish it, which would destroy the value of your trade secret.
- You're seeking investment. Though not always the case, investors can sometimes be concerned if your tech isn't protected

by patents.

- Consider trade secret protection when:
- You wouldn't be able to tell if others are infringing on your patent. If trade secret protection is available for your tech in this case, it might save you from disclosing your tech in a patent that you can't enforce.
- You don't have the funds to patent yet and want to protect your ability to file patent protection in the future, or you don't have the funds to enforce your patent if someone infringes it.
- Your tech has a very short life span. It usually takes at least a few years, and sometimes even longer, to obtain a patent from the day you first file your application. If your tech will be obsolete by the time your patent issues it might not be worth the time and money you'll need to spend to obtain patent protection.

Your tech has a very long life span. If your tech is foundational and could

be profitable for your company for the next 30-plus years, keeping it as a trade secret could mean extra years of profitability, whereas a patent on the tech would expire after twenty years and anyone would then be free to use the technology.

An additional consideration when deciding whether to patent or maintain your tech as a trade secret is that a regular patent application will be published 18-months after filing. If you're uncertain about your ability to obtain a patent, know that after publication (which is very likely to occur before you know whether-or-not your patent will grant) your information will be out there for the world to see. If your patent doesn't grant, you've effectively given your invention away for anyone to use. Starting your patent strategy by filing a U.S. provisional patent application is a one way to give yourself more time to determine whether or-not you want to move ahead with a regular patent application, since provisional patent applications aren't published unless you convert them

to a regular patent application within 12-months.

Every company's IP strategy should be built around its unique business objectives; your available IP budget also comes into play. Two companies operating in the same industry could have similar products but very different IP strategies. Many companies use a mix of patents and trade secrets to ensure the best protection for their IP. To get the most return from your IP investment, be sure to consult an IP professional who can help you work through the pros and cons of each type of IP protection and help you tailor your IP strategy to meet your unique needs and objectives. **EP&T**
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Years of keeping a trade secret could mean extra years of profitability

Josée Pharand is ventureLAB's director of IP. She has a Bachelor's of Applied Science in Mechanical Engineering and developed her interest for IP and innovation during her 13 years at the Canadian Intellectual Property Office. ventureLAB is a leading global founder community for hardware technology and enterprise software companies in Canada.

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Sensing the bigger picture

Why sensor technology is fundamental to manufacturing 4.0

BY NICK GREENE FOR MOUSER ELECTRONICS

 We are in the midst of a fourth Industrial Revolution.

The first Industrial Revolution, which began in the late eighteenth century, mechanized production with steam power. The second, just a century later, introduced electricity and mass production. The third took place in the 1960s and 1970s and brought early automation and computing technology onto the factory floor.

Each of these events fundamentally changed the world and disrupted multiple industries and sectors. And each arguably pales in comparison to what's currently taking place.

Digitalizing the factory floor

Unless you've been living under a rock, you've likely heard the term Industry 4.0 at least in passing. Industry 4.0 is a catchall term for the evolution of the manufacturing sector. A deceptively complex concept, Industry 4.0 encompasses multiple technologies, innovations, trends, and subsectors.

"Manufacturing 4.0" is one such trend, integrating modern technology to digitalize, optimize, and streamline the manufacturing process. In many ways, Manufacturing 4.0 is the most essential cornerstone of Industry 4.0—and the one that organizations frequently get wrong.

"Like other areas of the 4.0 era, Manufacturing 4.0 is all about using data and connectivity to make processes efficient and

lean while enabling intelligent systems to make decisions," explains Mario Sheppard, Senior Engineer, Automation, Robotics & Manufacturing Operations at Supernal. "[Although] artificial intelligence, machine learning, augmented reality, and big data tend to monopolize the spotlight, [several] vital—albeit under-recognized—technologies [are] helping to advance Manufacturing 4.0."

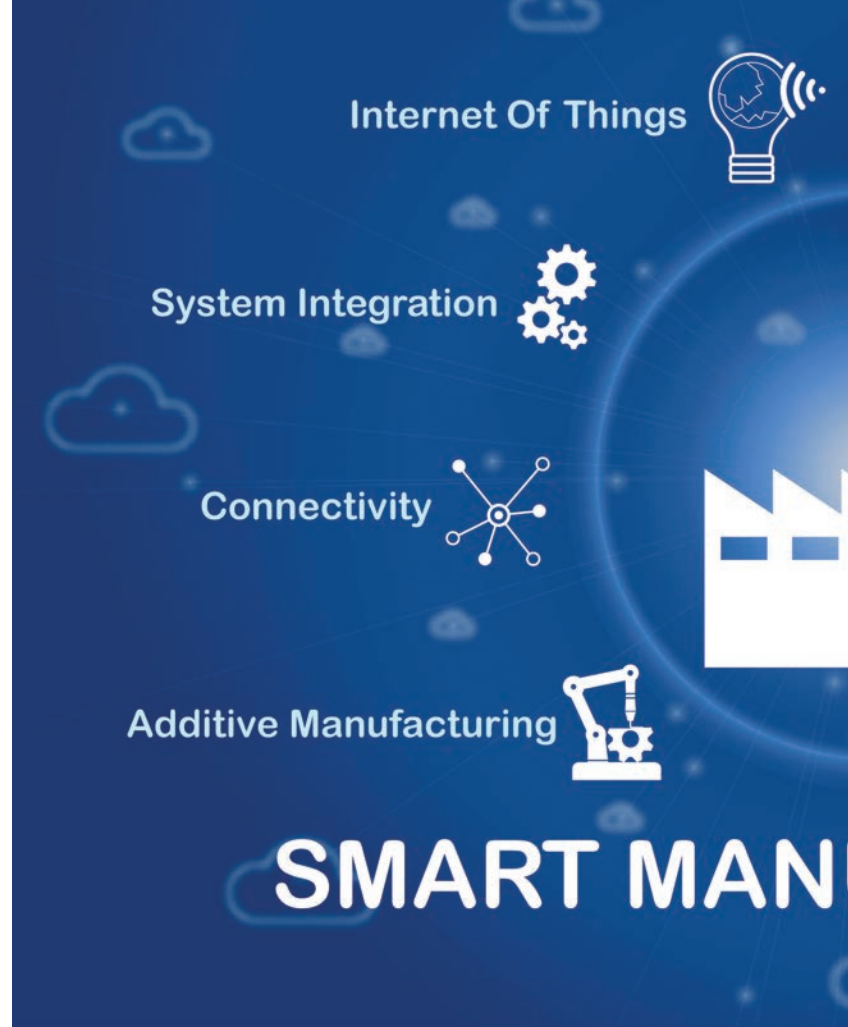
These supporting technologies ultimately all serve the same purpose—awareness.

Keeping eyes on the ground

"Without sensors, manufacturing automation simply could not happen," Sheppard continues. "Sensors are the digital eyes, ears, nose, and fingers of automation that remove guesswork or assumptions, which leads to much safer, consistent, efficient working conditions. From a data-collection standpoint, sensors are the gateway to the insights you seek in that they provide the raw data [that are] used to tell the story of what's happening along the production line."

These sensors may include the following:

- Positional sensors to align components of an industrial machine
- Presence detection sensors to identify personnel and obstructions in a machine's operational area
- Size-detecting sensors for quality control and operational safety



In manufacturing environments, vision systems can be trained to recognize objects that can be measured, counted, decoded, positioned.

- Contact sensors to identify whether a hatch or door is closed or to hard stop a piece of equipment to prevent damage
- Vibration sensors to help facilitate more efficient maintenance (for example, vibration from a servo motor may indicate deteriorating parts)
- Temperature and humidity sensors to maintain optimal operating conditions and detect possible hazards
- Level sensors to manage and monitor the volume of materials such as fuel
- Infrared sensors, which are frequently used in high-tech fields such as medical, military, and aerospace manufacturing
- Pressure sensors to monitor pipes and tubes for leaks or blockages

Most of the sensor technology listed above is hardly new. Some of these sensors, such as pressure gauges, have existed for decades. How exactly do these systems

enable manufacturing automation? In two ways: through sensor fusion and through the use of programmable logic controllers (PLCs).

"Sensor fusion has also advanced the quality and type of data that can be collected and the certainty of insights derived from the data," Sheppard explains. "You might use a laser sensor to detect height and a vision sensor to confirm. [This] enables you to combine data based on [each sensor's] strengths."

Sheppard continues: "When collecting information from machines, communication is not sensor to sensor. It's from sensor to PLC along the manufacturing network.... PLCs are the brains of manufacturing. [They are] where logic and process information is stored and [also] where network communication begins."

Advancing programmable innovation

In its simplest form, a PLC is a ruggedized, solid-state, industrial computer used to control



Seeing, thinking and acting

In a way, vision systems represent the true intersection of Industry 3.0 and Industry 4.0. These advanced platforms ingest information from across the entire factory floor—from every sensor, camera, logic controller, and application. They can then leverage this information to perform several different tasks:

- Configuring the position and orientation of each part in a machine
- Sorting inventory
- Recognizing bar codes
- Identifying defects and abnormalities
- Ensuring compliance
- Enforcing standardized sizing on components
- Identifying parts and ensuring they're properly constructed and oriented

“In manufacturing environments, vision systems can be trained to recognize objects that can be measured, counted, decoded, or positioned,” Sheppard explains. “As with other machine learning applications, training requires large datasets in which characteristics of shape, size, orientation, edges, patterns, colors, and the like are labeled. For example, [a] system might be trained to identify tubes of a specified length and circumference with [plain strip fins and] welds placed 0.14” apart—the trained system would then store a reference image or a series of reference images.”

In practice, this is much simpler than it sounds. Vision systems used in this fashion basically employ a sophisticated form of pattern recognition; they're trained to recognize a specific formation of pixels and then deliver a result of either pass or fail. While a vision system may improve at recognizing variations of the original pattern, it still cannot surpass its original purpose.

In fairness, it doesn't really need to. As they exist now, vision systems have proved invaluable to Manufacturing 4.0.

According to Sheppard, they've advanced the manufacturing sector in a multitude of ways:

- Improved product quality
- Reduced materials waste
- More efficient use of time
- Improved worker productivity
- Lower operational overhead
- Easier traceability and accountability
- Streamlined regulatory compliance

Conclusion

The manufacturing sector of today and the manufacturing sector as it existed ten years ago may as well be from completely different realities. With the birth and proliferation of Industry 4.0, manufacturing has evolved at a breakneck pace. Buzzworthy technologies such as artificial intelligence, cloud computing, and big data are undoubtedly at the heart of this revolution.

But a heart is useless if it lacks blood—in this case, the information generated by sensors, PLCs, and vision systems. As Sheppard notes, these technologies may be less glamorous than flirting with the singularity or searching a veritable ocean of data, but they are no less important:

- Sensors capture the data necessary to generate insights and guide decision-making.
- PLCs facilitate communication between systems and apply low-level automation.
- Vision systems are sophisticated tools that allow machines to see and identify objects, convey critical information, and autonomously react to data.

“Flashy technologies may steal the spotlight, but these less glamorized [systems] are vital to Manufacturing 4.0 and beyond,” Sheppard concludes. “Without them, there can be no fourth Industrial Revolution.” **EP&T**
<https://www.mouser.ca/>

Nick Greene is an experienced writer who works closely with multiple brands to create technology content on behalf of Mouser Electronics.

manufacturing processes. Using input from one or more industrial sensors, it determines the order of operations for several complex manufacturing processes based on real-time, logic-based decision-making. Output destinations may include the following:

- Sirens
- Relays
- Indicator lights
- Cylinders
- Analog outputs
- Robots
- Complex machinery (such as robots)
- Other PLCs

Essentially, when a pressure sensor or proximity sensor detects that something may be amiss, the PLC will act on those data. Imagine, for instance, that someone inadvertently activates a trash compactor while a colleague is retrieving something inside. The associated PLC will see the input from the trash compactor's proximity sensor and immediately deactivate the machine.

This use case represents only a fraction of what PLCs can achieve. With the right sensors

and the proper code, they can automate even the most sophisticated manufacturing processes. PLCs can also significantly improve operational efficiency when implemented as part of a closed-loop digital twin (CLDT).

“The idea of CLDTs is to use a virtual model that ideally accounts for all systems and variables that affect production efficiency,” says Sheppard. “Here, the PLCs provide historical and real-time [input/output] data that, along with data from other systems, can be used to fine-tune machine settings, staffing, material storage, and other operational aspects. CLDTs can be implemented at any scale, ranging from a single piece of equipment to an entire [factory floor].”

Together, augmented sensors and PLCs offer powerful guidance for modern manufacturing processes. These systems, however, only represent part of the equation.

Simply collecting data and defining a few action triggers is not enough. Manufacturing 4.0 demands more—it demands autonomy.

Five underestimated costs that can scupper an IoT project

A guide to a smooth IoT device development journey

BY BYTESNAP DESIGN

➔ It's expected that the number of connected IoT devices will surpass 43 billion in 2023, a phenomenal growth rate and massive opportunity for devices to contribute to our age of digital transformation. As the emergence and acceptance of IoT designs continue to surge worldwide, it's important to acknowledge this era of connectivity. At the same time, it's a great time to fine tune new IoT product planning.

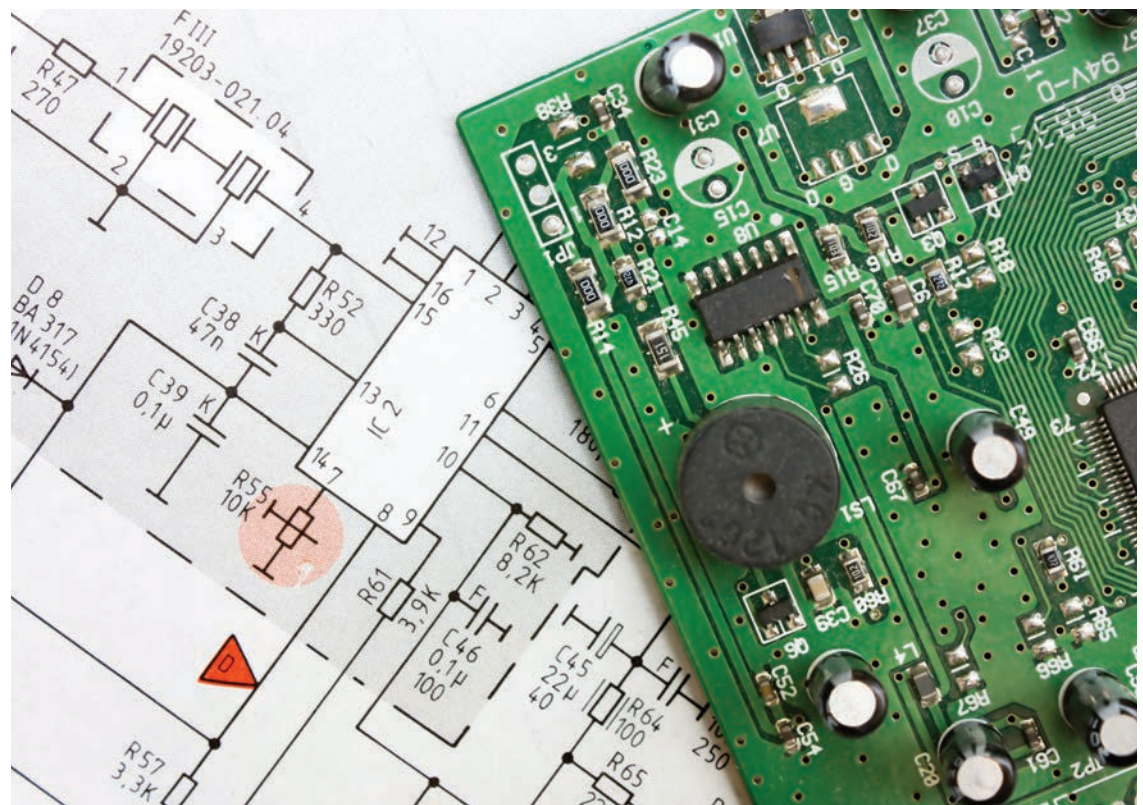
McKinsey, when predicting the number of IoT devices in use in 2023, surmised that "maturing underlying technologies will make Internet of Things technologies easier to implement and help companies and investors seize new opportunities." Although large enterprises will benefit, a maturing IoT market sees small and medium sized enterprises poised to benefit too.

As an example of just one field of application for IoT, global economic group says 84% of current IoT deployments can help to address sustainable development goals and that, "IoT technology is a huge opportunity to build a sustainable and prosperous future for SMEs."

Developing and launching an IoT device is a complex task though and can present unexpected costs and pitfalls. Here is our five-point guide to a smooth IoT device development journey.

1. Develop for low power

Often manufacturers developing an IoT product rush to get



It's worth obtaining tooling estimates early and budgeting in the cost before further mechanical design work.

a prototype ready for managers, investors or customers. Sometimes in this rush to create a prototype an important factor is missed and that is whether the product has been developed as a low power device.

Developers might decide to look at reducing a product's power usage or extending any battery life later, but underestimating how long and how costly leaving low power development until later in the process can be a critical mistake. This could actually result in a significant

redesign of a product and become a battle of diminishing returns.

Device developers should always factor in low power development and battery life considerations into Gantt charts and into product development time and budget. As the world progresses towards sustainable energy usage this will become more and more important.

2. Consider mechanical tooling needs

In early-stage product

development 3D printing is often used to rapidly develop a prototype and that results in a well-made product, quickly. However, 3D printing isn't scalable for mass production as the technique is expensive per unit and slow.

Most IoT product manufacture uses injection moulded plastic for casings and aesthetics because the unit cost in production is low. Injection moulding produces a functional, well-finished, and IP rated end-product. But an important downside to consider is the one-off cost in

creating the tool which can run into the hundreds of thousands depending on the finish detail and the complexity of the tool.

It's well worth obtaining tooling estimates early and budgeting in the cost before furthering mechanical design work.

3. Factor in compliance

A third group of unexpected costs that IoT device developers can encounter stem from compliance testing and certification and also from joining relevant standards bodies.

Developers understand that certification is required such as for CE marking in Europe and FCC and UL in the USA, but they often underestimate how heavy the costs of certification can be. At Bytesnap we often see our device development customers shocked by certification costs. Test houses can charge upwards of a CAD\$1,500 a day to use their facilities and compliance testing takes a number of days to weeks.

There are also numerous types of testing. Testing can be mandatory or advisory, and some customer regions can have a self-certification environment, while others will conduct mandatory testing. Environment testing, safety testing, EMC testing and radio testing may all need to be considered.

Different parts of the globe have different testing regimes, with compliance providing access to that product market.

Furthermore, there's the cost of joining standards bodies such as the ZigBee Alliance, whereby a device must be certified or registered per the Alliance's rules.

Often developers are not fully aware of these costs and they can represent a hefty sting in the tail at the end of a product's development.

4. Understand production testing needs

Moving into a product's manufacturing stages, production testing is another critical consideration that needs to be planned and effectively budgeted for. Every device moving through and out of a factory must be assessed to ensure it works properly and matches the original compliant design.

IoT product developers must create a testing process suitable for volume manufacture that is implemented at the end of the production line. There are

many methods of production testing and the most suitable will depend on the volume of devices produced and the device functionality.

The responsibility for production testing must be allocated to the appropriate team or to the factory, and the costs accounted for in both the production budget and cost-price of the device.

5. Be aware of beta programme requirements

Finally, beta programmes can be an unforeseen financial burden. Product recalls hit the news all the time both in the automotive and white goods industries, after shipping or even a year or two down the line. Major failures can result in hugely expensive product recalls that can be catastrophic for a business.

So, a beta testing programme in the user environment is the best solution. This may mean testing 50, 100, or more units

in the real world and with actual users. These customers may be non-technical and will see help to identify different issues with a product, compared to technical experts or those already familiar.

In summary, an IoT device development project can see unexpected, or not fully anticipated, costs from:

- Low power development
- Mechanical tooling
- Compliance and alliance participation
- Production testing
- Beta testing programmes

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ByteSnap Design is a UK-based embedded electronics design consultancy provider of hardware and software development. ByteSnap has a complete guide for developing a proof of concept IoT device through to final production.

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ELECTRONIC
MANUFACTURING
SERVICES GUIDE
2023**



SOURCING CEM PARTNERS CONTRACT MANUFACTURING

A coast to coast list of CEMs and EMS providers

Electronic Manufacturing Services Guide 2023

Playing an integral role in the eco system of the electronics industry in Canada, Contract Electronics Manufacturers (CEMs) or Electronic Manufacturing Services (EMS) providers represent one of the most important players in any design cycle.

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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 growth of RISC-V across industries

BY DAVE MILLER, HEAD OF CORPORATE COMMUNICATIONS AT SIFIVE

→ RISC-V has seen significant momentum during the past year. According to RISC-V International there are over 10 billion RISC-V cores on the market, with thousands of engineers working on RISC-V initiatives around the world. Furthermore, nearly every semiconductor company has an active RISC-V implementation strategy. So, what's driving this demand?

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Many companies also appreciate that RISC-V helps to alleviate concerns of vendor lock-in. With proprietary architectures, companies are tying their product roadmap to one company's future. Open architectures

workloads efficiently. Dedicated accelerators are an option, but they may not work well for modern neural networks and can be difficult to program. Additionally, in-house solutions can be expensive to maintain. With RISC-V, companies can create a better alternative, combining super high-performance control processors with scalable vector compute resources.

RISC-V vectors are powerful



RISC-V biz model will continue to transform the silicon industry in 2023.

like RISC-V give companies more choice for IP providers and other solutions.

RISC-V will continue to transform the silicon industry in 2023 and beyond, opening up new opportunities for AI and ML applications, consumer products, datacenters, automotive use cases, and even aerospace. Let's take a deeper look at why RISC-V adoption is growing in these segments.

AI & ML

Many of today's embedded control processors lack the compute resources needed to execute inference

and super-efficient – in terms of code size, performance, and area – offering a compelling alternative to the inefficient use of packed-SIMD and GPUs for processing large datasets. The RISC-V Vector Extension (RVV) is small-in-size, with just a few hundred instructions, making it ideal for designs that require higher power efficiency and smaller memory footprints. Additionally, RVV is vector length agnostic, meaning software written for a RISC-V vector processor is compatible with other vector processors. All these benefits enable RISC-V vector solutions to simplify design cycles for AI and ML

Source: SIFIVE; RISC-V

applications, giving companies greater design scalability and extensibility.

As a result, companies are turning to AI Dataflow Processors from companies like SiFive to efficiently manage these complex workloads and using RISC-V to offload or manage critical data and functions. Here again the performance and power efficiency bring strong benefits.

Consumer devices

Wearables, mobile phones, smart home devices, and AR/VR applications require processors that can handle demanding workloads but are also very efficient and compact. RISC-V vector solutions are a modern approach to help to address these requirements and enable companies to deliver higher compute density to consumer products. Additionally, the RISC-V Vector Cryptography extensions make it easier to bring secure and efficient cryptography to consumer devices. In just a few years, RISC-V Processors have power and performance that exceeds some of the most popular processors in the market today.

This past year, Google's Android Open Source Project (AOSP) started the upstream enablement of RISC-V. This will help accelerate the development of a new wave of mobile devices, wearables, and other Android products based on the RISC-V architecture.

Datacenter

While there's a common misconception that RISC-V is only used for microcontrollers, RISC-V is ideal for everything from tiny microcontrollers to super high performance computing solutions for datacenters. That's because RISC-V gives companies

complete design freedom. For data-center applications, companies can optimize designs for super high performance and very low latency, while also adding custom instructions for specific workloads.

Automotive

The automotive market is rapidly changing as we're seeing a centralization of computing, increased compute at the sensing edge, and increased software complexity due to mixed criticality support. Additionally, there's been a shift from domain architectures to more efficient zonal controllers. This is driving a need for more capable electronic control units (ECUs) with a higher degree of mixed criticality functional integration into fewer devices.

RISC-V automotive solutions make it possible for manufacturers to customize solutions far more than they would with other CPU vendors to meet the latest market requirements. As a result, Counterpoint Research estimates that RISC-V will be in 10% of cars by 2025. We anticipate that adoption of RISC-V in the automotive market will surge far higher in the following year as ISO certified and automotive ready RISC-V designs find use in safety, infotainment, ADAS, and autonomous and electric automotive innovations.

Aerospace

The power efficiency, fault tolerance, and compute flexibility of RISC-V solutions is perfect for aerospace applications. For example, NASA is using RISC-V cores, to deliver 100x the computational capability of today's space computers for planetary and surface missions. In rigorous

head-to-head testing RISC-V showed its competitiveness with existing solutions. This boost in computing performance will drive new kinds of innovations for autonomous rovers, vision processing, space flight, guidance systems, and communications.

In addition to the technical benefits of RISC-V, aerospace organizations recognize the value of having a vibrant global ecosystem that is designing with RISC-V. The open and collaborative nature of RISC-V allows the academic and scientific software development community to contribute and develop scientific applications and algorithms for RISC-V software, in addition to optimizing math functions, filters, transforms, neural net libraries, and other software libraries for RISC-V applications. This was a key part of the vision of our pioneer founders. Since aerospace processors can be in use for decades, it's critical that the ecosystem for an architecture will stand the test of time.

With billions of RISC-V cores on the market today and the surging demand for RISC-V across a wide range of applications, it's become clear that RISC-V truly has no limits. We look forward to seeing how RISC-V drives this new era of silicon design. **EP&T** <https://riscv.org/>

10B

RISC-V cores are on the market, with thousands of engineers working on these initiatives globally

SiFive Inc. is a fabless semiconductor company and provider of commercial RISC-V processor IP and silicon chips. <https://www.sifive.com>

RISC-V International is the non-profit home of the open standard RISC-V Instruction Set Architecture (ISA), related specifications and stakeholder community. More than 3,180 RISC-V members across 70 countries contribute and collaborate to define RISC-V open specifications.

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Medical OEMs partner on device additive manufacturing

Alliance enables a complete range of services to efficiently commercialize new, additively manufactured products to market



Four leading companies in the medical device manufacturing industry, EOS, Tecomet, Orthopaedic Innovation Centre (OIC) and Precision ADM announced a collaborative partnership offering an end-to-end solution for medical device additive manufacturing (AM). The partnership includes a full range of services including front-end engineering and design services, 510k approval pathways, device and machine validation, pre-clinical testing, and commercialization.

The adoption of AM in the medical device market is rapidly increasing due to the proven patient benefits, and the uncertainty in global supply chains where industrial 3D printing has proven to be more robust. With this new partnership, a complete end-to-end solution is provided to customers starting from product design and process development over large-scale manufacturing all the way to testing, validation and FDA submission. The advantage for medical OEMs is a significant reduction in product development lead-time, and a reduced time to market and overall risk, while leveraging the most recent manufacturing innovations.

Key to this partnership are the strengths and industry knowledge of each organization which delivers a seamless, turnkey solution for medical device AM. Specifically, EOS is the global technology leader in both metal and polymer AM, while Tecomet specializes in the precision manufacturing of medical devices and components. OIC provides accredited medical device testing and contract clinical research services to the orthopedic industry. Precision ADM provides comprehensive engineering and AM contract services to the medical device industry. The cohesive team enables medical device manufacturers to compress their time-to-market.

Scaling AM medical device production

“Scaling AM medical device production requires a complete understanding of the process chain which goes beyond just printing and includes design, post-processing, testing, sterilization, and packaging among other steps,” said Dr. Gregory Hayes, EOS SVP of Applied Engineering. “Our partnership with Tecomet, OIC and Precision ADM will yield unparalleled additive manufacturing

expertise to help medical device manufacturers navigate the complexities of the regulatory environment while delivering high-quality, reliable products.”

Through its innovative technologies such as high-productivity, multi-laser platforms like the EOS M 300-4, to industry-first support free solutions like the recently launched Smart Fusion software, EOS is a pioneer and leading innovator of AM to medical markets. EOS also engineers and produces an extensive portfolio of standard and customized materials designed for medical applications.

Advanced manufacturing powerhouses

“The partnership with EOS, Precision ADM, and Orthopaedic Innovation Centre aligns with our steadfast approach to provide full spectrum, scalable manufacturing solutions to the medical device market,” said Andreas Weller, CEO of Tecomet.

This complete end-to-end solution starts customers with product design and process development over large scale manufacturing

Combining additive technology with precision manufacturing expertise

et. “Combining the latest additive manufacturing technologies with our precision manufacturing expertise is a further commitment to this growing technology. Our global customers are consistently looking for ways to get their products to market faster, this partnership paired with our exceptional quality systems will offer a unique and comprehensive solution to the industry.”

“We are thrilled to work with advanced manufacturing powerhouses EOS, Tecomet, and Precision ADM to provide end-to-end medical device production to leading OEMs,” added Trevor Gascoyne, CEO of OIC. “Our renowned testing capabilities



and clinical research services will streamline clinical implementation and commercialization efforts unlike any other partnership in the industry.”

“By partnering with EOS and Tecomet, we can offer a complete suite of engineering, AM, and machining solutions that will help our customers bring their products to market faster,” said Martin Petrak, CEO of Precision ADM. “From materials options to lattice structures, our engineering, testing, and manufacturing services, combined with the expertise of EOS and Tecomet, will ensure that our customers have access to the best possible solution for their needs.”

Who are the players?

Precision ADM Inc.

Precision ADM is a global engineering and manufacturing solutions provider that uses Additive Manufacturing, also known as 3D Printing, as a core technology, complimented by multi-axis machining to manufacture high value components and devices for the medical, aerospace, energy, and industrial sectors. Precision ADM has created a comprehensive Advanced Digital Manufacturing process which includes Design Support, Engineering, Manufacturing and Finishing. Precision ADM possesses ISO 13485:2016, AS9100 Rev D, and ISO 9001:2015 certifications and is headquartered in Winnipeg, Manitoba, Canada.

OIC

Established in Winnipeg, Canada in 2010, the Orthopaedic Innovation Centre consists of a diverse team of surgeons, scientists, engineers, and technologists, offering a unique combination of accredited testing capabilities and clinical expertise to the medical device industry. OIC services include standardized and custom device testing, material analytics, clinical research, and device failure analyses. OIC holds ISO 9001 certification and ISO 17025 accreditation on an ever-growing list of test methods.

Tecomet

Headquartered in Wilmington, Massachusetts with over 16 facilities worldwide across 3 continents and 5 countries, Tecomet is a global leader in the design, development, and manufacture of orthopedic, robotic assisted, and minimally invasive surgical products. Tecomet provides a full range of metal and material conversion technologies, for long-term implants and instrument solutions, including forging, casting, precision-machining, and other value-add services. Tecomet is also a leading manufacturer of precision components to the aerospace & defense industry, producing

products used in aircraft engines, missile & satellite propulsion systems, vision systems, and infrared applications. Tecomet meets the requirements of ISO 9001, AS9100, ITAR, ISO 13485, and for decades has been a steadfast partner of quality to its customers.

EOS

EOS provides responsible manufacturing solutions via industrial 3D printing

technology to manufacturers around the world. Connecting high quality production efficiency with its pioneering innovation and sustainable practices, the independent company formed in 1989 will shape the future of manufacturing. Powered by its platform-driven digital value network of machines and a holistic portfolio of services, materials and processes, EOS is deeply committed to fulfilling its customers’ needs and acting responsibly for our planet. **EP&T**

Schleuniger



UniCrimp 208



schleuniger.com
905-827-1166

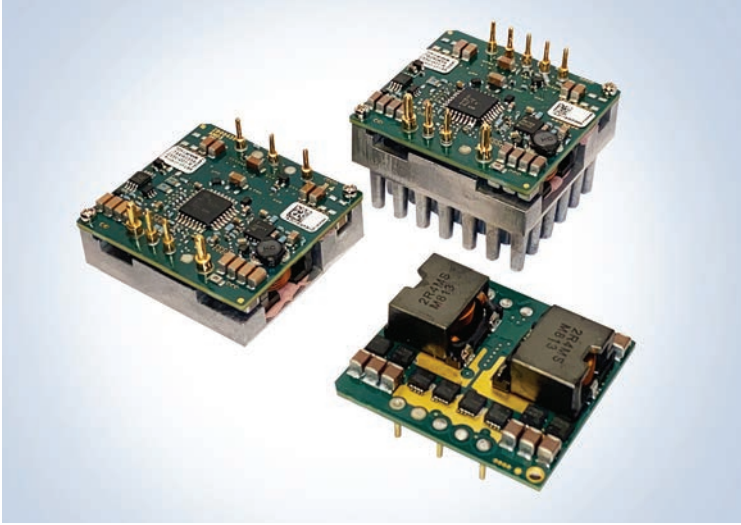
Powerful and Intuitive Crimping

The UniCrimp 208 features a modern design with intuitive operation and provides the high-quality performance one would expect from a Schleuniger product. With 33 kN (3.3 tons) of crimping force, the UniCrimp 208 can process wires up to 10 mm² (8 AWG) and accepts most industry-standard mini-style applicators for crimping rear-feed and side-feed terminals.

- Intuitive operation via 7" color touch screen
- Extremely powerful crimp force of 33 kN (3.3 tons)
- Quick-change system for all standard rear-feed and side-feed applicator tools
- Ergonomic design facilitates cable insertion
- Optional crimp force monitoring

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BRICK DC-DC BUCK CONVERTER ADJUSTS CURRENT LIMIT

TDK-LAMDA

i7A series of non-isolated buck dc-dc converters comes with the industry-standard 1/16th brick pinout. The 60A output models have a 400W maximum rating, offering 0.8 - 8V adjustable outputs from a 12V nominal input. An option to adjust the over current limit is now available on all input voltage and output current models. This reduces stress on the converter when exposed to excessive overload conditions and it facilitates over-current limit fine-tuning based on actual system needs. Product can be used to derive additional high-power outputs from a 9 to 18Vdc power supply.

➤ <https://www.us.lambda.tdk.com>

ARDUINO SOM SIMPLIFIES ACCESSIBILITY TO IOT AUTOMATION

NEWARK

Arduino Pro Portenta C33 system on module (SOM) is a cost-effective, high-performance, streamlined platform that provides an accelerated route to IoT automation, complete with industrial-grade quality and guaranteed security. Product boosts performance - made possible by a range of optimizations and streamlined features that enables it to be suitable for developing industrial, real-time applications. Product features the Arm Cortex-M33 microcontroller from Renesas and supports

MicroPython, as well as other high-level programming languages.

➤ <https://www.newark.com/arduino/abx00074/arduino-portenta-c33-rohs-compliant/dp/77AK2285?ost=arduino+c33>

LEDS WITHSTAND ABOVE INDUSTRY STANDARD TEMPERATURES

IRWIN INDUSTRIES

SunLED high-temperature series of high-performance LEDs are designed to withstand temperatures higher than the industry standard. Devices can be operated at a higher temperature, with an increased performance throughout the temperature range. Products have improved current derating curves, which result in higher brightness and overall efficiency. Devices provide longer lifetime and reduced die degradation, while preventing shifts in colour due to heat. Available in single- and multi-wavelength package configurations, devices eliminate failures in harsh environments due to excessive heat.

➤ https://www.irwin-ind.com/news/sunled_high_temperature_smd_leds/

COIN CELL BATTERY LIFE, POWER BOOSTER REDUCES WASTE IN IOT

NEXPERIA

NBM7100 and NBM5100 battery life boosting ICs extend the life of a typical non-rechargeable lithium coin cell battery by up to a factor of 10 compared to competing

solutions. Devices also increase peak output current capability by up to 25x compared to what a typical coin cell can deliver without



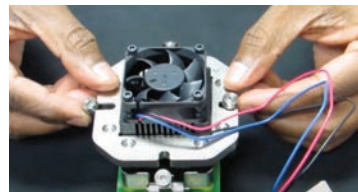
a battery booster. This extension in working life will reduce battery waste in low power IoT and other portable applications. Product will also make coin cells a viable power source for applications.

➤ <http://www.nexperia.com>

HIGH SPEED ELASTOMER SOCKET SERVES ETHERNET

IRONWOOD ELECTRONICS

Switch Device Socket is constructed with high performance and low inductance elastomer contactor. The temperature range is -55 C to +150 C. The pin self-inductance is 0.10nH and mutual inductance of 0.007nH. Capacitance to ground is 0.069pF. Current capacity is 4 amps per pin and operates at bandwidths up to 40GHz with less than 1dB of insertion loss. Socket is



also designed to dissipate 55 watts with unique spring loaded compression heatsink and axial flow fan.

➤ www.ironwoodelectronics.com

HANDHELD DIGITAL OSCILLOSCOPES COVER 100-200MHZ

B&K PRECISION

2510B Series of dual-channel, handheld digital oscilloscopes is comprised of four models, including 100MHz and 200MHz bandwidth models. For industrial applications, the 2515B and 2516B provide full isolation between all inputs and safety ratings of 1000V CAT II and 600V CAT III. For general electronic applications, the 2511B and 2512B provide the same feature set in a non-isolated design and at a more affordable price point. Units



provide a maximum sample rate of 1GSa/s, 12Mpts memory depth, a built-in 6000-count DMM with dedicated terminals for voltage measurements and scope/meter trend plot functions.

➤ <https://www.bkprecision.com/products/accessories/7/LC2510B>



MULTICORE DSP DRIVES AUTOMOTIVE APPLICATIONS

AKM

AK7709VQ multicore digital signal processor (DSP) is designed for next-generation in-vehicle sound design. Device enables real-time large-scale computational processing required to provide an immersive sound experience for passengers. further boosts the potential for a natural and immersive in-vehicle sound experience. With a processing capability of 7,000MIPS and 2.75MB of integrated memory, device performs real-time high-resolution audio processing for multi-channel speaker arrays, enabling a quiet cabin with immersive, detailed music playback.

➤ <http://www.akm.com>

FANLESS EDGE-AI IPC DELIVERS HIGH AI PERFORMANCE

SOLIDRUN

Bedrock R7000 Edge AI is a rugged system design that combines 8-core AMD Ryzen 7040 series processors with multiple Hailo-8 AI accelerators for artificial intelligence (AI)

applications. Fanless modular industrial PC is specifically designed to meet demanding vision-based situational awareness in harsh environments. System integrates with the AMD Ryzen 7840HS processor, a state-of-the-art 4nm APU with 8C/16T Zen4 CPU and integrated RDNA 3 Radeon 780M GPU. The 20 native PCIe Gen4 lanes and up to three Hailo-8 AI accelerators can be fully utilized together with NVME Gen4x4 storage, dual 2.5 Gbit Ethernet and 4x4K displays. <https://www.solid-run.com/fanless-computers/bedrock-r7000-edgeai>

TOUCHSCREEN THERMAL PROFILER DELIVERS HANDHELD ACCESS TO PROFILES

M.O.L.E. EV6 handheld, touchscreen thermal profiler provides access to profiles, calculation templates, pass/fail analysis and more – on the production floor. No PC download is required to effectively view, analyze and optimize a thermal profile. Product provides touchscreen

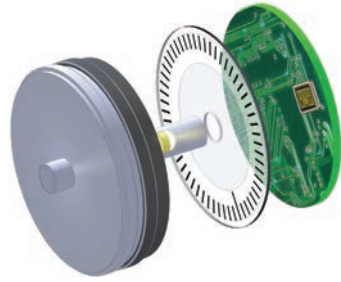


control and on-the-fly data access for immediate corrective actions, while enabling operators to simplify and streamline the profiling process. Productivity is raised, errors reduced, and decision-making is informed and immediate. www.ecd.com

OPTICAL ENCODER SENSORS SERVE INDUSTRIAL APPLICATIONS

TT ELECTRONICS

FlexSense optical encoder sensors feature auto-alignment, a closed-loop LED driver, on-chip diagnostics, a state-of-the-art 8x interpolator, and adaptability to multiple code-disk diameters and pulses per revolution. Device makes it simple to recalibrate the FlexSense chip to meet requirements in ever-changing



scenarios. Highly flexible solution can be configured quickly to meet optical encoder design requirements, including higher resolution, faster response, a smaller footprint, and greater intelligence. <https://www.ttelectronics.com/products/sensors/optoelectronics/flexsense/>

DIP SWITCH CAN BE MOUNTED TO PCB

E-SWITCH

KAD Series low-profile, DIP switch replaces the KAT Series DIP switch and can be ordered with 4, 5, 8, 9 or 10 positions that all feature single-pole, double-throw (SPDT) circuits with 2,000-cycle life expectancies. It can be mounted to the pcb via straight, through-hole pins or surface mounted via gull wing terminals. Both termination options feature gold contact material rated for 100mA of 50Vdc for non-switching functions and 25mA of 24Vdc for switching functions. While most DIP switches feature just ON and OFF functionality with multiple positions, product series is a tri-state DIP switch that features high and low output, plus high impedance or OFF functionality at multiple positions.

<https://www.e-switch.com/product-catalog/kad-series-low-profile-tri-state-dip-switch>

OSA ADDS POWER LASER DIODE MEASUREMENT FUNCTIONALITY

ANRITSU

MS9740B optical spectrum analyzer (OSA) meets the need for accurate, repeatable, and efficient testing of pulsed laser diode (LD) chips. The solution reduces test time and

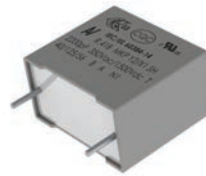


produces repeatable measurements when evaluating LD chips during production, helping speed time-to-market. Solution accelerates optical spectrum evaluation by eliminating the need for a trigger signal, which is necessary with alternative solutions. Measurement reproducibility of +/-1.4dB for Side Mode Suppression Ratio (SMSR) is assured when the expanded measurement functionality is added to the MS9740B. A low SMSR variation improves LD chip yield and production efficiency. <https://www.anritsu.com/en-us/test-measurement/products/ms9740b>

EMI SUPPRESSION CAPACITORS STEADY PERFORMANCE AT HIGH REQUIREMENTS

KEMET

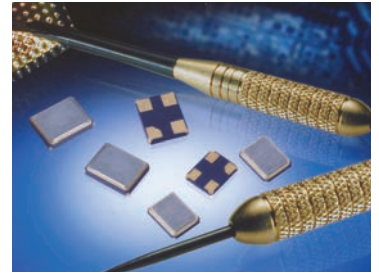
R41B film capacitor have voltage ratings of 350Vac (rated voltage) and up to 1500Vdc (rated dc voltage) and passed 1,000 hours of operation at rated voltage applied in the accelerated THB test at temperatures of 85°C and humidity of 85%. Devices are suitable solution for use in harsh environments and are also available in a halogen-free version on request. Devices come with protection class Y2/X1, and combine THB class IIIB with high operating temperature and high capacitance value while offering tiny lead space of a minimum of 10mm. Devices are made of metalized polypropylene film coated with self-extinguishing resin and are UL/ENEC/CQC certified. <https://www.kemet.com/en/us/capacitors/film.html>



MINIATURE LOW-EMI 1.8V/3.3V OSCILLATORS REDUCE EMI

SAELIG

EQHM22C series oscillators can operate from a supply voltage of 1.8-3.3V and are available in a miniature 2.5mm x 2.0mm x 0.9mm standard surface mount package. Devices are drop-in replacements for standard clocks. Products reduce EMI at source, i.e. the system clock



oscillator, reducing the need to employ costly shielded backplanes, ferrite cores, or similar techniques for reducing EMI. Device delivers a frequency range from 16 to 40.0MHz, CMOS output logic, dc input voltage of 1.8V ±0.15V, frequency stability options of ±25ppm, ±50ppm and ±100ppm for commercial (0 to +70°C) and industrial (-40 to +85°C) devices, rise/fall times of 10ns maximum, 15pF load and start-up time 1ms typical.

www.saelig.com

HANDHELD ANALYZER DELIVERS SPECTRUM - NETWORK ANALYSIS

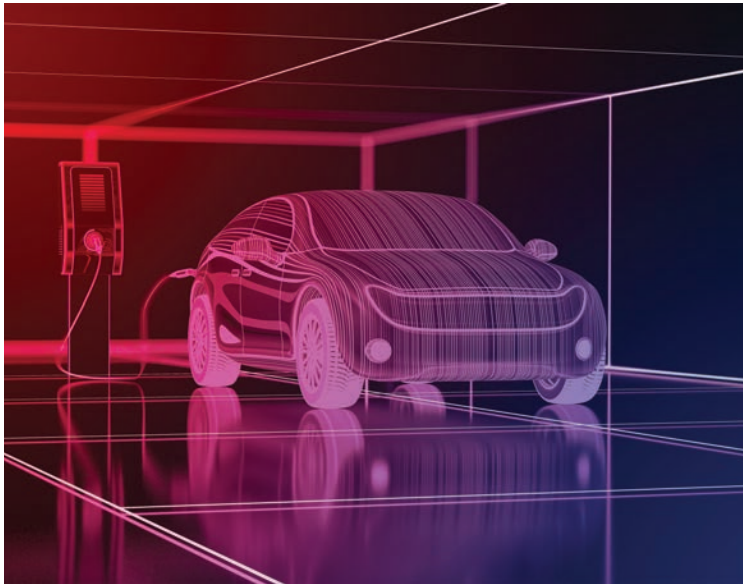
KEYSIGHT

N9912C FieldFox Handheld Analyzer is a software-defined radio frequency (RF) testing platform that provides field engineers more than 20 vector network analyzer (VNA), cable and antenna tester (CAT), and spectrum analyzer (SA) options for upgrade and download. Unit accurately measures a variety of devices or signals, including cables, antennas, and over-the-air (OTA) signals, to ensure robust signal quality and uninterrupted service.



<https://www.keysight.com/ca/en/product/N9912C/fieldfox-c-handheld-rf-analyzer-10-ghz.html>

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TEST

KEYSIGHT ACQUIRES ESI GROUP

Keysight Technologies, Inc. has acquired the entire share capital of ESI Group SA, a leading innovator of virtual prototyping solutions in automotive and aerospace end markets.

ESI Group's sophisticated software solutions simulate a product's behavior during testing and real-life use. The company's portfolio is highly differentiated, with predictive simulation technology for the most challenging system designs. ESI Group's real-time digital twin solutions combine model-driven simulation with data-driven test to create virtual simulations, and its immersive industrial solutions enable workflow automation and virtual manufacturing.

By bringing ESI Group into its electronic design and test portfolio, Keysight will further expand its software prototyping capabilities into computer-aided engineering, enabling customers to accelerate time to market and lower operational costs, while reducing their environmental footprint.

COMTREE TO REP QA TECH IN CANADA EAST

QA Technology Company Inc., Hampton NH, a global provider of test probes and interconnect products, has expanded its representation in eastern Canada by extending its representatives

agreement with Comtree Inc., providers of leading-edge tools for the electronics manufacturing process.

For more than 20 years, Comtree has represented QA Tech in central and western Canada – providing product line knowledge, customer technical support and after sales service. Comtree's territory now includes Newfoundland, Nova Scotia, Quebec and Ontario.

“Both companies share a passion for unmatched customer support. I look forward to working with QA's clients across Canada,” said Comtree's disty sales manager, Jill Gagnon.

MATERIALS

HENKEL CELEBRATES 100 YEARS

One century ago, Henkel Adhesive Technologies began selling its first adhesive solutions to



Global electronics materials supplier Henkel celebrates 100 years.

neighboring companies. From the development of laundry detergent packaging adhesives for its own use to today's advanced solutions in more than 800 industry segments the company's world-leading adhesives, sealants and functional coatings are integral parts of countless consumer and industrial goods.

“With our pioneering spirit and innovative strength, we have become the world's largest manufacturer for adhesives, sealants and functional coatings, creating value for more than 100,000 industrial customers, as well as millions of consumers. Our next step to create value across industries around the world is to develop the sustainable solutions necessary that enable circularity and CO2 reduction,” explained Mark Dorn, executive VP Henkel.

INTERCONNECT

WEIDMULLER CANADA JOINS AD ELECTRICAL

Weidmuller Ltd. Canada has joined AD's Electrical – Canada division, a contractor and industrial products wholesale buying group in North America. As a leading manufacturer of connectivity solutions, Weidmuller offers a diverse range of products, solutions, and services for smart industrial connectivity and the Industrial Internet of Things.

“This partnership will not only enable Weidmuller to enhance connectivity, communication, and engagement within AD's membership, but it will also play

a crucial role in driving market growth,” said Vince Hosick, distribution manager, Weidmuller.

The AD distributor network is exceptionally well-positioned to market Weidmuller's extensive range of offerings, including terminal blocks, power supplies, relays, I/Os, heavy duty connectors, signal conditioning, Ethernet product classifications and more.

ACQUISITIONS

INFINEON ACQUIRES IMAGIMOB

Infineon Technologies has acquired the Stockholm-based start-up Imagimob AB, a leading platform provider for Machine Learning solutions for edge devices.

With this acquisition Infineon advances its position to offer a world-class Machine Learning (ML) solution and significantly complements its AI offerings. Imagimob provides an end-to-end machine learning toolchain that is highly flexible and easy to use with a strong focus on delivering production-grade ML-models.

“and ML respectively are about to largely enter every embedded application and thus enable new functionalities,” said Thomas Rosteck, president, Infineon's connected secure systems division.

RENESAS TO ACQUIRE SEQUANS

Renesas Electronics Corp. and Sequans Communications, a provider of 5G/4G cellular IoT chips and modules, have entered into a memorandum of understanding (MoU).

Renesas intends to integrate Sequans' breadth of cellular connectivity products and IP into its core product lineup, including microcontrollers, microprocessors, analog and mixed signal front ends. **EP&T**



PRODUCT SOURCE GUIDE

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VENDOR: ARDUINO
ROBOKIT1-DK DEVELOPMENT KIT

 Development board massively scales performance with new 32-bit versions, enabling users to connect to the Arduino Cloud and other platforms for IoT projects. The next-generation UNO board represents a significant revision of its 8-bit technology. Powered by a 32-bit microcontroller, the new UNO R4 comes in two versions: the basic UNO R4 Minima and comprehensive UNO R4 WiFi, meeting the budgetary and creative needs of the maker community. Preserving the standard form factor, shield compatibility and 5V power supply of the popular UNO R3, the UNO R4 adds a 32-bit microcontroller with up to 16x the clock speed, memory and flash storage with the integration of the RA4M1 processor from Renesas. Renesas is a global leader in microcontrollers, analog, power and SoC products and provides developers with a significant boost in processing power, memory, and functionality.

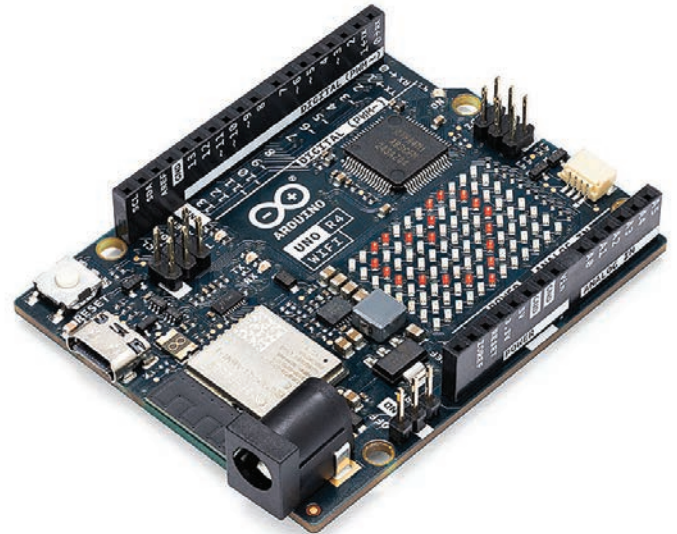
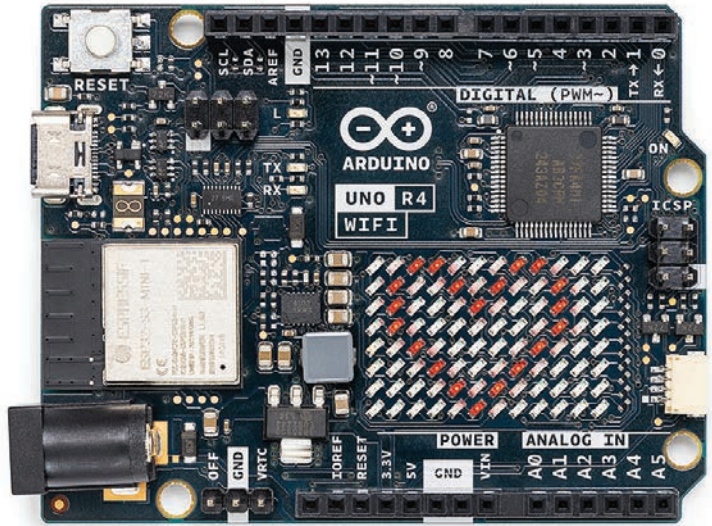
 **Some Specs**
Based on an Arm Cortex-M4 core, the RA4M1 microcontroller on the Arduino UNO R4 features a clock speed of 48MHz for higher processing power. To accommodate more complex projects, the UNO R4 is fitted with 32kB of SRAM and 256kB of flash memory. Plus, the Arm Cortex-M4 core features a Floating Point Unit (FPU), bringing a huge performance boost for certain applications. Software scalability is also supported on the new board, allowing easy upgrades for projects made with UNO R3 or Leonardo.

Arduino community
Requests from the Arduino community see the USB port upgraded to USB-C and the maximum power supply voltage increased to 24V with an improved thermal design. The board provides a CAN bus, which allows users to minimize wiring and execute different tasks in parallel by connecting multiple shields as well as two SPI and two I2C serial ports. Finally, the new board includes a 12-bit analog DAC and operational amplifier. Keeping the pinout, voltage and form factor unchanged from the UNO R3

ensures maximum hardware and electrical compatibility with existing shields and projects while allowing the UNO R4 boards to be a high-performance drop-in replacement.

Variety of compatible modules
The UNO R4 WiFi version comes with an Espressif ESP32-S3 module for Wi-Fi and Bluetooth Low Energy connectivity. The bright 12x8 red LED matrix is ideal for creative projects using animations or for plotting sensor data, without the need for additional display hardware. With a wide variety of compatible modules that can

be connected via the Qwiic I2C connector, combined with the large ecosystem of shields for UNO already in the market, UNO R4 WiFi provides an unprecedented plug-and-play experience that allows the creation of projects without soldering, breadboards or manual wiring.



Scan here to view more information.
<https://store.arduino.cc/pages/unor4>



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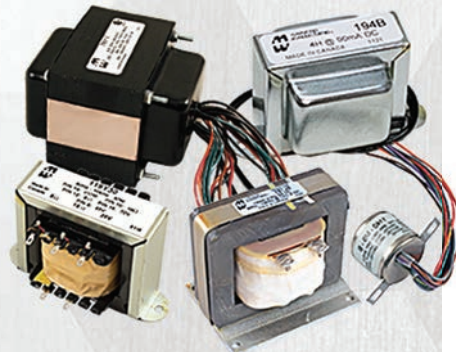


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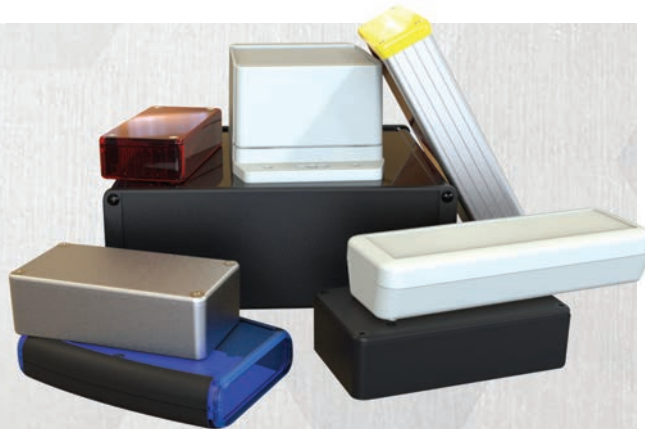
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