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JUNE/JULY 2020

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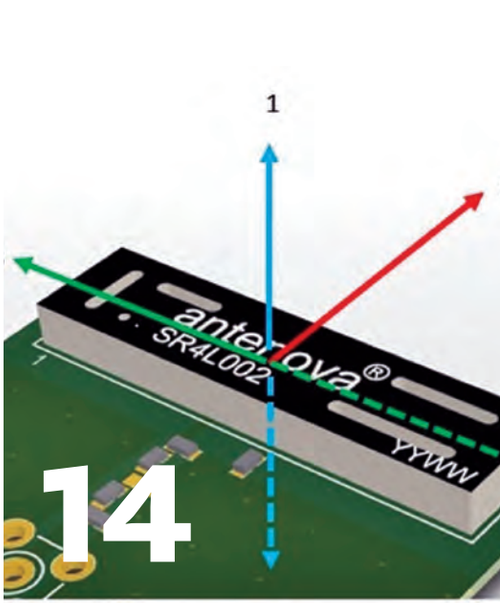

INSIDE

EP&T
JUNE/JULY 2020

Cover: Social Distancer Technologies Inc.
Photos (this page, from top): Social Distancer Technologies; Antenova; Avnet Abacus; TZOA

Covid tracing apps

Tracking devices may inch us towards surveillance state

I must admit that some flags go up for me when I hear this country's political leaders endorsing the use of contact tracing technology to assist with tracking the spread of COVID-19, while also supporting the ramp-up of testing for the virus.

These smartphone apps perform the practice of tracking people who may have come in contact with an infected person in order to get them tested and isolated, and it is widely viewed by some as vital to a country's pandemic recovery.

Prime Minister Justin Trudeau said that federal public health authorities and his provincial counterparts are investigating whether they should recommend a particular mobile phone app.

"We're coming up with new apps when it comes to contact tracing and testing. It's absolutely critical that that's part of it," said Ontario Premier Doug Ford.

Divulging sensitive information

However, it's unclear if Canadians will agree to divulge sensitive information about themselves through their phone? As global governments begin allowing people to once again go to restaurants and cafes, parks and beaches and museums and monuments, some people are obviously keen to adopt the technology to help bring life back to normal.

As smartwatches and other wearable technologies are becoming more commonplace, researchers are exploring how they can use biometric data collected by these tools to create beneficial health insights about the users. Although some of these devices are marketed as being clinically validated, there are currently no standards to ensure that the data from digital medicine tools is evaluated and fit for clinical purposes.

"If done properly, tracing applications can achieve both privacy and public health goals at the same time. Everything hinges on design, and appropriate design depends on respect for certain key privacy principles," said Privacy Commissioner of Canada Daniel Therrien in a statement.

Justifiably, civil liberties groups worry that tracing apps are a gateway to more government surveillance. This technology, once deployed, will likely not be 'rolled back'. We are repeatedly told that contact tracing apps and COVID-19-related surveillance are temporary measures for use until the pandemic passes. That's likely to be untrue.

Tools become entrenched

Surveillance inertia is remarkably difficult to resist. Norms get set and practices and tools become entrenched. And, who can say when this will wind down? Consider the fact that we are still dealing with the supposedly temporary surveillance authorized almost 20-years ago in the wake of after 9/11. Rollbacks are rare and highly unlikely because the tools we build today will create a path dependency that will shape our future data and surveillance practices.

The lure of automating the painstaking process of contact tracing is apparent. But to date, no one has demonstrated that it's possible to do so reliably despite numerous concurrent attempts. Apps that notify participants of disclosure could, on the margins and in the right conditions, help direct testing resources to those at higher risk. Anything else strikes us as implausible at best, and dangerous at worst.

There is also a very real concern that these voluntary surveillance technologies will effectively become compulsory for any public and social engagement. Employers, retailers, or even policymakers can require that consumers display the results of their app before they are permitted to enter a grocery store, return back to work, or use public services—is as slowly becoming the norm in China and Hong Kong.

Good privacy engineering is one piece of the puzzle for contact tracing apps. Even more difficult is weighing the long-term consequences of how these tools will be used after the pandemic ends. The majority of Canadians do not approve of a mandatory contact tracing app, according to the results of a recent Mainstreet Research poll.

Given the Orwellian overtures related to this so-called tech advancement – I'm definitely 'All Out'. **EP&T**

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

JUNE/JULY 2020
Volume 42, Number 4

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

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

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ISSN 0708-4366 (print)
ISSN 1923-3701 (digital)

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

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NEWSWATCH

COVID-19

MYANT PRODUCES PPE MASKS

In an effort to lend assistance to medical front line workers during the Covid pandemic, Toronto-based E-textile specialist Myant Inc. redirected its expertise and reconfigured its manufacturing facility to generate personal protective equipment (PPE).

Recognized as a global leader in textile computing, Myant recently unveiled a new line of reusable, washable textile face masks were designed to provide superior safety (leveraging the known antiviral properties of copper and silver), comfort, and practicality for frontline workers in the community. With the vast number of state-of-the-art knitting machines reprogrammed to support this initiative, Myant was producing more than 340,000 masks a month.

The entire process from design to ramping up the mass production of these masks spanned a manner of a few short weeks. As the knitting machines work non-stop to keep up with the demand for the first line of masks, the innovative team at Myant is already deep into development on its next line of masks, working closely with partners in academia and in industry both here in Canada and overseas in Germany.

Myant's PPE masks are reusable, washable.

MED-TECH FIRMS COLLABORATE ON SMART HEALTH PATCH

The 'COVID-19 smart patch' has been developed by several partners with strong medical and technology expertise.

Six medical and technology companies have developed an innovative smart health patch that allows continuous, remote and wireless monitoring of the respiration, heart rate and soon also the temperature of patients. The product – initially set up to monitor the vital functions of patients with heart failure and epilepsy – will soon be tested for the use of monitoring Covid patients in a Belgian hospital. The partners aim to further roll-out the technology over the next month to respond to a potential new Covid surge in autumn.

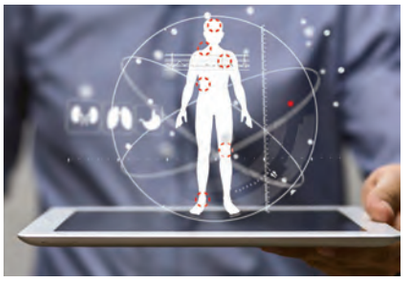
The new 'COVID-19 smart patch' is the result of a collaboration between the Belgian companies Byteflies, Melexis, Quad Industries, Televic and Z-Plus and the Belgian departments of multinationals Henkel and Nitto. All partners provided expertise and technology components for the 15cm long adhesive patch, which can easily applied to the left side of the chest. It has been developed especially for skin-friendly, medical use and contains high-tech electrodes and conductive inks to register vital signs. A 'sensor dot' located in the centre of the patch collects the patient's vital signs and sends all the data to the cloud wirelessly. A mini temperature sensor will also be integrated soon. The healthcare centre's nurses and the patient's general practitioner or specialist can then access this cloud data on a user-friendly platform. Thus, the innovative patch can improve the patient follow-up at home and reduces time and effort for medical stuff in data management.

WEARABLES

SENSOR INTEGRATES MACHINE LEARNING INNOVATION

Silicon Valley and Calgary based precision medicine technology pioneer Protxx unveiled its new precision healthcare platform that integrates wearable sensor and machine learning innovations to replace bulky and expensive clinical equipment and time-consuming testing procedures.

The device targets a variety of neurodegenerative medical conditions, in which patients suffer from impairments to multiple physiological systems. Protxx solves the difficult problem of identifying and quantifying these multiple different impairments, disrupting diagnosis and treatment with easy-to-use low-cost precision patient assessments.



PROTXX innovations in wearable devices deliver clinical grade data and machine learning models that use this data to deliver quantitative physiological insights, enhancing healthcare service quality, patient outcomes, and provider economics.

In collaboration with researchers at the University of Calgary Human Performance Lab (UCHPL), Protxx recently demonstrated the ability to integrate both diagnostic and therapeutic functions into Protxx wearable devices in order to enhance the management of neurodegenerative medical conditions. The newly announced collaborations and investments will drive product prototyping of the integrated device with Triple Ring Technologies (TRT), Newark CA, and pilot testing at UCHPL. TRT's Venture Studio and Edmonton-based Brass Dome Ventures are both supporting the collaboration as new Protxx investors. Investment terms were not disclosed.

ARTIFICIAL INTELLIGENCE

WATERLOO'S DARWINAI TO COLLABORATE WITH LOCKHEED MARTIN

DarwinAI, 'the explainable AI company,' reached a strategic

Photo: Myant Inc.; Henkel; Protxx

collaboration with global aerospace leader Lockheed Martin that seeks to improve its customers' understanding of AI solutions.

Explainable AI (XAI) or 'explainability' attempts to illuminate how neural networks – complex constructions that mimic the human brain – reach their decisions. The lack of understanding around AI's decision-making process has hampered its widespread adoption.

In response to the industry-wide impasse, Waterloo-based DarwinAI created an explainability platform for deep learning development powered by its proprietary technology, GenSynth Explain. In addition to improving neural network efficiencies, the platform can reduce the time it takes to produce robust and accurate models through the insights it generates.

PCBS

COLLABORATION ACHIEVES 3D BREAKTHROUGH

Sensor solutions provider Hensoldt together with Additively Manufactured Electronics (AME) / Printed Electronics (PE) provider, Nano Dimension, has achieved a major breakthrough on its way to utilizing 3D printing in the development process of high-performance electronics components. Utilizing a newly developed dielectric polymer ink and conductive ink from Nano Dimension, Hensoldt succeeded in assembling the world-wide first 10-layer printed circuit board (pcb) which carries high-performance electronic structures soldered to both outer sides. Until now, 3D printed boards could not bear the soldering process necessary for two-sided population of components.

Utilizing a newly developed dielectric polymer ink and conductive ink from Nano Dimension, Hensoldt succeeded in assembling the world-wide first 10-layer pcb.

Photo: Darwin AI; Hensoldt;

"Military sensor solutions require performance and reliability levels far above those of commercial components," says Hensoldt CEO, Thomas Müller. "To have high-density components quickly available with reduced effort by means of 3D printing gives us a competitive edge in the development process of such high-end electronic systems."

DISPLAYS

YNVISIBLE ACQUIRES DISPLAY FIRM

Ynvisible Interactive Inc., Vancouver-based leader in electrochromic interfaces and printed electronics, reached a business transfer agreement to acquire the printed electrochromic displays business of rdot AB of Gothenburg, Sweden. The move expands Ynvisible's client list, strengthens its sales and marketing team and brings new assets to digital and product creation.

"rdot has a proven track record and it's strong in digital channels. The COVID pandemic rapidly changed how companies conduct business and rdot's born-digital approach to business is proving to be effective in these times," says Tommy Höglund, VP sales & marketing. "With this acquisition, we're delighted to strengthen our sales and marketing team with this rich set of capabilities and further tools for prototyping."

*Visit **ept.ca** for the latest supply side, news and industry events.*

Traction Guest automates contactless visitor access, screening

Pandemic perfect timing with launch of touchless guest management system. **BY SOHAIL KAMAL**

As we grapple with the extraordinary global changes caused by the COVID-19 pandemic, managing and tracking the movement of human beings has become crucial. Traction Guest, a Burnaby BC-based company is uniquely positioned to respond to the needs of large enterprises to develop custom secure visitor access solutions.

West Tech Report recently had the opportunity to speak with Keith Metcalfe, CEO at Traction Guest, about his company's reaction to the global crisis, the company's genesis, and what has driven the firm's recent growth.

"We started the company out of another Burnaby-based entity called Traction on Demand – which is the largest independent Salesforce consulting partner & app development firm," says Metcalfe. The combined efforts of Greg Maplpass, CEO of Traction on Demand, along with a founder of Traction Guest and Metcalfe saw a need in the market to provide a safe, secure way to manage the entry and egress of employees and visitors at workplaces. Traction Guest now has more than 90 employees working across Seattle, Dublin and Vancouver, and such notable customers as Thermo Fisher Scientific, UPS and Docusign.

Zero Touch provides completely touchless sign-in/sign out capabilities.

Companies bound by regulations

The pain point that Traction Guest was solving at the beginning were mostly in support of big companies who were bound by regulations, and as requirements grew, a lot of companies were having difficulty keeping up.

"We had people going in and out of [offices], where theoretically they had to be checking them in and checking them out. At the end of the day, they weren't," says Metcalfe. This is where Traction Guest would come in."

As a team, they worked hard to differentiate themselves, clarifying exactly who they wanted to serve. In particular, they targeted large companies that had a lot of websites, and had a reason to care who had been on or off those domains.

"At one site you may have to sign documents or watch videos, answer questions, and at another it might be completely different. But, we roll it all up to one platform where people could actually see the results," Metcalfe says. Launched at the most opportune time, Traction Guest provides completely touchless sign-in/sign-out capabilities, known as ZeroTouch.

"Contactless visitor management capabilities was a compelling concept before COVID-19, but now it's becoming a required protocol. This new era of visitor management is not just about visitors, this is also about managing employees in and out of the workplace," he adds.

Physical or employee interaction

Once pre-registration is complete using ZeroTouch, guests are provided a secure one-time QR code to complete an automated touchless sign-in and entry process that allows them to register as being on-site – without requiring any physical or employee interaction upon entry. The system provides individuals with a comprehensive sign-in flow at pre-registration, including all required documents, videos and instructions, before entering a facility, which is highly efficient and reduces risk of exposure. Walk-up scenarios are handled efficiently without the installation of an app on a guest's smartphone.

Traction Guest works with suppliers to provide ID cards and kiosks or stands to set up iPads for on-site check-in. One particular challenge the group faced was selling across multiple geographies.

"If you are going to serve international companies, it's really important to understand how you are going to handle security requirements around the globe. For startups, it's critical you get ahead of that," explains Metcalfe. "Fortunately we worked hard to ensure we followed SOC2 compliance requirements for our platform. We did that because it was the right thing to do to protect our customers' data. What it's allowed us to do is to serve really big customers quickly."

To learn more, go to www.tractionguest.com. EP&T

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

Photo: Traction Guest

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CUS400M	400W	O, E, B, F	3x5"	Class I / II
CUS600M	600W	O, E, F	3x5"	Class I / II
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* E = Enclosed, O = open frame, P = pcb mount, F internal fan, B conduction cooling

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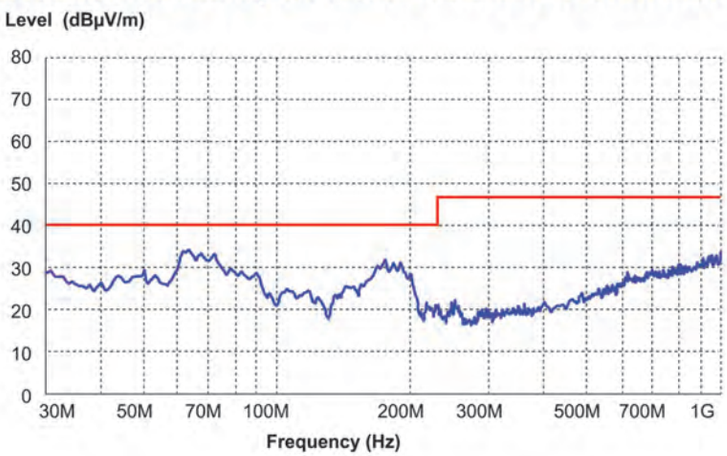

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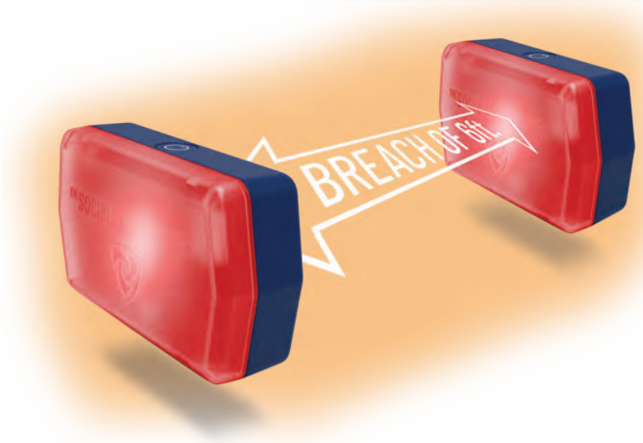
Keeping your distance

Promark collaborates to create social distancing device during pandemic. **BY STEPHEN LAW, EDITOR EP&T**



As workers in manufacturing environments continued to execute their jobs amid COVID-19, actual conditions made it very difficult for them to follow recommended physical distancing standards. These very circumstances held true for two such manufacturers in Quebec – Promark Electronics Inc. and CMP Advanced Mechanical Solutions.

Struggling to assure staff that their work space was safe, Promark president Jarred Knecht collaborated with John Soares and Steve Zimmermann at CMP to design a device that would ensure employees keep a safe distance under social distancing protocols during the pandemic.

"As an essential service provider, we were seeing early on in the lockdown that it was increasingly difficult to convince people it was safe to come to work," says Knecht, adding that Promark took extreme measures to ensure safety, such as bringing a nurse on staff and equipping everyone with PPE gear.

"But, we also discovered that some people have difficulty respecting others personal space. Some people have difficulty understanding and calculating what two meters distance really is– all the time during the day," Knecht adds. "We proceeded with this project for our own two companies – to help protect our staff. And, through the design process we realized that a lot of other companies have similar challenges," he adds.

Three manufacturing veterans

It wasn't long before conversations had these three manufacturing veterans unite their companies' expertise and co-founded Social Distancer Technologies Inc., to create, the Social Distancer, a wearable product designed to provide workers with a means to easily maintain a safe two-meter distance between one another.

Formed in 1987, Promark is described as a combined system integrator / contract manufacturer, with customers all over North America. For years, Promark has had a collaborative relationship with CMP, a Chateauguay-based CEM with expertise in electro-mechanical design and manufacturing. Early conversations in the process revolved around how to harness the best, most relevant resources out of both firms to create something of their own – leveraging a pool of almost 1,000 employees between both firms.

"Through the years we have been in business, we have been responsible for bringing thousands of products to market for others," says Knecht. "So, it was determined that we would use our collective expertise to do what we know best – and that is to build things – and, build them fast."

Put on 'start-up' hats

The trio quickly put on their 'start-up' hats on. However, unlike a true start-up, the team had 30+ years of experience and resources to pull from. As a result, the entire process was expedited, avoiding a lot of the gaps a true start-up may experience. The team's background and knowledge allowed them to go from a conversation to a company, to a product, to a patent, to a trademark, to going online and selling that product to customers – all within a four-week period.

The credit-card size, one-inch thick patent-pending device calculates the distance between employees. It has three methods of alert – visual, vibration and tone — to instantly notify employees. If employees are within 2.5 meters of one another, the device will flash red, vibrate and audibly alert the employees to move farther away. These alerts are all customizable as well. Priced at CND$199 per unit, or $1,990 per pack of 10 units, the Social Distancer lasts 10-12 hours on a single charge, which is the duration of one full shift.

If employees are within **2.5 METERS** of one another, the device will flash red, vibrate and audibly alert the employees to move farther away

"That is the thing with being a contract manufacturer, as we are constantly pivoting based on the OEMs changing needs and products. Fortunately, we are used to this. We are very adaptable by the nature of our business," Knecht who also carries the title of co-founder and COO of the newly formed concern.

Ease of implementation to the system is also key to its success, according to Knecht, as he points out that

Photos: Social Distancing Technologies Inc

Another advantage to users, is that the device does not come with any privacy concerns, eliminating employee's concerns that it may also serve as a tracking device

In a matter of weeks Promark Electronics collaborated with CMP Advanced Mechanical to form a company, along with a product, patent, trademark, and online sales to end-user customers.

there is no infrastructure required to have it operate. The self-sufficient devices can work inside or outside without any need for a gateway or antennas.

"Employees can go on with their workday without the need for any awkward conversations, unexpected proximity issues, or discrepancy about what exactly six feet is," said John Soares, co-founder and VP of Social DistancerTech and EVP of CMP Advanced.

Obvious necessity

Knecht conducted live demos with customers over video conferencing platforms, showing how the devices are used. First envisioned for use within his own operations, Knecht says the social distancing product is an obvious necessity within manufacturing environments, especially in critical sectors such as food processing facilities – even distribution centres.

"Through our conversations with customers, they are educating us as well. We thought we had considered every use case – until having customers point out several others. It has been great," Knecht says.

Once again, drawing from its established contacts given previous dealings at the National Research Council (NRC) of Canada, Knecht and his newly formed concern were able to access support via the Industrial Research Assistance Program (NRC IRAP). The response was immediate, due to the device being a technology product created by Canadians and COVID-19 related.

"So, within a couple of days the conversation went from discussing the idea and us filling out the applications to receiving approval. It was very, very fast." Knecht says the NRC's support was helpful with its guidance in the launch of the device, even assisting during the post research and development phase.

Promark's contributions to the device's creation involved electronic hardware, software design and product safety testing, while also managing the early prototyping all the way to full production runs.

Having to operate within a pandemic environment forced communications to a virtual format and it actually facilitated a speedier turnaround, according to Knecht. Using conference platforms, such as Zoom and Skype, permitted quick assembly of virtual conferences or strategy sessions online. Everyone was easily and always accessible to meet.

Situation created a need

"These tools allowed us to keep a cadence between the different people involved, who each had different responsibilities. This situation (pandemic) created the need for the product, but it also facilitated our ability to get it done fast."

Another advantage to users, is that the device does not come with any privacy concerns, eliminating employee's concerns that it may also serve as a tracking device by management.

"We did have one employee bemoan that our product would detect the frequency of her trips to the bathroom or coffee area." Not so, says Knecht. "Our goal was to give the people the tools necessary to be responsible with social distancing, but not make it feel like 'Big Brother' or that you're policing them," he adds.

Delivery of the product to end-users was scheduled for early this June. In a post-pandemic world, Knecht says his device may serve multiple purposes. The other potential end-users are eclectic, led by pharmaceutical companies; medical device makers; event (indoor and outdoor) organizers, theme parks – to grocery, retail and some restaurant type operators.

"Our objective from the start has been to try and get this product to market as fast as possible, because we know from past experience that our own customers will tell us what the possibilities are. A lot of companies often get stuck in this infinite loop of R&D. They will iterate and iterate themselves to death. **EP&T**

Wearable sensors in clothing can monitor vital signs

Form-fitting garments could be used to remotely track patients' health.

BY ANNE TRAFTON

The MIT electronic sensors consist of long, flexible strips that are encased in epoxy and then woven into narrow channels in the fabric.

MIT researchers have developed a way to incorporate electronic sensors into stretchy fabrics, allowing them to create shirts or other garments that could be used to monitor vital signs such as temperature, respiration, and heart rate.

The sensor-embedded garments, which are machine washable, can be customized to fit close to the body of the person wearing them. The researchers envision that this type of sensing could be used for monitoring people who are ill, either at home or in the hospital, as well as athletes or astronauts.

"We can have any commercially available electronic parts or custom lab-made electronics embedded within the textiles that we wear every day, creating conformable garments," says Canan Dagdeviren, the LG Electronics career development assistant professor of media arts and sciences at MIT. "These are customizable, so we can make garments for anyone who needs to have some physical data from their body like temperature, respiration rate, and so forth."

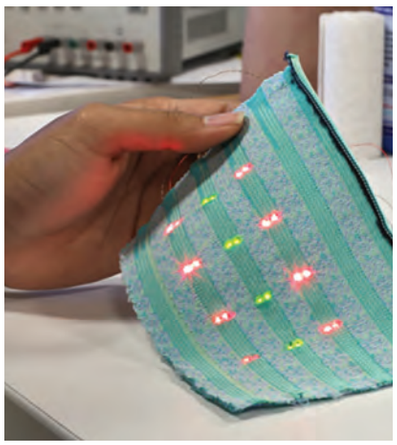
Dagdeviren is the senior author of a paper describing the new material, while MIT graduate student Irmandy Wicaksono is the lead author of the study. Several MIT undergraduates also contributed to the study through the Undergraduate Research Opportunities Program.

Embedded sensors

Other research groups have developed thin, skin-like patches that can measure temperature and other vital signs, but these are delicate and must be taped to the skin. Dagdeviren's Conformable Decoders group at the media lab set out to create garments more similar to the clothes we normally wear, using a stretchy fabric that has removable electronic sensors incorporated into it.

"In our case, the textile is not electrically functional. It's just a passive element of our garment so that you can wear the devices comfortably and conformably during your daily activities," Dagdeviren says. "Our main goal was to measure the physical activity of the body in terms of temperature, respiration, acceleration, all from the same body part, without requiring any fixture or any tape."

The electronic sensors consist of long, flexible strips that are encased in epoxy and then woven into narrow channels in the fabric. These channels have small openings that allow the sensors to be exposed to the skin. For this study, the researchers designed a prototype shirt with 30 temperature sensors and an accelerometer that can measure the wearer's movement, heart rate, and breathing rate. The garment can then transmit this data wirelessly to a smartphone.



The sensor is unnoticeable on the outside of the garment, but you can see it on the inside.

The researchers chose their fabric — a polyester blend — for its moisture-wicking properties and its ability to conform to the skin, similar to compression shirts worn during exercise. Last summer, several of the researchers spent time at a factory in Shenzhen, China, to experiment with mass-producing the material used for the garments.

"From the outside it looks like a normal T-shirt, but from the inside, you can see the electronic parts which are touching your skin," Dagdeviren says. "It compresses on your body, and the active parts of the sensors are exposed to the skin."

The garments can be washed with the sensors embedded in them, and the sensors can also be removed and transferred to a different garment.

Remote monitoring

The researchers tested their prototype shirts as wearers exercised at the gym, allowing them to monitor changes in temperature, heart rate, and breathing rate. Because the sensors cover a large surface area of the body, the researchers can observe temperature changes in different parts of the body, and how those changes correlate with each other.

The shirts can be easily manufactured in different sizes to fit an array of ages and body types, Dagdeviren says. She plans to begin developing other types of garments, such as pants, and is working on incorporating additional sensors for monitoring blood oxygen levels and other indicators of health.

This kind of sensing could be useful for personalized telemedicine, allowing doctors to remotely monitor patients while patients remain at home, Dagdeviren says, or to monitor astronauts' health while they're in space.

"You don't need to go to the doctor or do a video call," Dagdeviren says. "Through this kind of data collection, I think doctors can make better assessments and help their patients in a better way."

The research was funded by the MIT Media Lab Consortium and a NASA Translational Research Institute for Space Health Seed Grant from the MIT Media Lab Space Exploration Initiative. **EP&T**

***Anne Trafton**, Massachusetts Institute of Technology (MIT).*

Photos: MIT

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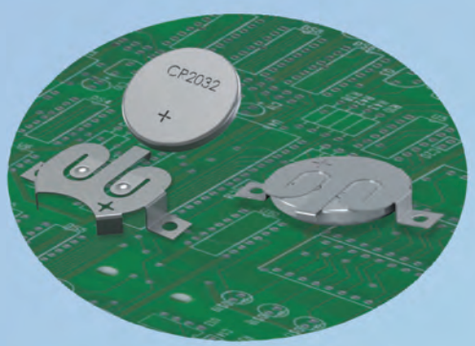

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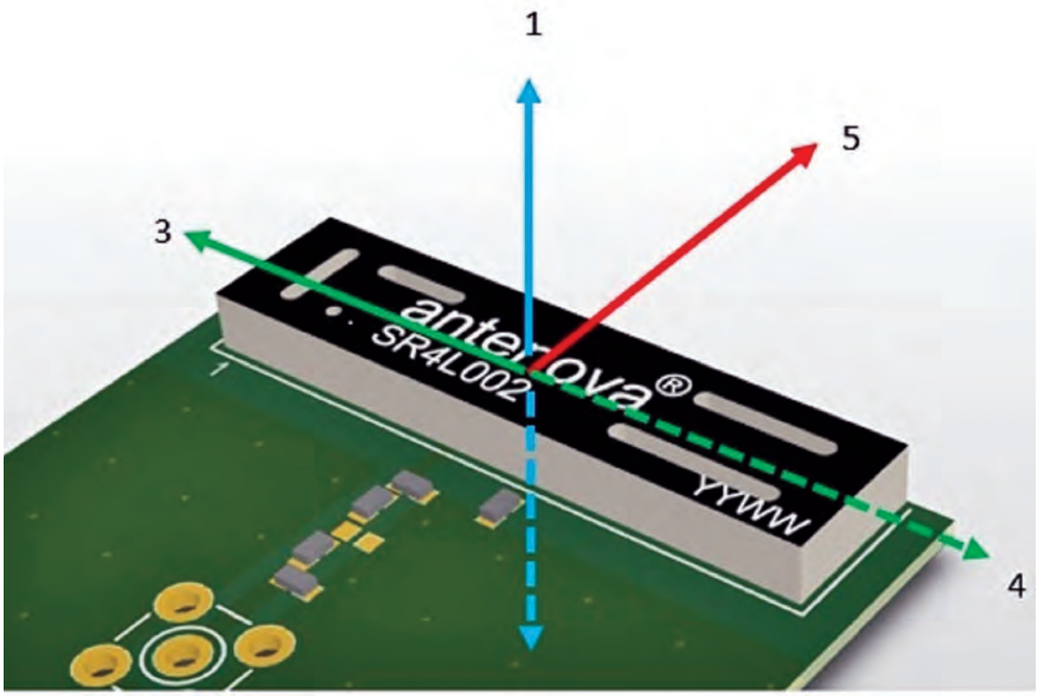


Figure 1 shows how the antenna radiates in six spatial directions.

Using chip antennas in pcb design

NB-IoT products are being implemented into many applications, including wearable electronics. **BY GEOFF SCHULTEIS AND ROBERT DUMONT**

Antennas are effectively transducers, turning electrical energy into radio waves and back again. This process involves physics, so the laws of physics are at play. While digital and analog components may be placed anywhere you like, with an antenna, its position and operation will impact its performance greatly. For this very reason, it is recommended to think about the antenna first, i.e. selecting an antenna at the early stages of a new product design, so that the antenna design constraints can be considered, and then think about creating a layout that will allow the antenna to perform at its best.

Antenna position on pcb

Unlike a digital component, an antenna will not always perform exactly as the specifications quoted on the data sheet. There are several factors that can affect its overall performance, such as:

- Length of ground plane
- Other components in proximity
- Outer casing and its material
- Position within the device
- Layout of the pcb (power/noise issues)

With any antenna, it is important to understand how its position will affect its performance. Particularly for an embedded antenna, the device needs to be positioned clearly away from the rest of the circuit – otherwise noise and other components can detune and interfere the component's performance.

Some antennas perform best when positioned on the corner of the pcb. However, there are other antennas that operate best along the long-side edge. The data sheet of each antenna will detail the optimum placement of the antenna, as will the design of the evaluation board.

The greatest design challenge is probably to provide sufficient ground plane length for sub-Gigahertz frequencies.

How the antenna radiates

A chip antenna radiates in six spatial directions and ideally requires clearance in three to five of these, as shown below. Where this cannot be achieved it is important to keep as many directions clear as possible, and at least a minimum of three. Where there are fewer directions clear, there will be a degradation of performance.

This is why some antennas perform best on the corner of a circuit board, as this effectively means there are five directions where the antenna can operate as if it were in free space.

Ground plane

Embedded antennas use ground planes on the host pcb in order to radiate efficiently. The ground plane constitutes half of the antenna, so respecting the recommendations provided in the manufacturer's data sheets is essential, if you are to achieve good levels of radiated performance. In applications that require network certification, following the guidelines in the manufacturers data sheet for the selected antenna is critical.

There are two common configurations for the ground plane. In some cases, the ground plane extends under the antenna and in others there needs to be ground cleared away under the antenna itself.

NB-IoT products are an interesting area of development right now, with

Photo: Antenova Ltd.

many new applications in remote-controlled lighting, tracking and wearable electronics. However, the greatest demand is for smaller products, which means the devices must work with shorter ground planes and cannot use too much power.

This presents a dilemma for the designer, because for antennas to operate at sub-1GHz frequencies, they need ground plane lengths of 100mm or more to prevent antenna efficiency from dropping. If the antenna efficiency should drop, this will cause issues gaining network approval for the finished product. So, the challenge for the product designer is to create a physical design that meets the limitations of size and space, and still performs well in operation.

Consideration for how the antenna and pcb are incorporated into the overall design may take advantage of being attached to either a wiring harness and plug such as in OBD2 devices or connecting to a larger device through data I/O and power buses extending the electrical ground plane presented to the antenna.

Efficiency

Efficiency is the single most important measure of antenna performance. It describes the portion of radiated power which is supplied to and radiates away from the antenna. In small, battery-powered devices, achieving efficient performance is integral to the longevity of the device.

There are plenty of factors to consider when examining potential areas to improve antenna efficiency. Some of these include:

- Resonant frequency shifts caused by reflective or absorptive masses placed near the antenna.
- Metallic casing or glass filled nylon plastic housings near or around an antenna, which will cause a null or depression in the 3D radiated pattern inhibiting radiation in the direction of the null.
- Nearby antennas with similar frequencies which may detune one another's near-fields. We recommend that they should be isolated up to -10dB <1GHz and -20dB for 2GHz as a minimum goal.

RF Modules

Like SMD antennas, modules are complete antenna solutions which can be placed directly on the pcb. The advantage these have over standard surface-mounted antennas is that they come pre-assembled. The antenna will already have a chip and other key components.

These work well for GNSS applications. They effectively offer a 'drop-in' solution, which means that designers do not need to spend time designing in complex RF circuitry.

Outer casing

Having considered the antenna's position on the pcb, it is also important to think about the outer casing for the device. Metal is not conducive to effective antenna performance. Conductive surfaces become charged when in contact with electromagnetic fields and become radiators. This causes a range of issues for effective antenna performance.

NB-IoT products are an interesting area of development right now, with many new applications in remote-controlled lighting, tracking and wearable electronics. However, the greatest demand is for smaller products, which means the devices must work with shorter ground planes and cannot use too much power

It is also important to consider the gap between the casing or housing and the antenna. Plastic has a higher dielectric constant than air, so placing an antenna too close to a plastic cover is also likely to detune the signals.

Tips for antenna integration

Some tips for successful integration of a chip antenna:

1. Select an appropriate ground plane length for the lowest frequency of the antenna.
2. If the antenna is ground plane free, make sure that all the pcb layers under the antenna are free, and that no metallic objects such as a battery or LCD are placed beneath it.
3. Never run digital traces underneath the antenna or wires above/below it.
4. Respect the ground plane clearance shown in the datasheet.
5. Never use narrow traces or unnecessarily long transmission lines.
6. Some antennas need to be placed in the pcb corner, whilst others are to be placed along the long edge of the pcb; find an antenna which integrates seamlessly within your design.
7. Do not place large or noisy high-speed switching components nearby. EP&T

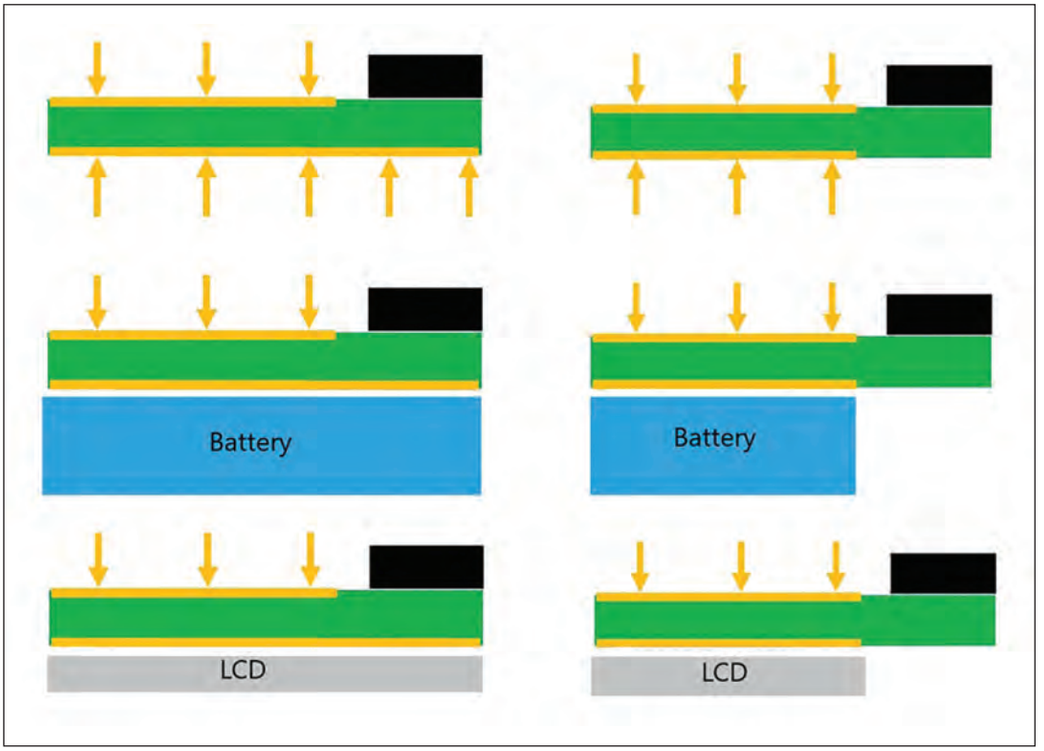
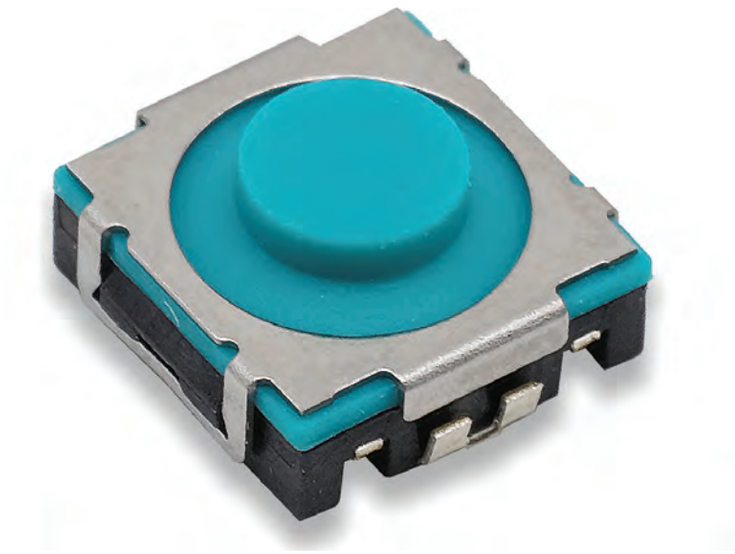


Figure 2 shows the two forms of ground plane in yellow, with the PCB is shown in green, and the antenna component in black.

Photo: Antenova Ltd.

Geoff Schulteis *is senior antenna applications engineer and* ***Robert Dumont****, America's sales manager, Antenova Ltd. www.antenova.com*



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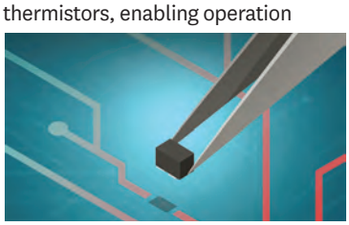

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An unlikely tale: Wearables heading for success in IIoT

Wearables were initially widely heralded as the most visible and most successful face of IoT

BY MARTIN KEENAN

Wearables might have become firmly entrenched in consumers' minds, but in the world of IIoT they have been sidelined due to a host of practical and operational complexities. However, as Industry 4.0 technologies evolve, wearables in IIoT have changed course dramatically.

A perennial talking point in the consumer market, wearables were initially widely heralded as the most visible and most successful face of IoT - until it became clear that initial interest had slowed. This was due to a variety of factors, including the usual 'new technology' overhype, battery technology, fragmented connectivity and data standards, and a lack of compelling applications.

Frame of reference

While the world of Industrial Internet of Things (IIoT) might have very different frames of reference, the same challenges resulted in a similarly low level of uptake for industrial wearables.

Despite a slow start, as battery, display and connectivity technologies have evolved in parallel with wider IIoT deployments, wearables in IIoT have begun a resurgence. One example is industrial wearables firm ProGlove, a startup from 2014 that has just closed a successful investment round.

The company's scanner glove might sound like blue-sky thinking - a hands-free barcode scanning device that provides direct feedback to the user via optical, haptic and acoustic signals - except it has been deployed by Audi, BMW, Bosch, Daimler, DHL and Lufthansa Technik. Because of the cumbersome nature of traditional warehousing and fulfillment barcode scanners, backing their functionality into a glove saves up to four seconds per scan, according to ProGlove, an efficiency improvement of up to 50% for some of its users.

The promise of low-power displays has been well-acknowledged in IIoT environments, from smart warehousing to fulfillment applications, but a combination of battery life and cost implications has restricted market growth.

Wirelessly powered paper

However, a new take on the scenario from Ossia, E-PEAS & E Ink shows an encouraging direction of travel. The trio of companies have developed a wirelessly-powered electronic paper display prototype that is entirely battery free, designed for dynamic environments.

This could include electronic shelf labels for retailers and warehouse use, digital signage, logistics tags and distributed sensor networks to name but a few. The companies plan to release the technology for commercial use by the end of next year.

Another solution to the problem of portable, connected industrial displays is virtual reality

Photo: ©Getty Images

(VR) and augmented reality (AR), two emerging technologies that have been on the cusp of widespread adoption for some time.

However, inroads are being made, with commercial VR headsets being used in applications from aircraft maintenance to F1 pit crew training. DAQRI's industrially-targeted VR headset is designed to provide a valuable overlay of AR data to industrial settings, enabling workers to have operating manuals immediately available.

Incorporate IIoT sensors

For example, to highlight which valve requires maintenance, or to have a remote expert guide them in repairing a specific module. As more industrial settings incorporate IIoT sensors to provide this type of operational data, it requires little imagination to see the value in intuitively visualizing cloud-based, contextualized data in the field.

Safety is one of the major standout themes in IIoT wearables, especially in North America and Europe, where a tight regulatory environment makes automated approaches to compliance highly desirable.

Employee tracking might sound somewhat draconian in an office setting, but when the frame of reference is shifted to heavy construction or mining style applications it seems much more sensible.

Emergecncy technology

Even more practical, attaching battery-free rugged devices (such as Opal) to key items of PPE such as hardhats or safety vests means that not only are workers easily accounted for on larger construction sites, but the system also mitigates potential personal data issues by not tracking individuals offsite.

In the event of an emergency or evacuation this type of technology saves valuable time in determining that all workers are safe, as well as ensuring that individuals are not working too many hours, as accident rates can rise when tiredness kicks in.

Beyond basic tracking of construction workers, companies such as Eleksen have created smart PPE devices with additional sensors that monitor noise, gas and other environmental factors. This data is streamed back to a central hub to monitor safety as well as build up a complete picture of the work environment, especially valuable in high-risk oil and gas industries.

Aside from individual sensors, broader approaches to health, safety, and environment (HSE) compliance are becoming increasingly widespread, with suites such as IBM Maximo Worker Insights delivering wearable device monitoring, as well as an overlay of predictive context that can reduce workplace incidents.

Decibel meters

One interesting example from IBM is using wearable decibel meters to monitor exposure to loud noises for individual technicians, so that potential impact can be measured and the correct PPE issued. The problem being particularly relevant for mobile workers such as engineers or inspectors, who come into contact with high levels of noise irregularly, but at degrees that may well have a cumulative effect that would be near-impossible to measure in any other way.

While consumer wearables continue to seek out 'killer applications', the same is not true of IIoT wearables. A host of use cases already exist, and as the supporting environment matures many of these niches are being filled with positive results. As the move to Industry 4.0 gathers pace, it is clear that creating intuitive interfaces for workers on the ground in order for them to benefit from the increasing volume of valuable cloud data is only going to rise in importance. The IIoT wearables are coming – and this time they are here to stay. **EP&T**

Martin Keenan *is the technical director at Avnet Abacus, serving designers with IoT and IIoT industrial applications.*

Residential air quality perfected with Canadian ingenuity

Vancouver OEM finds success in partnering with local CEM

British Columbia's high tech sector is fueling a growing industrial base for innovative solutions and opportunities within Canada. Supported by strong and diverse electronics manufacturing, BC is now known for more than its natural resources, but also a vibrant mix of aerospace, shipbuilding, clean-tech and life sciences companies. The lower mainland of Vancouver is attracting and supporting some of the most successful and innovative companies in the world.

Vancouver's TZOA and Burnaby-based Dorigo Systems are examples of forward thinking companies collaborating together to bring innovative products to market and fueling BC's growth within the high tech sector. TZOA is redefining how residential indoor air quality is monitored and managed, vastly improving daily life.

"We spend on average 90% of our time indoors in spaces that are heated or cooled for our comfort," says Kevin Hart, president of TZOA. "These indoor spaces often consume a lot of energy and contain potentially harmful pollution levels that directly impact our health and well-being."

There are a number of factors that affect indoor air quality from humidity, furniture materials, how homes are cleaned and how they are heated and cooled to name but a few. When these factors combine to create less than optimal air quality, it has a dramatic impact on our bodies, especially our lungs. Indoor pollution contributes to eye, nose and throat irritations as well as increased levels of fatigue. For some, living in damp and moldy homes significantly increases the risk of asthma. Improving indoor air quality is essential so we don't put our health at risk.

Kevin Hart, President, TZOA.

TZOA focuses on controlling indoor air quality throughout the entire home by adding a layer of intelligence to residential HVAC systems. Their solution is Haven, an Internet of Things (IoT) monitoring system that uses machine learning and artificial intelligence to empower residential users with the ability to control their own indoor environment.

Up until now, air quality control was a niche market with two types of solutions: either very expensive or cheap and low quality, according to Hart. Typically, air quality monitors were only used by research labs, manufacturers and research institutions and required investments of up to $100,000. Haven was created as an affordable and technologically advanced solution for improving air quality in our homes.

Haven lets you see what's in air

"Haven allows you to 'see' what is in your air," states Hart. "We give you eyes into what you are breathing indoors in your home and actionable ways to improve it using our patented air monitor."

The Haven whole home central air monitoring solution was launched in 2018 and is designed to leverage the efficiencies of cloud computing and IoT to properly monitor and control indoor air quality where it needs to be – in the air duct. Haven monitors air pollution levels to understand what activities need to be taken for more ventilation, filtration in homes.

"Bringing Haven to market required the creation of prototypes to validate design with professional production runs," states Hart, "and we also needed the ability to ramp up manufacturing of our monitors as our solution was embraced by the market."

Partnering with the ideal electronics

Central Air Monitor – for homes with a central forced air system.

Photo: TZOA

manufacturing services provider was critical to TZOA's growth. Working locally with an EMS provider in Vancouver's lower mainland turned out to be the best option for TZOA's design team, as time between iterations was vastly improved. The team didn't need to wait weeks to receive prototypes from overseas to see if they "got it right". Instead, establishing a 'belly to belly' relationship with a local EMS provider was preferred.

"We assessed several EMS companies and narrowed our choice to the one that had the capacity to grow and innovate with us," says Vlad Lavrovsky, CTO at TZOA, "Dorigo Systems was the best fit for providing us with the strong manufacturing capabilities we were seeking along with a willingness to partner with us to bring Haven to market."

TZOA partnered with Dorigo right from its start-up phase, as the CEM facilitated onsite tours from potential investors and HVAC suppliers to view how Haven's central air monitor was being prototyped to the highest standards and capabilities.

Iterate on pcb assembly

"When you are in start-up mode it is difficult for a small company to build pcb assemblies when you are focusing on designing the technology platform," adds Lavrovsky. "Dorigo's ability to iterate on the circuit board and dial-in all of the settings upfront gave us a critical advantage."

The Haven whole home air monitoring system uses a pcb assembly with a unique shape and length, which presented a number of design challenges.

"The bow and twist of the pcb impacted yield and strain on solder joints," states Lavrovsky. "We also had to refactor the design by moving parts inward to reduce strain and displacement."

The Haven pcb assemblies were inspected using Dorigo's Koh Young KY8030-3 solder paste inspection system (SPI) and 3D AOI system, providing true automated optical inspection. The system detects all kinds of potential assembly defects using patented shadow-free 3D vision technology.

"When it comes to building high-precision electronics, there is no margin for error, says Paul Vasvary, business development manager, Dorigo. "We continue to adapt our electronics manufacturing processes and technologies to achieve close to zero defects while ensuring a seamless customer experience."

Dorigo's automated SMT assembly equipment includes high-speed Panasonic multi-functional pick and place machines that can place chips as small as 01005 and can handle a broad range of components with lead pitch as small as 0.3mm, including micro BGA, BGA, CSP, LGA, FN, QFP and other odd-form packages, such as connectors as large as 150mm in length.

"Dorigo has provided us with flawless execution in manufacturing our boards," states Lavrovsky.

Clean breathing spaces

The COVID-19 pandemic has accelerated demand for ensuring clean breathing spaces, as Canada's working population is using their homes in new ways. From being a home office, school, work out space to numerous other activities, most installed residential air control systems aren't designed to keep up with this sort of use.

"We're seeing a more intense use of the typical home," says Hart. "Peace of mind in breathing the cleanest air in your home is now at the forefront for most property owners.

As demand continues to rise, TZOA leans towards Dorigo Systems' local supply chain and new industry 4.0 manufacturing facility located in Burnaby's Glenlyon Office Park to ensure strong and stable growth.

"Dorigo's turnkey capabilities will enable us to scale more gracefully over time," says Hart, stating he enjoys the added flexibility, and benefits from the company's purchasing power and the ability to quickly optimize all steps of the process.

Led by its Haven system, TZOA aims to become one of the largest providers of indoor air environment quality systems worldwide. **EP&T**

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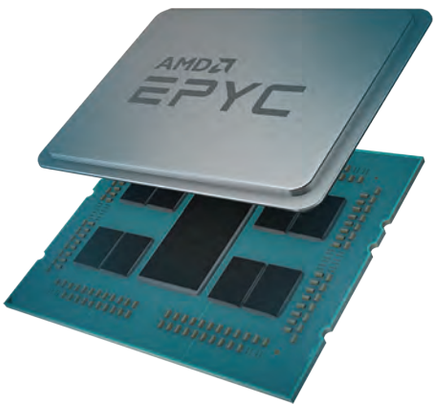
Chiplets promise to help reinstate Moore's Law

New approach to semiconductor design and integration has arrived

Moore's Law may not be dead, but at 55 years old, it's certainly feeling its age, with the pace of semiconductor manufacturing advancement decelerating in recent years. However, a new approach to semiconductor design and integration has arrived: the chiplet, which promises to help restore the microchip industry to its historic rate of advancement.

The global market for processor microchips that utilize chiplets in their manufacturing process is set to expand to $5.8-billion (all funds USD) in 2024, rising by a factor of nine from $645-million in 2018, according Omdia, an independent analyst and consultancy firm in London UK.

Restoring Moore's Law, which states that the number of transistors that can be placed on a single silicon chip doubles every two years due to the continuous advancement of semiconductor manufacturing technology. However, in recent years, the pace of doubling has slowed to about two-and-a-half years as semiconductor production processes have encountered physical limitations at extremely small sizes.



AMD EPYC CPU cores and caches are organized into 'chiplets'.

Chiplets may permit doubling cycle

Chiplets effectively bypass Moore's Law by replacing a single silicon die with multiple smaller dice that work together in a unified packaged solution. This approach provides much more silicon to add transistors compared to a monolithic microchip. As a result, chiplets are expected to allow a return to the two-year doubling cycle that has underpinned the economics of the semiconductor business since 1965.

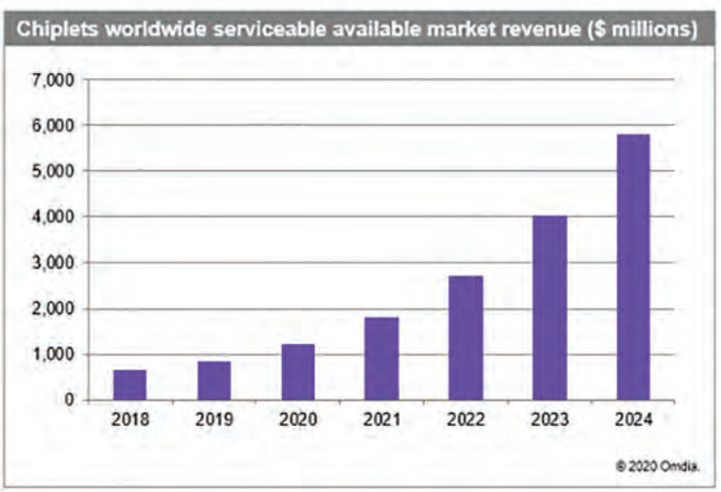


Photo: Advanced Micro Devices Inc.

"When semiconductor pioneer Gordon Moore first published his theory about semiconductor advancement, he provided a key forecasting benchmark that set a development cycle for the entire tech industry," said Tom Hackenberg, principal analyst, embedded processors, at Omdia. "From software developers, to system designers, to tech investors, everyone for decades counted on the swift two-year schedule defined by Moore's Law. With the arrival of chiplets, the semiconductor business and those that depend upon it now have the opportunity to return to the customary rate of progress that has driven so much economic value for the overall tech industry."

Widespread adoption

Chiplets receive a warm welcome from microprocessor suppliers?Chiplets are experiencing adoption in more advanced and highly integrated semiconductor devices, i.e., microprocessors (MPUs), system-on-chip (SOC) devices, graphics processing units (GPUs) and programmable logic devices (PLDs). The MPU segment represents the largest single market for chiplets among different microchip product types. The global market with chiplet-enabled MPUs is expected to expand to $2.4-billion in 2024, up from $452-million in 2018.

"To remain competitive, MPU makers must always stick to the cutting edge of semiconductor manufacturing technologies," Hackenberg said. "These companies have the most to lose from the slowdown in Moore's Law. Because of this, these companies are among the earliest adopters of chiplets and are likely to be the primary contributors to chiplet standardization efforts."

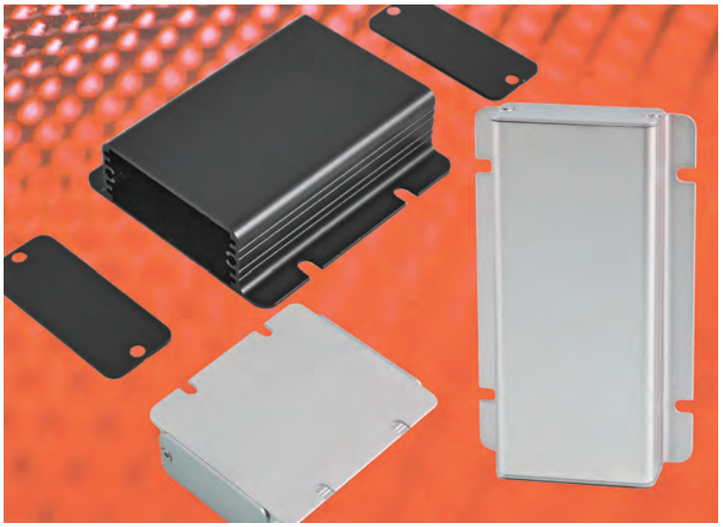
MPU suppliers such as Intel and AMD are the early innovators building proprietary advanced packaging chiplets. Intel is also a member of the Open Compute Project, Open Domain-Specific Architecture (OCP ODSA) foundation, which is promoting the development of standards and technologies that help enable advanced packaging strategies.

With the early adoption in MPUs, the computing segment is expected to be the dominant application market for chiplets through 2024. Computing will account for 96 percent of revenue in 2020 and 92 percent by 2024.

$57 billion in revenue

Over the longer term, Omdia expects chiplet revenue to continue to expand and reach $57 billion in revenue by 2035. Much of this growth will be driven by chiplets that serve as heterogenous processors, i.e., chips that combine different processing elements, such as applications processors that integrate graphics, security engines, artificial intelligence (AI) acceleration, low-power internet of things (IoT) controllers and more.

"Chiplets may not single-handedly save Moore's Law, but they do represent an innovative, emerging approach that help advance new packaging technologies, new design strategies and new materials," Hackenberg said. "This exciting new approach also may enable a more competitive landscape with diverse contributors. Chiplets will bolster the cadence Moore conveyed in his original 1965 article. The import of that original statement was not really about how microprocessors grow in performance. Rather, it was about establishing an industry guideline for a cadence that system designers, software developers and investors could count on to drive the innovation engine. This is the aspect of Moore's Law that will live on." **EP&T**



FLANGED EXTRUDED ALUMINIUM ENCLOSURE FOR SURFACE MOUNTING

HAMMOND MANUFACTURING

1455F flanged extruded aluminium enclosures add a further variant to the popular 1455 standard family. Product features a new extrusion with flat base and integral mounting flanges, which extend beyond the body of the unit. Flanges have four notches to accept securing screws for mounting the units to a flat surface such as a wall, bulkhead or machine. Two sizes, 80 x 54 x 23mm and 120 x 54 x 23mm, are initially available in clear and black anodised finish. Product's overall width is 77mm including the two mounting flanges.

www.hammfg.com

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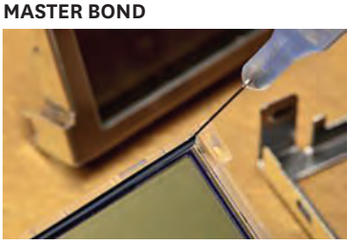

EP42-2LV Black two-part epoxy provides low viscosity and good flow and it withstands prolonged immersion in many acids, bases, solvents, fuels and oils. System can be used for bonding, sealing, coating and casting. It has a mix ratio of 100 to 40 by weight or 100 to 50 by volume with Part A being black and Part B being light amber. The viscosity of the mixed system is approx 1,000-2,000 cps, and has a working life of 60 to 90 minutes per 100-gram batch.

www.masterbond.com/properties/chemical-resistance

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info.okinternational.com/gt90-gt120.

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MURATA

UWE-Q12 series dc-dc converters provide output voltages of 5V, 12V & 24Vdc. Product line deliver improved design flexibility because of the 9-36Vin range, 120 Watt rating, high efficiency, and cost effectiveness that it delivers. The eighth brick 120 Watt version provides improved power, density, and efficiency since it encompasses the latest technology for fixed frequency switching in power supply architectures. Devices are open frame DOSA compliant.

www.murata.com

LIGHTWEIGHT ALUMINUM BACKSHELLS SHROUD D-SUB CONNECTORS

POSITRONIC

Lightweight Aluminum Backshells for firm's D-subminiature (D-sub) connectors come with new styles, including straight exit, side exit and low-profile designs. Designs are appealing for applications where size and space configuration constraints are present. Products ensure high performance connections and a long life in the field.

www.connectpositronic.com/aluminumbackshells.

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SCHURTER

DG12 series power entry modules integrate an IEC inlet, EMC filter, and rocker-style circuit breaker with optional IP67 protection, making them suitable for use in environments exposed to splashing water. The compact and versatile devices are IEC rated up to 10A at 250Vac and UL/CSA rated up to 15A at 125/250Vac. Products provide a standard or low leakage mains filter, with standard or higher inductive performance options, along with a recessed 2-pole ON/OFF rocker switch circuit breaker.

medical-technology.schurter.com

NEXT GEN RF SIGNAL GENERATORS DELIVER OUTPUT FREQUENCIES UP TO 6GHZ

SIGLENT TECHNOLOGIES

Model SSG5000X Series RF Signal Generator can source analog and vector signals up to 4GHz or 6GHz,

capable of handling a wide range of RF testing applications, including the NR-5G Band (FR1) between 3.4 and 3.7 GHz. Units provide internal IQ modulation with an RF Modulation Bandwidth up to 150MHz and an arbitrary waveform playback function. Product's menu structure makes it easy to create complex signal types. The phase noise specification is -120dBc (@1GHz / 20kHz offset).

www.siglenteu.com/rf-generators/

HALF-BRICK POWER MODULE OPERATES FROM 200 TO 425VDC INPUT

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PH600A280-24 dc-dc converter is rated at 24V 600W, further extending the 280Vdc nominal input PH-A series from 50W to 600W. Product series is utilized in HVDC (High Voltage Direct Current) equipment for data communications, high voltage transmission, renewable energy applications, robot controllers and factory automation. Certification to the safety standard EN 62477-1 (Over Voltage Category III) benefits users requiring compliance to the machinery safety standard IEC 60204-1.

www.us.lambda.tdk.com

PROGRAMMABLE DC SOURCE CAN SINK AND SOURCE CURRENT

CHROMA

62000D bidirectional dc power supplies provide two-quadrant operation, enabling both dc power output and regenerative dc loading. The absorbed energy feeds back to

the grid with a conversion efficiency up to 93% and can operate in constant voltage, constant current and constant power modes. Unit has four auto-ranging operation ranges making it possible to get a wider coverage of low voltage/high current and high voltage/low current with a device under test.

www.chromaate.com/product/bidirectional_dc_power_supply_62000D.htm

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Standardized component carrier solution, based on 3D-MID technology, is capable of replacing flexible circuit boards. Electronic components can be fitted directly onto the component carrier, which serves as a connecting element between the printed circuit board (pcb) and electronic components such as LEDs, ICs, photodiodes and sensors. Electronic components are mounted directly on the new component carrier in automated processes. The smaller design of the component carrier is suitable for components of size SOT23 and smaller.

www.harting.com/DE/en-gb/solutions/3d%E2%80%93mid-process

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www.fujipoly.com

INSTRUMENT SOURCES CURRENT PULSES AS SHORT AS 10µSEC

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Keithley 2601B-PULSE System SourceMeter 10µs Pulser/SMU Instrument integrates a high-speed current pulser with dc source and measurement functions in one instrument. System incorporates PulseMeter technology for sourcing current pulses as short as 10µsec at 10A and 10V without the need to manually tune the output to match device impedance up to 3µH. This is critical for minimizing device self-heating, which for optical devices, can result in erroneous measurements and the potential for damaging test equipment.

tek.com/smu-2601b-pulse-sourcemeter

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RF047-A flexible low-loss cable assembly with performance up to 67GHz, uses 1.85mm male and female connectors, operates to 67GHz with a maximum VSWR of 1.4:1 or better. Devices are solder clamp designs with fully captivated center contacts. The body components are passivated stainless steel with gold plated brass solder ferrule and beryllium copper contact. Other connector options offered include male and female 2.92 mm series, as well as male & female SMPM series.

www.samtec.com

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M225 Series of high-performance cable-to-board connectors are resistant to shock and vibration on a 2.00mm pitch. Product range features a rubber locking collar and fixing pin system, providing a fast and simple strain-relief connection suited for a wide scope of industrial and other related applications. The three points of contact on the female crimp contact enable resistance against industrial levels of vibration (10G) and shock (100G). Fully shrouded and polarized housings, devices are capable of withstanding extremes of temperature.

www.harwin.com/m225/

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Workswell Medicas thermal camera for face temperature scanning was developed for precise measurement of facial temperature and to maximize accuracy by referencing a fixed heat source (black body) with a known temperature value. Adding a stationary heat source to the system provides much higher accuracy (0.3°C) than a standard thermal camera. The Medicas model offers an additional layer of preventive screening and can provide more peace of mind to businesses, institutions and participants

Instruments

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www.we-online.com/we-clfs

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What's next for micro-electronics after Covid-19?

BY MARIA PAULA MORENO

Like every other sector of the global economy, the microelectronics industry has been impacted by the COVID-19 pandemic, and the disruptions it has caused to daily life worldwide. With our own team working remotely as much as possible, we wanted to take a look at not only how the microelectronics industry is being affected now, but what might be in store for the sector once the pandemic subsides and life begins to return to normal.

Impacts on industry

In a recent webinar, Ajit Manocha, president and CEO of SEMI, the global industry association for the electronic product design and manufacturing industry, revealed the results of a commissioned survey of the status of the sector during the pandemic.

Despite the challenging situation, the good news is that 77% of respondents expect to meet their manufacturing output goals, with roughly 20% anticipating opportunities for new business as a result of the current situation. Fully 58% of manufacturers plan to diversify their supply chain in light of the current experience, with the rest likely already in the process of doing so.

That said, these manufacturers shared several common concerns, including employee safety, shipping and receiving challenges, and the prospects for economic and business recovery once the crisis has passed, including how and when supply chains can be re-established at capacity.

Supply chain questions

COVID-19 has further exacerbated what was already a period of flux for the ASEAN supply chain. With the ongoing trade war between the United States and China in 2019, many companies in China that exported to the United States took it upon themselves to relocate to Southeast Asian countries, such as Vietnam and Thailand, to circumvent tariffs. The advent of the coronavirus has impacted not just manufacturing capacity but utilization rates as well, as factory closures and travel ban have resulted in labour shortages throughout the region.

Semiconductors

A recent white paper from Deloitte on the impact of the coronavirus on the semiconductor industry highlighted the single point of failure in semiconductor supply chains brought to light by the emergency. The authors of the paper suggest that, as a consequence, manufacturers should modify their supply chain strategy to address geographical concentration and its consequent lack of resiliency in black swan events like a global pandemic.

Deloitte suggests that semiconductor companies move to an 'agile supply node network,' which favours multiple pathways of supply that help eliminate the risks of a single point of failure. As a regional-based approach to supply, an agile supply node network would enable manufacturing and supply nodes to be quickly scaled up as needed in the event of an emergency.

Bright spots on the horizon

Emerging technologies like 5G, the Internet of Things, high-performance computing, and artificial intelligence will be fundamental to an overall recovery by the technology sector. Timing of the recovery from the impact is uncertain, however, with estimates running from a very optimistic one to three months, to a far more pessimistic nine to twelve (or more) months until a full recovery.

In the meantime, a number of electronics manufacturers (including Sharp, General Motors, Ford, and Tesla) are all doing their part to combat the pandemic by making ventilators and other medical and safety equipment (such as surgical masks) to help treat the virus and keep frontline responders protected. These companies keep their own productivity and sales up during the downturn while putting their manufacturing power to good use.

The biggest question in all this—even more than when supply chains or manufacturing capacity might again be operating at their pre-crisis levels—is the question of what lasting impacts the pandemic will have on consumer sentiment.

With consumers stocking up on medications and essential provisions for extended isolation, and with a plunging stock market, and growing oil price war, the global economy is suffering a kind of economic perfect storm that will surely hurt the purchase of high ticket consumer item sand durable goods—everything from smartphones to TVs and automobiles. This decline will impact the sale of microelectronics throughout 2020 and perhaps beyond.

Short-term impact

The silver lining, however, is that like other disruptions in the past (like 9/11 or the H1N1 epidemic), the short-term impact that isolation is having on our lives now could have positive long-term implications for the electronics industry.

More work, education and events that have shifted online temporarily during this crisis could end up permanently in the virtual space. Manufacturers of everything from smartphones, to PCs, to virtual reality (VR) headsets, and Wi-Fi routers could see positive knock-on effects of these structural changes in society, as a need for communications infrastructure, services, and applications is created.

Allied industries like autonomous delivery solutions, telemedicine, autonomous vehicles, and automated manufacturing could all see increased uptake, offering yet another long-term silver lining for the electronics industry.

So despite short-term pain and uncertainty, the last impacts of the pandemic on individuals, markets, and society offer upside potential for the electronics industry in both the short and long-term. EP&T

Maria Paula Moreno *is the marketing manager at NeuronicWorks Inc., a Toronto-based electronic engineering design house.*
https://neuronicworks.com

CUSTOM CABLES

DATA CABLE MARKS 40TH ANNIVERSARY

Data Cable marked its 40th anniversary in business this month.

The Data Cable Co. Inc, a leading custom cable assembly manufacturer located in Orangeville ON marks its 40th Anniversary this June.

Specializing in building custom high quality designed wire harnesses, Data Cable first opened its doors on June 30, 1980, manufacturing custom cabling that connected mainframe computers and minicomputers. The firm evolved to become speed-to-market experts in the manufacture of high-quality OEM cabling assemblies and custom connectivity solutions for a widely diverse customer base and group of industries including medical, military, industrial automation & satellite ground technology.

"We take great pride in what we do because the products we make impact lives all over the world," says Data Cable president Paul Nelson.

Data Cable assembles and manufactures all custom connectivity solutions, including cable assemblies, wire harnesses, electro-mechanical assemblies, box builds, sub-assemblies and more, from its 35,000 sq. ft. state-of-the-art manufacturing and distribution facility.

"We've come a long way in four decades," adds Nelson. "We couldn't be prouder of our history or our amazing team of people."

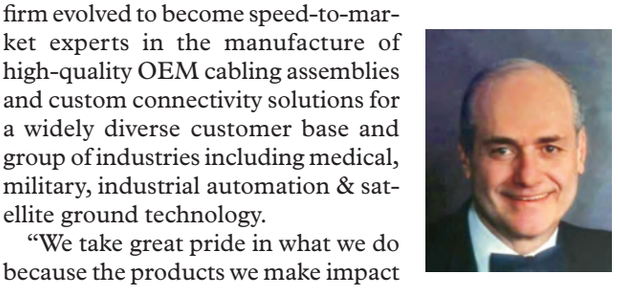
CYBERSECURITY

BLACKBERRY SEEKS TO DELIVER INTELLIGENT SECURITY

BlackBerry Ltd. has launched its Spark Suites security tools that deliver enterprises a range of tailored cybersecurity and endpoint management options to help protect data, minimize risk, and reduce cost and complexity.

The platform is powered by artificial intelligence (AI), machine learning (ML) and automation for improved cyber threat prevention and remediation from BlackBerry Cylance, plus seamless endpoint management, user authentication, and application and data encryption from BlackBerry UEM. The new suites improve user productivity and layered security defenses, while simplifying purchasing decisions for enterprise customers who are undergoing digital transformation and shift to remote work.

"2020 is a pivotal year for organizations trying to maintain business continuity, while undergoing digital transformation and workplace upheaval. With the increased volume and variety of enterprise IoT endpoints and as the scale of cyber threats continues to grow," says John Chen, chairman & CEO BlackBerry.



Long-serving connector industry salesman Shelley Newman.

PEOPLE

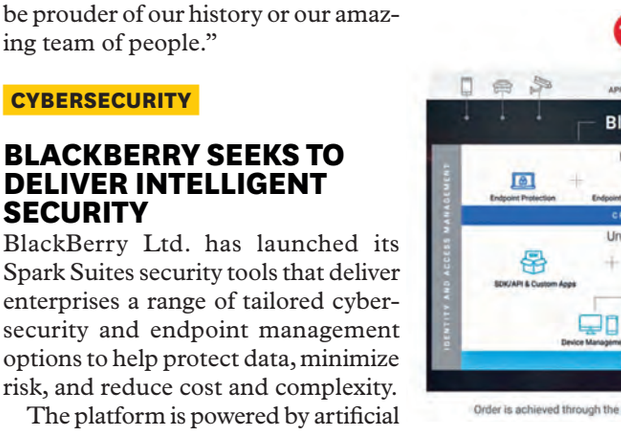
COMPONENT INDUSTRY VETERAN PASSES

The Canadian electronics sector has lost a long-serving veteran. Described as a good friend and mentor to many, Shelley Newman, passed away this spring in his 86th year.

After working for Automatic Connector Corp. in New York during the late 1960's, Shelley moved to Canada a decade later. He started working for Ben Manis, who then was president of Specialty Electronics Inc. Newman remained there for about a decade, building the business and selling what he knew best, connectors.

He retired from the industry about 10-years ago. Roughly five years ago, he developed advanced dementia and had to be placed in a residence where he resided for the last two years.

"The Canadian Electronics Industry has lost a smart, resourceful and gentle man," says Syd Knecht, CEO, Promark Electronics Inc., Montreal. "Throughout his career, he certainly knew where to source connectors. He took great pride in finding new customers and in the success of booking new business. He will be remembered as a pioneer in our industry."



BlackBerry Spark Suites tools deliver cybersecurity.

DESIGN

RASPBERRY PI BREAKS NEW GROUND WITH CAMERA

World renowned for its series of small single-board computers used to promote the teaching of basic computer science, Raspberry Pi has launched a high quality camera to the designer marketplace. Complete with a 12-megapixel ultra-definition-resolution camera and interchangeable lenses, the Raspberry Pi High Quality Camera is the first-of-its-kind to hit the market and is suitable for professional and consumer applications which require the highest levels of visual fidelity and integration with specialist optics.

The camera can effectively capture still images and video footage. It is compatible with all models of Raspberry Pi boards from the Raspberry Pi 1 Model B onwards and can be used as a desktop camera. The camera is suitable for a wide range of professional applications including machine vision, robotics, industrial and agriculture. The camera can be programmed to collect data to support facial and number plate recognition and parking space monitoring.

SAGER ENHANCES THERMAL OFFERING

Sager Electronics announced the addition of Advanced Thermal Solutions (ATS) to its line card. A complete thermal solutions provider, ATS offers a robust portfolio of thermal products and solutions.

"We're excited to partner with Sager Power Systems," remarked Steve Nolan, VP sales and business development for Advanced Thermal. "This gives us the opportunity to work with a distributor with a highly trained, technically experienced sales force focused on thermal management."

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Coming in the August Edition

CONTRACT ELECTRONICS SPECIAL SUPPLEMENT

Electronics manufacturing across Canada is growing and **EP&T** has launched a brand new guide aimed at helping engineers and designers source a *Contract Electronics Manufacturer* (CEM) or *Electronic Manufacturing Services* (EMS) provider in Canada.

Please contact your account manager for more details on this special supplement.

DEADLINE IS JULY 10

Joanna Malivoire
jmailivoire@ept.ca

Jason Bauer
jbauer@ept.ca

Canadian Women in Electronics Engineering

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

Martine Simard-Normandin, PhD, is founder and president of Ottawa-based MuAnalysis, a privately owned professional laboratory and analytical service provider. Created in 2002, Dr. Simard-Normandin is formerly a scientist with Nortel Networks and later with STMicroelectonics. MuAnalysis provides analytical expertise and solutions to the electronics, photonics, life sciences, and manufacturing industries. The firm provides expertise in electron microscopy, optical microscopy, materials and failure analysis techniques and reliability testing to its customers. MuAnalysis was acquired by Grafoid in 2015.

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

What led you into an engineering career?
Technically speaking I'm not an engineer. I am a scientist. My graduate work was in astronomy, very 'pure science R&D' and leading only to an academic career. After 10 years in the university environment, I wanted something different and did an industrial post-doc at a semiconductor company. I loved the manufacturing environment and discovered that it has just as many challenges as academic R&D. I stayed.

How has your role or career path evolved over the years?
I spent 20 years at Nortel/STMicroelectronics in technical roles and eventually engineering management. In 2002, the crash came. We were all laid-off. That's when I became an entrepreneur and started MuAnalysis. Over the years our business has evolved from semiconductors to many aspects of electronics.

What are your most compelling accomplishments?
Switching fields from astronomy to semiconductors. Launching MuAnalysis.

What is your message to female engineers seeking to take on leadership roles?
If that's what you want, go for it. Don't be afraid. Plan your career moves for it. It won't happen by itself. Mentor junior staff, take initiatives, call meetings when a decision needs to be taken or a technical issue needs discussing. You might get a few raps on your knuckles now and then. Learn from the experience and keep going until you find that you are where you want to be.

Can gender imbalance in the engineering industry be solved?
Of course, but it depends on what you mean by imbalance. It's not just about numbers, it's about every employee feeling that they are in the right role for them.

How would you sum up the work/life balance advice you share with female engineers and their employers?
Work/life balance is important for everyone. It's not gender or occupation defined. Engineers are well paid; they have an advantage over other employment, but they work hard, long hours sometimes. Don't be afraid to spend extra on child care, housekeeping, snow removal, etc. In the end it's purchased free time to use as you choose. If you want to attend the late meeting because it's important to your advancement, or travel for business, you should be free to do so without guilt. You will also have more fun time with your family if you are not burdened by chores.

Do you see newer generations of women reacting differently in the workplace? Are they more bold?
I don't think so. In the 60s and 70s most doors were closed to women, and great feminists lead to way to open them. The new generations have expectations that everything is open and they complain when encountering discrimination, but don't necessary fight to get it resolved.

Why is it important to have women leaders in engineering firms?
It's important to have good leaders.

Industry employers and associations have set some goals to achieve when it comes to equalization of genders within engineering circles. How do you think imposed gender initiatives will help women in their field?
When there is zero participation, imposing initiatives are useful to get the ball rolling. After that let it go. Mandating equal percentages or quotas is not useful, because you might get ill-suited candidates and that never helps a cause.

How can women in industry feel more connected to the engineering community?
Participate, attend conferences, present papers, join the IEEE, the SMTA, EDFAS. Volunteer to be on committees.

What impact does the lack of female role models in higher level positions have on aspiring engineers or young women entering the field?
It has no effect. The role models needed are in elementary, high school and university. Girls develop an interest in STEM before puberty. They must be encouraged to stick with it until graduation. If they have good models throughout their education, they will carry on and become role models themselves in their careers. New grads looking for jobs don't choose where to apply based on who is the CEO.

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

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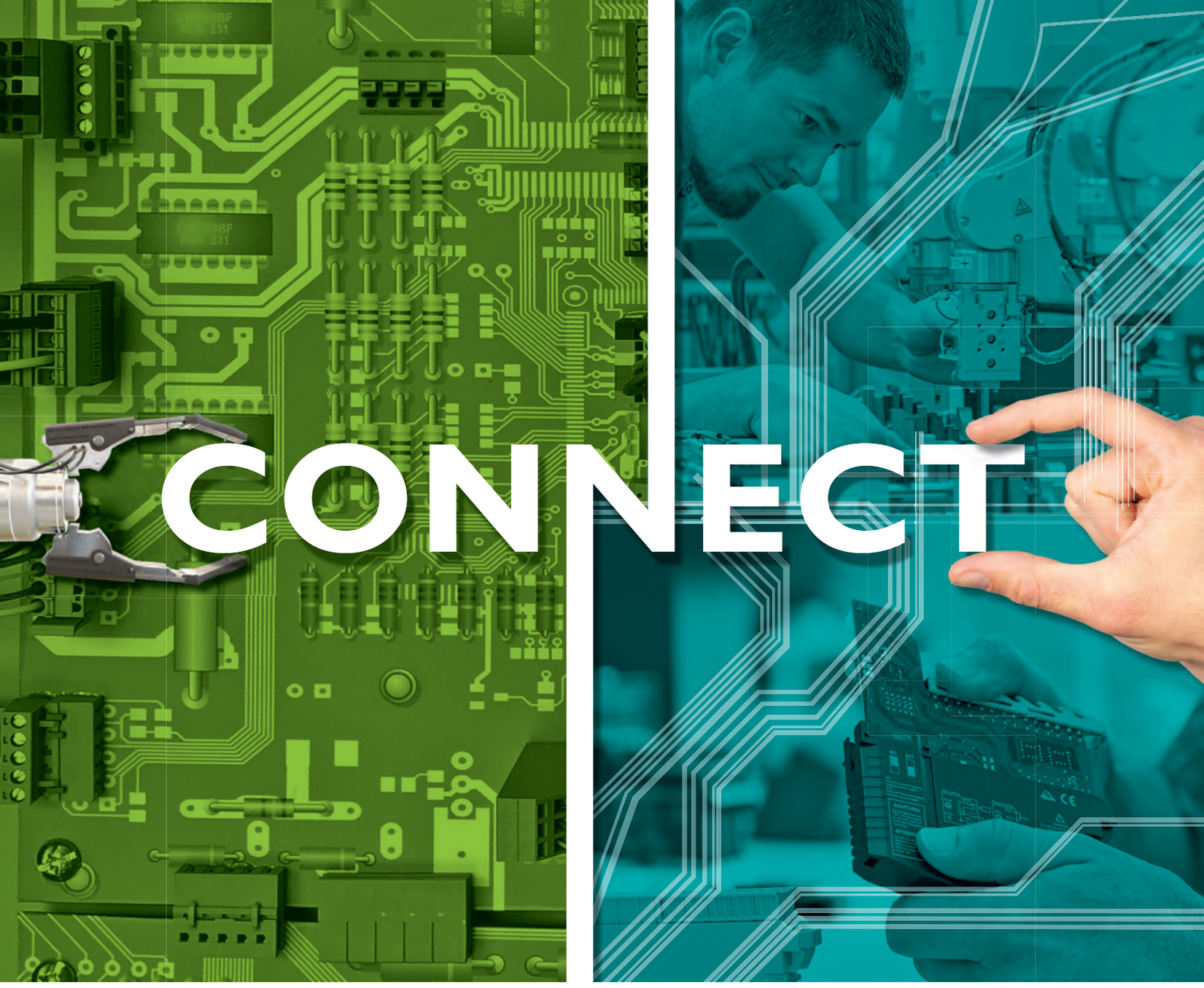

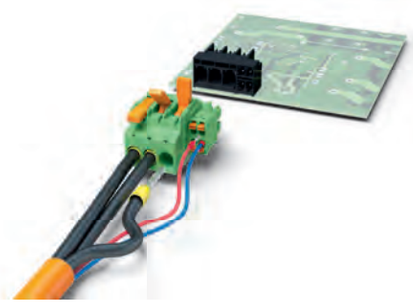

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