EP&T

ELECTRONIC PRODUCTS & TECHNOLOGY

AUGUST 2022

CANADA'S INFORMATION LEADER FOR ELECTRONIC ENGINEERS AND DESIGNERS

EPT.CA

SPECIAL SUPPLEMENT

CONTRACT ELECTRONICS MANUFACTURER GUIDE

Find the best CEM partner for your project on pages 18-23

TEAMWORK

Dorigo Systems endures challenges driven by the pandemic P.12

BRIDGE THE GAP

Optimizing the supply chain has huge potential for OEM profitability p.14

PATENT PARTNERS

M.I.S. leverages its patents to convert CEM customer success p.24

GOING DEEP

NeuronicWorks deepens its customer relationships via production capability p.10

INSPIRATION
STARTS HERE

From millions of in-stock parts to cutting-edge technical resources—we've got everything you need to turn inspiration into innovation.

Get inspired at **digikey.ca** or call 1.800.344.4539.

Digi-Key ELECTRONICS

INSIDE

EP&T

AUGUST 2022

Cover photo: © industrieblick / Adobe Stock

CEM partnership: A journey together

Contract manufacturing. It's the bridge between an idea in someone's head, and an actual product that customers can hold in their hands. That bridge, however, requires ample space for a lot of things. Among the obvious - specialized equipment that transforms raw material into finished product, and a skilled workforce to staff and operate the production machines.

Some may argue even more important on the road to success is trust, transparency and partnership between the CEM and OEM. From inventors and start-ups, all the way up to large corporate entities, electronic design teams most often turn to a CEM in order to convert their dream into reality.

Finding a partner

CEMs are essential partners when bringing your product to market. They're your guide through the manufacturing process, and selecting the right one can guarantee a smooth journey from design to aftermarket support.

It's always important to do your homework when choosing any supplier. But, when it comes to selecting a CEM to take over your procurement, assembly, test and shipping requirements, extra scrutiny is clearly required. Outsourcing your manufacturing means aligning both parties to a common set of objectives for the foreseeable future. A lot rests on the synergy of this relationship, including the ongoing growth and profitability of your company.

Knowing what to ask while communicating with a CEM is crucial for addressing your concerns. Transparent and informative communication about pricing and procedures can help determine if the EMS provider is a right match for you. Human interactions play a key role in a successful collaboration, so getting to know who you will be working with is vital. This also reinforces the importance of building within Canada.

Service levels

CEMs will often take steps to make sure the components and other materials used for your project are of the highest quality. If your preferred component brand is unavailable to complete the build of materials (BOM), your CEM partner will likely access its vetted group of suppliers to illicit a viable replacement part. Among the many services offered by most full-service CEMs includes engineering design, pcb fabrication, subassembly manufacturing, turnkey or box builds, functional testing, distribution and order fulfillment on behalf of their design customer.

Most domestic manufacturers are willing to go the extra mile to ensure that quality is consistent across the board. Rigorous testing is typically performed at each stage of production, with checks and rechecks made throughout the assembly line. Working with a CEM, along with a dedicated group of suppliers means quicker communication to problems with parts - often solved on the spot.

CEMs also tend to have established and rigorous quality control processes in place. Certification to a quality standard like ISO 9001 is a common feature, or ISO 13485 in creating medical devices. Some even have additional specialty certifications for servicing companies with products in the aerospace & defense, medical, automotive, industries.

Mythbusting offshoring

There is a common misconception that you could save a lot of money by relying on foreign based CEMs. That is not necessarily true, as often cheap labour in Asia is now being offset by rising fuel and shipping fees. The advantages of partnering with a domestic player carries many positive intangibles - such as supporting the Canadian economy, and keeping domestic engineers and technicians employed.

Going offshore can also impose some challenges and concerns as it relates to protecting your intellectual property (IP). On the flip side, Canada does carry strict IP rights protections – thus decreasing the chances of illegitimately losing your design.

Once you've put in the legwork and dedicated your resources to designing and developing your next great electronics product, you will find a new partnership can be ground-breaking. So choose the option that is best for you and enjoy the benefits of your choice for years to come. **EP&T**

STEPHEN LAW
Editor
slaw@ept.ca

There is a common misconception that you could save a lot of money by relying on foreign based CEMs. That is not necessarily true, as cheap labour in Asia is being offset by rising fuel and shipping fees.

Connect with EP&T magazine

@EPTmagazine facebook.com/EPTmag/ /ept-magazine info@ept.ca ept.ca

EP&T
ELECTRONIC PRODUCTS & TECHNOLOGY

Canada's information leader for electronic engineers and designers

AUGUST 2022
Volume 44, Number 05

READER SERVICE
Print and digital subscription inquiries or changes, please contact
Angelita Potal
Tel: (416) 510-5113 Fax: (416) 510-6875
Email: apotal@annexbusinessmedia.com
Mail: 111 Gordon Baker Rd., Suite 400
Toronto, ON M2H 3R1

EDITOR Stephen Law
slaw@ept.ca · (416) 510-5208

WEST COAST CORRESPONDENT
Sohail Kamal · sohail@nextgear.ca

SENIOR PUBLISHER Scott Atkinson
satkinson@ept.ca · (416) 510-5207

ACCOUNT MANAGER Joanna Malivoire
jmalivoire@ept.ca · direct 866-868-7089

ACCOUNT COORDINATOR Shannon Drumm
sdrumm@annexbusinessmedia.com

MEDIA DESIGNER Lisa Zambri
lzambri@annexbusinessmedia.com

AUDIENCE DEVELOPMENT MANAGER
Anita Madden
amadden@annexbusinessmedia.com
(416) 510-5183

GROUP PUBLISHER Paul Grossinger
pgrossinger@annexbusinessmedia.com

COO Scott Jamieson
sjamieson@annesbusinessmedia.com

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
annexbusinessmedia.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

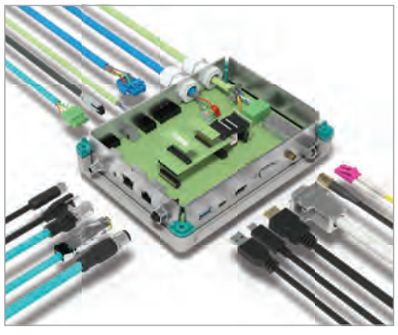
ISSN 0708-4366 (print)
ISSN 1923-3701 (digital)

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

PRINTED IN CANADA

Funded by the Government of Canada | Canada

Reliable connections for smart devices



Traditional industrial Ethernet, fiber-optic networks, 5G, and other modern communication methods share one common requirement: Consistent quality in data transmission depends on the reliability of all cables and connector components.

Modular standardized connectors enable the flexible and efficient design of automation solutions with real-time communication. As a leading supplier for device manufacturers, Phoenix Contact provides the right data connection for your applications, both on the device and in the field.

To see our full range of data connectivity products, visit **www.phoenixcontact.com/leading-data-connectivity**.

PHOENIX CONTACT
INSPIRING INNOVATIONS

NEWSWATCH

COLLABORATION

IBM CLIENT INNOVATION CENTRE TO OPEN IN CALGARY

IBM Canada announced an IBM Client Innovation Centre (CIC) for Western Canada, with plans to create 250 new jobs in Calgary and helping to invigorate the city's technology sector, diversify the economy, and fast track cross-industry digital transformation and application modernization. The CIC will have a focus on sustainability, delivering consulting services and technologies like 5G, artificial intelligence, hybrid cloud and blockchain, helping to elevate Alberta's position as a centre for energy transformation.

IBM is working with Invest Alberta, Calgary Economic Development and Opportunity Calgary Investment Fund (OCIF) to establish the CIC. The creation of the CIC aligns with shared objectives of the Province and City of Calgary to create jobs, improve workforce skills training, and further grow the tech sector, which has already been accelerating at a rapid pace.

IBM Canada's new Calgary-based Client Innovation Centre for Western Canada aims to invigorate the city's tech sector and diversify the economy.

BLACKBERRY, BITECH BUILD INSTRUMENT CLUSTER

BlackBerry Ltd. and BiTECH Automotive Co., Ltd. have jointly developed an advanced digital LCD cluster incorporating the QNX Neutrino Realtime Operating System (RTOS) deployed in Changan Automobile's new coupe, while integrating Changan's range of intelligent technologies, including its Interactive Monitoring System, Intelligent Voice Interaction System, and Game-loaded Cockpit, among others.

The newly launched UNI-V mirrors the technology and intelligent configuration of the UNI-K, with its LCD digital instrument cluster comprising three distinct parts. Highlighting essential information such as the vehicle's speed, engine revs and fuel level, the cluster also incorporates Augmented Reality (AR) real-world navigation, as well as a multimedia interface and additional entertainment information.

By leveraging the QNX Neutrino RTOS, the advanced LCD digital instrument cluster incorporates BlackBerry security technologies that safeguard users against system malfunctions, malware and cybersecurity breaches. The QNX Neutrino RTOS provides technology to power products, while also supporting 64-bit ARMv8 computing platforms and Intel x86-64 architecture.

NZ TECH, DUPAR CONTROLS IMPLEMENT HOVERTAP

NZ Technologies, Vancouver, has entered into a manufacturing collaboration agreement with Dupar Controls, manufacturers of elevator control systems and push-button technology.

NZ Technologies will provide the core hardware and Dupar Controls will market the products to its customer base. The HoverTap technology aims to change how people interact within an elevator environment, giving them the ability to be hands-free and reduce nonessential touchpoints, providing the safety and smart technology shift the industry demands. The inspiration behind HoverTap was based on the patented TIPSO AirPad, one of NZ Technologies' flagship products developed to enable surgeons to touchlessly interact with equipment in the operation room during surgery.

HoverTap technology delivers hands-free operation.

GROUPS SEEK TO COMMERCIALIZE MICRO-NANO-EMERGENT TECH

MANCEF, an independent international organization dedicated to accelerating the commercialization of micro-nano-emergent technology products and services, and Canadian technology leaders Teledyne MEMS, NanoCanada, and CMC Microsystems have partnered to deliver COMSWORLD and NanoCanada's International Conference, co-located in Edmonton, AB in 2023.

A well-established international conference focused on commercialization, COMSWORLD helps companies find new markets and customers for their products. Microsystems and nanotechnologies have moved quickly from R&D stages to being essential for a range of products and services including the computer chips and sensors found in autonomous vehicles, biomedical devices, and the millions of connected Internet of Things (IoT) devices throughout the world.

AEROSPACE

AEROSPACE SUPPLIER GETS FEDS SUPPORT

Firan Technology Group Corp. (FTG) has received over $7-million from FedDev Ontario, through the Aerospace Regional Recovery Initiative (ARRI).

A leading Canadian supplier of electronic products and subsystems to the global aerospace and defence markets, FTG, Scarborough ON, is expected

Photo: IBM Canada; BiTECH; NZ Technologies;

Aerospace player FTG will use gov't funding to enhance productivity

to leverage the funds to enhance its productivity and expand offerings. The firm will also invest in automation equipment to improve efficiency and reduce its environmental footprint; green operations by reducing waste, conserving energy and reducing water consumption; improve cybersecurity systems; produce and test new products; and create and maintain nearly 300 jobs.

The project will help to increase domestic and international sales and enable the company to pursue new initiatives.

CMC ELECTRONICS AWARDED KAI CONTRACT

Korea Aerospace Industries (KAI) has awarded a new contract to CMC Electronics for the modernization of the Republic of Korea Air Force (ROKAF) fleet of KA-1 trainer aircraft used for advanced mission training and light attack missions.

KAI was looking for a cockpit upgrade to renew their products and provide ROKAF's KA-1 fleet with more modern avionics with room for growth. CMC worked closely with KAI to meet their request and proposed its mission computer-based cockpit built on the PU-3000, a multicore mission computer. The PU-3000 and its partitioned, embedded, software applications offer an alternative solution to integrate several conventional multifunctional displays (MFDs) or a single large area display (LAD) configuration as used in the KA-1 solution. The PU-3000 software development kit also allows KAI to develop specific proprietary mission applications on their own.

AI

D-BOX TECH, MILA PARTNER ON AI HAPTICS

Montreal-based tech firms D-BOX Technologies Inc., providers in haptic and immersive experiences, and Mila, a deep learning research institute, have entered into a strategic partnership in order to use artificial intelligence (AI) for haptics and to increase business productivity. More specifically, the aim of the agreement is to begin using automated encoding tools relying on machine learning to detect instances where motion, texture, and vibration could be integrated into audio and video content to create more immersive experiences using haptics.

D-BOX & Mila intend to merge haptics and AI to increase business productivity.

At present, haptic technology requires that audio and visual content be systematically encoded to create an immersive experience in a seat or armchair.

BRAINBOX AI EXPANDS AI FOOTPRINT WITH KMC CONTROLS

BrainBox AI, a Montreal-based firm involved in autonomous building technology, has partnered with KMC Controls, an independent manufacturer of open and scalable building automation and technology solutions. Both new and existing KMC system integrators now have access to BrainBox AI's predictive and self-adaptive cloud-based artificial intelligence (AI).

KMC Controls designs and manufactures heating, ventilation and air conditioning (HVAC) control system products and building automation systems. Over the last seven years, KMC has developed the KMC Commander, an Intel Market Ready Solution and Smart Building Platform for commercial buildings of any size.

Now, as part of the KMC Commander ecosystem, BrainBox AI can begin ingesting a building's data more easily, learning its performance and behaviours, and proactively applying its AI-based changes to the system.

SOFTWARE

SPARK MICROSYSTEMS RELEASES SOFTWARE DEV KIT

SPARK Microsystems, a Montreal-based fabless semiconductor company specializing in next-gen ultra-wideband (UWB), has released a Software Development Kit 1.0 (SDK) for its SR1000 Series UWB transceivers. SPARK's SDK can be used to simplify and accelerate development of high data rate, low power, and low latency UWB communication links for various applications.

The kit includes a comprehensive set of APIs (Application Programming Interfaces) to facilitate development of various software applications without requiring direct access and control of the UWB transceiver. Combined with various example application code included in the SDK, this enables more efficient development of new products.

"Release of the SPARK SDK 1.0 represents another milestone in our effort to proliferate our products using the unique SPARK UWB technology and support fast time to market for a wide range of customer applications." said Frederic Nabki, co-founder and CTO, SPARK Microsystems.

CEM

DSM CELEBRATES 22ND ANNIVERSARY

Calgary-based electronics manufacturing services provider Dynamic Source Manufacturing (DSM) Inc. marked its 22nd anniversary recently by hosting a staff BBQ on site at its facility.

Celebrating in-person for the first time since the COVID19 lockdown, all staff enjoyed a catered lunch and line dancing.

"I am proud of where we are today," says Duane Macauley, president & CEO at Dynamic Source Manufacturing. "We could not be where we are without our staff, and we are honoured to celebrate them. We are exceedingly grateful to continue making high-quality products for incredible customers that share the same focus on people and digital transformation philosophy."

DSM started out in 2000 as a small business to fill a gap in the electronics manufacturing industry. Over the decades, the company grew rapidly, expanding to Arizona and moving to a brand-new manufacturing facility in Calgary last year. The CEM continues to serve diverse markets like automotive, communications, energy and security & defense, to name some. **EP&T**

Photo: Firan Technology; D-BOX Technologies; DSM

Nano One seeks to clean-up Li-ion footprint

BC firm has patented, scalable process for producing cathode powders

BY SOHAIL KAMAL, WEST COAST CORRESPONDENT

While growing global demands for electrified vehicles amplifies the demands for battery technologies, a BC-based firm has emerged with a vision to improve the lithium battery industry's environmental footprint.

Nano One is a technology company with a patented and scalable industrial process for the production of low-cost, high-performance cathode powders used in lithium-ion batteries. These unique materials are being designed to add value to electric vehicles and grid storage batteries in the global push for a zero-emissions future. Nano One's goal is to produce with and license its technology to be the leading platform for the global production of a new generation of battery materials.

Based out of Burnaby, BC, the firm has tripled from a 20-person operation in 2020 to 60 people today. The firm recently acquired the Johnson Matthey Battery Materials Canada (JM) plant in Quebec, which will bring staffing to 100 by year-end.

West Tech Report took the opportunity to speak with Dan Blondal, chief executive officer of Nano One. We asked why his company wants to change how the industry refines battery metals, and how their end goal is to work with customers through licensing. In addition, we want to find out why the acquisition of a plant in Quebec is so important.

90% Global grid market

It is easy to take rechargeable batteries for granted. Lithium-ion batteries are the most popular battery storage option today, controlling more than 90% of the global grid market. And they store energy efficiently for a long period of time.

But, for years, perhaps due to demand, we have turned a blind eye to how we refine the input metals and make them into cathode materials for these batteries. In South America, huge lithium reserves are using up water supplies, causing devastating water-related conflicts among locals. Enter Nano One.

"It is imperative to find a greener solution if we are to make and recycle tens of millions of tons of battery metals and cathode materials to feed the world of batteries," says Blondal. In response, the firm has built a platform that will eliminate large volumes of sodium sulfate which is a wasteful by-product of the current process.

Dan Blondal, CEO of Nano One shares why his firm wants to change how the industry refines battery metals.

"At the core of our technology is our One Pot Process which is a platform for the production of Lithium Iron Phosphate (LFP), Nickel, Manganese and Cobalt (NMC), and Lithium Nickel Manganese Oxide (LMNO) cathodes that can be made directly from sulfate-free forms of metals," explains Blondal. "We eliminate large volumes of sodium sulfate, which is a wasteful by-product that is a fundamental impediment to Terawatt-hour scale-up of batteries, and we reduce water usage, emissions, manufacturing steps, equipment, and operating costs." Nano One's list of partners continues to grow.

"We are collaborating up and down the supply chain. Firstly, at the bookends of the supply chain with the world's largest miners (Rio Tinto) and OEM's (Volkswagen) to drive change in the supply chain, and midstream with the world's largest chemical and materials companies (BASF, Johnson Matthey)," adds Blondal, noting that the battery industry landscape has changed for the better in past years.

"The volume and commitment to battery production reached a point 2-3 years ago, where energy density is no longer the only driver. Environmental footprint, critical minerals, security of supply, localization, recycling solutions, and diversification are all critical to the adoption of batteries outside of Asia," he explains. "There is a once-in-a-generation opportunity to change how we make these materials, define a resilient and secure supply chain and by doing so, set ourselves apart from the methods used in Asia."

Ground-breaking efforts

In broad strokes, this is why Nano One's efforts are ground-breaking. Most of the cathode powders used in today's Lithium-Ion batteries come from Asia, and Nano One will try to change this. This is in part why they acquired JM's LFP production facility in Quebec. It will be a testing ground to show and prove to their customers that it can be done, here and elsewhere, in an effective and environmentally-conscious way.

"Quebec has been investing in battery materials and know-how longer than almost any jurisdiction in the world, and they will be a critical center of gravity for the battery supply chain," explains Blondal. "People are the most important aspect of this, adding centuries of know-how in cathode development, scale-up and production, and with Rio Tinto now as a collaborative partner on raw materials and commercialization, we have added horsepower to move faster and towards volumes that dwarf where the industry is today."

In order to change the supply chain, Nano One needs the entire industry to get on-board with a newer, more sustainable way of refining battery metals and making them into cathode materials. As such, the strategy is to produce and license their technology with others as a way to expand the impact of their efforts.

www.nanoone.ca. **EP&T**

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

Photo: Nano One

Website promotes pcb repair – not E-waste

RepairDontWaste.com fosters virtues, techniques of repairing electronics

A new website created by UK-based embedded test equipment manufacturer ABI Electronics has been introduced with the mission to promote the virtues and techniques of repairing electronics products rather than discard and replace.

The website, RepairDontWaste.com, highlights a movement started in 2015 for implementing the benefits of creating a repair-first approach in every business. The website already includes helpful posts, articles, and videos, and it is intended that the website will evolve to bring even more tips, advice, and case studies from across the world, in industries such as manufacturing, defense, aerospace, rail transport, energy, and others.

Photo: ABI Electronics

Repair critical assets

The 'Training Resources' section of the website provides access to resources about the technology, training, and standards required for the effective implementation of a 'Repair, Don'tWaste' strategy in businesses and organizations.

RepairDontWaste.com intends to explore the technology, training, and standards available to ensure that critical assets are effectively repaired rather than replaced, thus reducing costs, waste, carbon emissions and downtime, inspiring the next generation of cost-saving repair heroes.

The modern world runs on electronic systems that are designed to last many years. An enormous amount of natural resources are used to produce semiconductor chips and other electronics components, destined to be mounted on printed circuit boards that are critical to modern technology. These expensive circuit board assemblies are used in industrial applications to help control vehicles, production machinery, airplanes, wind turbines, etc. Typically costing from a few dollars to tens of thousands of dollars, they are ultimately used to manage power, safety systems, complex industrial equipment, monitoring devices, and many other applications.

Replacing faulty industrial technologies for new ones is wasteful, unnecessary, and aggravates the burgeoning E-waste issue. According to the United Nations University, more than 50-million tons (Mt) of E-waste are produced globally every year, needlessly feeding world landfills. The common replace-not-repair mentality urgently needs to be superseded across the business spectrum, a vital step in eliminating waste, lowering emissions, and saving precious resources.

UN report

A recent UN report also predicts that global e-waste (discarded products with a battery or electrical plug) will reach 74 Mt by 2030 — almost a doubling of e-waste tonnage in just 16 years. This makes e-waste the world's fastest-growing domestic waste stream, fueled mainly by higher consumption rates of electric and electronic equipment, short life-cycles, and few options for repair.

Only 17.4 per cent of 2019's e-waste was collected and recycled. This means that gold, silver, copper, platinum, and other high-value, recoverable materials conservatively valued at US $57 billion — a sum greater than the Gross Domestic Product of most countries — were mostly dumped or burned rather than being collected for treatment and reuse.

According to the report, Asia generated the greatest volume of e-waste in 2019 —followed by the Americas, Europe, Africa, and and Oceania. E-waste in 2019 mainly comprised small and large equipment, temperature exchange equipment – along with screens and monitors, lamps and small IT and telecommunication equipment.

Conclusion

ABI Electronics 'Repair, Don't Waste' movement seeks to draw the attention of business leaders, academia, and an even wider audience to the benefits and techniques of developing the capabilities to efficiently 'repair-not-replace' industrial electronic systems.

This website was designed to give access to relevant technology and training for repair techniques, sharing the knowledge and best practices implemented by leading organizations that are reducing waste, costs, with the bonus of creating quality technical jobs across the world. **EP&T**

ABI Electronics Ltd. *is a leading embedded test equipment manufacturer. https://www.abielectronics.co.uk*

Deepening customer relationships via production capability

NeuronicWorks extends its engagement beyond design: Adds box-build assembly & pcba services

BY STEPHEN LAW, EDITOR EP&T

Working closely with customers through the engineering stages of an electronic design is an obvious part of the process for Titu Botos CEO of NeuronicWorks. That is until now, after operating strictly as a design house in Toronto, the firm has boldly taken the next, most logical step towards deepening its relationship with the customer. Earlier this year, the firm added a fully integrated, turnkey, custom box-build assembly and pcba services capable of delivering timely prototyping and full production runs. NeuronicWorks is now capable of seeing projects through from initial design stage to prototyping, testing and certification, supply chain and inventory management, manufacturing, shipment & logistics and end-user delivery. Since its beginning, NeuronicWorks has focused solely on design, a process which Botos says can last months to a year depending on any given project.

"We examined our relationships with many clients. And, close partnering is necessary through the design process. But, ultimately what happens next is that customer would take their Gerber files and head off to someone else to have it made, most often a contract manufacturer," explains Botos. "So we looked at what was necessary to continue to remain with our customers – right through the duration of their journey. We have received very good response from our existing customer base, as they appreciate that we can serve them longer."

NeuronicWorks CEO Titu Botos says his firm's next target is to try and keep most, if not all future customer designs in-house - right to the shipping of final product.

Keep customers engaged

Having moved into a larger facility last year, the production area is spread over 22,000-sq-ft, housing box assembly and SMT assembly services. The newly expanded facility with state-of-the-art equipment can accommodate significantly higher production runs, while providing the ability to handle larger, more complex projects seamlessly out of one location. The production numbers and capabilities vary between big and small projects.

"Obviously, we cannot get involved in production requirements within the 10,000 to 50,000-range, however, it was natural for us to attach to the design something that represents a logical next step in the process for our partners, our customers," says Botos. "Moving forward, our team will only get more experience and ultimately get better at these (production) processes. Our goal is to keep our customers engaged with us longer."

With turnkey integrated services, NeuronicWorks now offers the ability to handle end to end design, prototyping, certification, pilot, high-mix, low volume manufacturing, and inventory and supply chain management out of one location. Having both design engineering and manufacturing services vertically integrated will shorten the NPD cycle, highly increasing NPI efficiency.

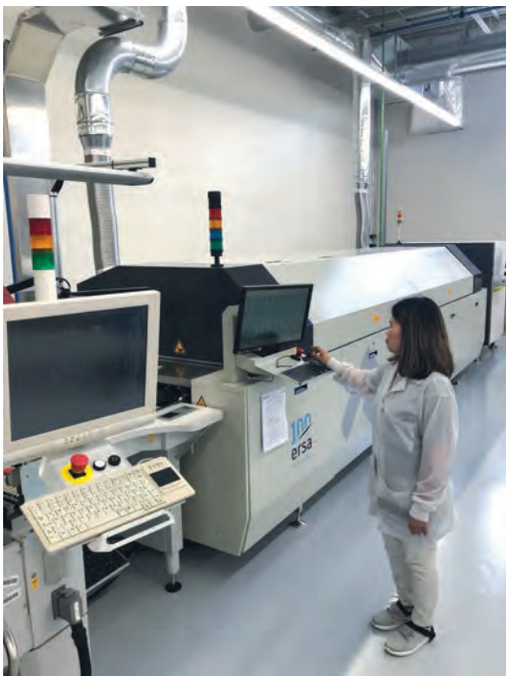
"This addition represents the biggest leap of faith financial investment in this next step represents a huge leap of faith," Botos says.

Turnaround time on projects is highly dependent on the complexity of any given project, he says, adding that small, less complicated designs can be done in three months – while larger, more complex projects could require up to nine to 12-months to complete.

Printed circuit board (pcb) manufacturing will remain outsourced, however the pcb assembly is now done on premise, using the firm's recently acquired equipment, such as pick-and-place, paste application, AOI & X-ray inspection, curing oven, dry cabinets, and an inventory system.

"Being guided by a constant demand for low volume manufacturing support, we believe the next natural

Photo:Stephen Law, EP&T



NeuronicWorks director of biz development Alexander Hasmany (above left) poses with CEO Titu Botos in the company's new box build area.

Photo:Stephen Law, EP&T

step for our growth as a company is to enter into high mix, low volume manufacturing services that will complement our design services allowing us to serve a full spectrum of services," Botos says.

"With design engineering, prototyping and manufacturing services seamlessly provided under one roof, our customers gain benefits that include seamless design transfer, increased productivity, high quality, reduced time and competitive pricing. Our pcba and SMT production services will produce state of the art designs incorporating best-in-class manufacturability and testability standards enabling faster development cycles."

Box-build assembly

For some customers that fit into the high mix and low volume category, we can easily manage production runs of say 175 – and for some customers that is all they require to be happy, because of the nature of their design.

Depending on the complexity of any design ultimately determines whether or not NeuronicWorks can accommodate – prior to enlisting outside support from a CEM, according to Botos. For example, if the electronic device is the size of a cellphone, NeuronicWorks is equipped to product 5,000-units per month, including box assembly, while still entertaining three or four separate clients at the same time.

The next step in the firm's evolution will include adoption of a new enterprise resource planning (ERP) system. The software platform will be used to manage day-to-day business activities such as accounting, procurement, project management, risk management and compliance and supply chain operations. In the end, it will enhance or streamline the customer's experience, according to Botos.

"This ERP system will help us grow, as it will represent full integration of design and manufacturing, making everything much easier to follow – from managing job orders, staffing, design changes,

> ***"Our goal is to keep the cusomter engaged with us longer - right through the duration of their design/build journey"***
> ***- Titu Botos***

In May of this year, NeuronicWorks achieved ISO for its process in both design to production, which opens the door to accepting more complex designs, according to Alexander Hasmany, B.Sc, director of business development at NeuronicWorks. One of the mainstay or key design areas for NeuronicWorks has always been industrial automation / instrumentation, and industrial controls. Other of importance have included designs in the automotive, medical, wearables, consumer electronics, green energy, and home automation.

"The design process becomes more seamless to our customer, as our facility now serves as a one-stop shop and we take full responsibility for the complete design, from design to prototype to testing, certifications and manufacturing," says Hasmany.

"The seamlessness of having everything under one roof makes us more nimble and reactive to any issues that may arise through any design/manufacturing process," he adds.

Among its added services is product testing, which in many cases involves customizing the test process for individual projects and customers, says Hasmany.

Plans to expand team

"If a customer wants us to test all 100 or 1,000 of their end designs before shipping, we have a capabilities to do so – to verify with a certification sticker on the end product," he says.

Botos recently extended the lease on the firm's Toronto facility. NeuronicWorks also operates another design-only office situated inside Catalyst137, a IoT themed design hub in Kitchener ON. It operates in a 5,000-square-feet office. At present, Botos describes his design team as "small", but has plans to actively expand.

"As our business continues to grow, we understand that with every new client – there is a learning curve for all involved," he concludes. **EP&T**

Growth amidst supply chain and staffing challenges

Burnaby B.C.-based CEM Dorigo Systems endures challenges driven by the ongoing pandemic

There has been a lot of talk about how to put in place protocols and procedures to make the electronics manufacturing process resilient to supply chain disruptions. We are all aware of the strain and challenge that global supply chain issues are creating for the electronics manufacturing industry.

Is there a way to work within the given constraints to survive and thrive? This is a question that all contract manufacturers are seeking to answer.

Dorigo Systems Ltd., of Burnaby, BC, has faced supply chain management issues since the start of the pandemic. The company had just opened a new world-class facility in 2020 when everything in the electronics manufacturing world changed.

Balancing Dorigo's need to continue to operate efficiently, while delivering on customer timelines was almost impossible. Learning how to pivot and respond to this rapidly changing work environment required quick thinking by management and taking a customer-first approach to find solutions.

Labour supply challenges are seen across all industries in North America.

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

Today, Dorigo is experiencing a 38% growth year-over-year in booking backlog which is well ahead of the North American EMS industry standard. The company has increased capacity by adding an evening work shift, which has expanded its production workforce by over 40% despite the ongoing labour supply challenges seen across all industries in North America. When faced with the reality of supply chain constraints, the organization worked together to view things differently.

Rethinking supply chain

Dorigo Systems is an electronics manufacturer who understands how upfront collaboration is key to bringing innovative products to market. Since 1988, the company has used Design for Manufacturability (DFM) advice to ensure their customers' product design is optimized to be manufactured efficiently right from the start.

"Customers place trust in us. From compliance to reliability and testing, our engineering team's DFM process is a vital part of Dorigo's effort to provide a Seamless Customer Experience," says Mark Pillon, P.Eng., president and founder at Dorigo Systems. "Today's disruptive supply chain is making us rethink how we provide transparency to our customers while sustainably manufacturing their products."

Just a couple of years ago, supply chain management meant finding the best price for components and running lean. That's not the case today, as any component may turn out to be a "golden screw" whose absence can stall a production build and delay the manufacturing process. Lead time estimates from suppliers are unreliable. Costs are rapidly increasing as demand backlog accumulates.

"Our team has a willingness to go above and beyond to source parts in order to be a partner in the manufacturing process for our customers," says Danial Arooj, P.Eng. and manufacturing manager at Dorigo. "We've had to go outside of our traditional part supplier networks to source parts. Our focus is to always put quality first. Our reputation as a high quality, high mix, low volume manufacturer enables us to build First Article boards in small quantities prior to starting main production runs. We are happy to do this so our customers can validate these parts for quality assurance."

There is also no doubt that having a supplier or manufacturer nearby is beneficial during these uncertain times. For many of Dorigo's

Photo: Dorigo Systems

customers, being able to go onsite to view boards being manufactured vastly reduces the time between iterations.

"Near-shoring" means customers don't need to wait weeks to receive prototypes from overseas to see if they meet the required specifications. Customers are encouraged to be onsite at Dorigo to enable instant feedback on First Article builds. Working with local suppliers promotes a more dynamic and collaborative manufacturing experience for customers.

Design for excellence

For Dorigo, minimizing supply chain disruption and achieving a competitive advantage relies on having a multi-faceted procurement approach from scouring regional markets, securing strategic parts, or accessing excess inventory – to name a few. Their long-term presence and connections within the industry makes a difference in building resilience in the manufacturing process.

Design for Procurement is now a part of Dorigo's manufacturing engineering process through a product's lifecycle. "Inventory is a critical asset in manufacturing any product; without having every item available in stock creates a liability," states Aimee Jo Milendres, procurement and customer experience manager, Dorigo Systems. "We view planning and procurement as being fundamental for us to successfully deliver our electronics manufacturing services."

Dorigo's team strives to find the "golden screw" as early as possible and work with customers to look at alternatives. Having options for components can make a product more sustainable over its life cycle. The "golden screw" term typically refers to the normally inexpensive part whose critical absence means that it may as well be made of gold.

"Dorigo's customer experience teams connect customers with suppliers to build a stronger supply chain. It is changing the dynamics between Dorigo and its customers by promoting higher levels of collaboration," says Milendres.

"We believe this approach is designing for excellence," Milendres continues. "We must look deeper into each issue in the supply chain that may prevent a customer's product from successfully getting to market. Products with longer supply chains require investigation and assessment of all supply chain factors that affect accessibility, quality, and repeatability."

Growth during challenging times

Supply chain issues across the electronics industry continue to pose challenges for Dorigo and many of its customers. Despite these ongoing challenges, the company is continuing to grow and expand due to its commitment to providing a seamless customer experience and delivering high levels of collaboration and transparency in the manufacturing process.

'Near-shoring' encourages closer collaboration with customers.

"Putting our team's safety and needs first has always been the most important step we have taken in growing our business and navigating the pandemic," states Pillon. "Looking towards the future, keeping communication clear and transparent with our customers ensures whatever new disruption occurs in our ecosystem, Dorigo Systems has the agility and resilience to respond."

Working with some of the most respected OEM's in the industry, Dorigo Systems continues to see strong demand from customers coming out of the pandemic. "Our book-to-bill ratio is 1.28 which is an indicator that demand is outpacing supply," confirms Pillon.

Today, Dorigo is in the process of acquiring new capital equipment to extend its production and inspection capabilities. With the acquisition of this new equipment, Dorigo is continuing to hire new staff and invest in valuable training for all staff members so that they can be effective in their positions. Building redundancy across all resources is a key step to creating the required resilience.

"We are in a business that has a fine balance between people, process and technology," states Mark Pillon. "I believe in always taking a people first approach. It's reflective in all that we do as an organization to grow and thrive." **EP&T**

Inventory is a critical asset in manufacturing any product; without having every item available in stock creates a liability.

Photo: Dorigo Systems

This article was written and submitted by Dorigo Systems Ltd., a Burnaby BC-based full, turn-key contract electronics manufacturer. https://dorigo.com

Bridging the gap for a resilient supply chain

BY DR. HENRIKE WONNEBERGER, REPLIQUE

Optimizing the supply chain contains huge potential for OEMs to increase profitability. Reducing inventory costs with punctual delivery has been, for many years, the focus of supply chain management. Over the years, supply chains have been optimized to perfection, using algorithms and digital tools, but it is a balance on a knife's edge. COVID 19 and the subsequent closing of borders have revealed the limits of planning and the fragility of supply chains to suppliers, OEMs and end customers.

Mitigating supply chain risks

When a part is needed urgently, every hour can cost manufacturers hundreds and thousands of dollars with the cost of the spare part itself often negligible compared to the economic and reputational damage caused by its absence. Increasing the buffer in warehouses could minimize the risk of supply gaps, but counteracts previous efforts to reduce inventory and increases tied up capital, warehousing costs and obsolescence.

Another option is to source from several suppliers in multiple locations; should one supplier fail, others can cover the demand. However, interconnected global supply chains are often dependent upon a few suppliers of basic materials. Subsequently, for specific parts or components, all worldwide suppliers might be affected by the material shortage. A better solution is not only supplier diversification, but also in material alternatives.

A third way to improve the resilience of the supply chain is to return to localized manufacturing – as witnessed at the beginning of the COVID-19 pandemic. This saw many manufacturers 3D print critical parts needed to fight COVID-19 – such as face shields or valves for respiratory devices. This manufacturing philosophy, named bridge manufacturing, can be used as a blueprint to generally improve supply chain resilience.

The most viable option for bridging is additive manufacturing or more recently 3D printing. Pictured above, Replique staff package up parts for delivery.

Essentially, bridge manufacturing means having a technically viable alternative to bridge a gap. This gap can be economic if other technologies are too expensive, or an availability gap, if parts produced in another manufacturing technology are unavailable.

Bridge manufacturing requires a manufacturing alternative for the part that allows on-demand, decentralized production. This ensures the part can easily be made available anywhere globally in the event of a sudden unexpected shortage. Consequently, should supply chains be disrupted, the OEM or supplier has alternative options, potentially saving money and reputation. As a concept, bridge manufacturing comprises three different types: provisional solution, equivalent manufacturing solution, and ramp-up/phase-out bridging.

Provisional solutions

Well known in dentistry, this is where a transitional prosthesis – using a different material and a different technology – is provided as a makeshift solution while the actual prosthesis is manufactured. Requirements for a makeshift solution are often lesser than for the original, making bridge manufacturing a second-best alternative from a technological standpoint.

Whether a part is used as a stop-gap until the 'original' spare part is delivered, or until it breaks down and is replaced by the 'original' spare part, bridge manufacturing of the part takes place in parallel to ordering a standard 'original' spare part. Like this, the machine downtime is reduced in the same way, saving the OEM money and reputation.

Equivalent manufacturing

However, bridge manufacturing can meet all requirements and specifications of the 'original' part. In this case, bridge manufacturing might be more expensive in a regular supply chain situation, making it inappropriate for standard production, but it might have certain advantages when other constraints occur. For example, a polymer part could be manufactured at low cost per part in large quantities in a central location.

In the event of a global supply chain disruption and the part is needed overseas, this can be bridged by localised 3D printing close to where it's needed in the required (probably low) quantity. If the manufacturing alternative was set up conforming to specifications, a part produced correspondingly might last as long as an 'original', eliminating the need to parallel order the 'original' spare part.

Photo: Replique

Ramp-up/phase-out bridging

Change in demand over a product's lifecycle can vary drastically and upon launch, it's hard to forecast future demand. It could boom or stay at moderate volume. For small and mid-volume series, additive manufacturing is an attractive option throughout the whole lifecycle.

If product demand rises quickly, manufacturing methods like injection molding are best from a price-per-part standpoint. Once manufacturing alternatives are in place, bridge manufacturing enables companies to switch as needed to optimize manufacturing costs.

3D printing is often favourable upon a product's launch when only small quantities are needed, but when demand increases the OEM would benefit from another manufacturing method. Towards the end of the lifecycle, when demand decreases, the OEM can easily switch back to 3D printing.

With bridge manufacturing, it is important the technology does not need significant ramp-up time, is flexible insofar as quantities and is location-independent. Few manufacturing technologies meet these criteria; injection molding, requires high tooling investments and ramp-up-time before production can start. Milling can be very expensive and material-intense, and is limited regarding geometries and complex structures.

Enabled by 3D printing, parts can be made on demand - anywhere, anytime, close to the location needed. Above, we see parts required to adhere to food contract industry standards .

Added value with 3D printing

The most viable option for bridging is additive manufacturing and in the last years 3D printing has become increasingly popular, especially for industrial applications.

Once a part is qualified and print parameters are set, it does not need any ramp up but can simply be sent securely to a 3D print service bureau for fast, cost-effective production. That's to say, exactly where the part is needed, when it is needed and in the precise quantity needed – even a lot size of just one. It is these basic principles of 3D printing that continue to make it an agile and benefit-enhancing option for low-volume manufacturing requirements among OEMs large and small. **EP&T**

henrike.wonneberger@chemovator.com

Dr. Henrike Wonneberger is COO and co-founder of BASF-owned, Replique, which offers an industrial 3D printing platform that enables OEMs to provide parts on-demand anytime and anywhere to their customers through a global, decentralized and secured 3D printing network.

EPTECH 2022

Connect with Canada's leading electronics suppliers!

MONTREAL
SEPTEMBER
13

QUEBEC CITY
SEPTEMBER
15

MISSISSAUGA
OCTOBER
13

CALGARY
OCTOBER
19

EPTECH
CANADA'S COAST-TO-COAST
ELECTRONICS
TRADE SHOWS

"What a great show! Tell your clients they should be exhibiting"
- Eptech exhibitor, Vancouver

BOOK YOUR TABLE NOW! SPACE IS LIMITED.

EPTECH.CA/EXHIBIT

EP&T

ELECTRONIC PRODUCTS & TECHNOLOGY

PRESENTS

CONTRACT ELECTRONICS MANUFACTURING (CEM) PROVIDERS IN CANADA

ELECTRONIC MANUFACTURING SERVICES GUIDE 2022

SOURCING CEM PARTNERS

CONTRACT MANUFACTURING

A coast to coast list of CEMs p.18

Electronic Manufacturing Services Guide 2022

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.

Flexible and adaptable to a wide variance of needs and services from its customer base, Contract Manufacturers constantly demonstrate the ability to meet the requirements of a vast array of industry sectors. Whether high or low complexity, volume production or prototyping, Original Equipment Manufacturers (OEMs) turn to their contract manufacturing partners for their expertise in everything from engineering services, supply chain management, printed circuit board assembly, testing and final integration capabilities.

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

WESTERN CANADA

BRITISH COLUMBIA

Active Electronic Manufacturing
PCB assembly line includes high-speed pick and place machines.
8 - 12357 82a Ave,
Surrey, BC V3W0L5 Canada
Tel: 778-591-2361
Email: info@activeelectronic.com
http://activeelectronic.com/

Ampco
Advanced manufacturing and printing company.
#101 – 9 Burbidge Street,
Coquitlam, British Columbia,
Canada V3K 7B2
Tel: 1-604-472-3800
Toll-Free: 1-800-663-5482
Email: info@ampcomfg.com
https://www.ampcomfg.com/

Canadian Circuits Inc. (CCI)
Quick-turn pcb board shop.
#12 – 13140 88th Avenue,
Surrey, British Columbia
Tel: 604-599-8600
Toll-Free: 1-888-590-6464
Email: sales@canadiancircuits.com
http://www.canadiancircuits.com

CIMtech Mfg. Inc.
AS9100D Certified Machining; 20 years' experience in aerospace assembly tooling and aerospace parts: prototyping, production and complete sub-assemblies.
17942 55 Ave #8,
Surrey, BC V3S 6C8
Tel: 604-807-4850
Toll Free: 1-877-999-5049
Email: machining@cimtechmfg.com
https://cimtechmfg.com/

Dena Technologies
BC-based designs and assembles high performing pcb.
8170 Winston St,
Burnaby, BC V5A 2H5
Tel: 604-765-0880
https://denatechnologies.com/

Dorigo Systems Ltd.
Full turnkey CEM.
5085 North Fraser Way,
Burnaby, BC V5J 0J2
Tel: 604-294-4600
Fax: 604-294-4609
Email: Sales@dorigo.com
https://www.dorigo.com/

EMS2020 Technologies Ltd.
Electronic manufacturing company.
570 Ebury Pl, Delta, BC V3M 6M8
Tel: 604-525-3133
Email: sales@ems2020tech.com
http://ems2020tech.com/

Enigma Interconnect Corp.
Manufacturer of quality bare pcbs.
8070 Winston St,
Burnaby, BC V5A 2H5
Tel: 604-420-3313
https://www.enigmacorp.com/

Euro Solutions
Makes flexible, customized electronics manufacturing solutions.
Unit E104 - 19720 94a Ave,
Langley City, BC V1M 3B7
Tel: 604-513-8584
https://www.eurobc.com/

ForeSeeson
Electronic manufacturing services provider.
#2105-11980 Hammersmith Way,
Richmond, BC, V7A 0A4
Toll Free: 1-866-233-0247
Tel: 604-233-0247
Email: info@foreseeson.com
www.foreseeson.com

Hansen Indusries Ltd.
Metal fabricator.
2871 Olafsen Ave,
Richmond, BC V6X 2R4
Tel: 604-278-2223
http://www.hansenindustries.com/

Humble Manufacturing Co. Ltd.
Precision-made custom sheet metal components, sub-assemblies.
3331 Ardingley Ave,
Burnaby, BC V5B 4A5
Tel: 604-294-3331
https://humblemfg.com/

Leach
Since 1999 Leach has specialized in PCB assembly, IC programming, function testing and box build. Primarily focussed in the communications, industrial, medical, RF/GPS, automotive and lighting markets.
107 – 7188 Progress Way,
Delta BC. V4G 1M6.
Tel: 1 (604) 940-6797
Email: info@leach-pcba.com
www.leach-pcba.com

Link2 Manufacturing
Full service solution electronics assembly company.
7177 Vantage Way #150,
Delta, BC V4G 1K7
Tel: 604-940-4556
Email: sales@link2mfg.com
http://link2mfg.com/

Maxtech Electronics Inc.
One-stop electronic manufacturing service provider.
102-1750 Hartley Avenue,
Coquitlam, BC, V3K 7A1
Tel: 1-604-998-1564
Email:info@maxtechelectronics.com
http://maxtechelectronics.com

MechWareTronik Inc.
Delivering high quality SMT (Surface Mount Technology) laser cut stencils for the electronics printed circuit board assembly industry.
215-12837 76th Avenue,
Surrey, BC V3W2V3
Tel: 778-590-0358
http://www.stencil-express.com

Mountain Technologies Ltd
Electrical sub-assemblies, cable assemblies and wiring harnesses.
35 Gostick Pl,
North Vancouver, BC V7M 3N2
Tel: 604-986-9008
https://www.mtntech.com/

NDS Electronic Solutions
Electronics manufacturing services provider.
2425 Canoe Ave.,
Coquitlam, BC V3K 6A9
Tel: 604-474-4040
http://www.ndselectronics.com/

SAPA Technologies Ltd.
Turnkey electronics manufacturing services provider.
3202 Beta Ave,
Burnaby, BC V5G 4K4
Tel: 604-520-5611
Email: info@sapatechs.com
http://www.sapatechs.com/

Selcom Industries Inc.
Turnkey electronic manufacturing services provider.
112 - 3011 Underhill Ave.
Burnaby, B.C. V5A 3C2, Canada
Tel: 604-420-7575
Email: info@selcom.com
https://www.selcom.com/

Surtek Industries Inc.,
Specializes in the assembly of pcbs, connector cables, motor controllers, electrical control panels.
13018 84 Ave, Surrey, BC V3W 1L2
Tel: 604-590-2235
https://www.surtek.net/

U Choice Manufacturing Inc.
Quick turn pcb assembly.
17665 66A Ave #505,
Surrey, BC V3S 2A7
Tel: 778-574-2570
https://www.uchoice.ca/

WESTERN CANADA

ALBERTA

August Electronics
End-to-end electronic manufacturing services from prototyping to production.
1810 Centre Ave NE
Calgary, AB T2E 0A6
Tel: 403-273-3131
Email: info@eeicm.com
https://aeicm.com/

Commutron Industries Ltd
Calgary based pcb board shop.
302 Stanley St, Elbow,
SK S0H 1J0
Tel: 306-854-2265
https://commutron.ca/

Dynamic Source Manufacturing
Full suite of EMS services including quick-turn- prototyping, volume manufacturing, testing, component sourcing and box build assembly.
2765 48 Ave NE Unit 117,
Calgary, AB T3J 5M9
Tel: 403-516-1888
https://dynamicsourcemfg.com/

IMS Innovative Manufacturing Source Inc.
Specialize in circuit board assembly, cable assembly, sheet metal fabrication, testing, vertical integration (box-build), and quality assurance.
Bay #3, 3855 64 Ave SE,
Calgary, AB T2C 2V5
Tel: 403-279-7702
https://imsmfg.ca

MANITOBA

Price Electronics Ltd.
Contract manufacturing of pcb assemblies.
638 Raleigh St,
Winnipeg, MB R2K 3Z9
Tel: 204-669-4220
Email: info@priceelectronics.ca
https://www.priceelectronics.ca

Priority Electronics Ltd
Manufactures all types of fiber optic assemblies.
55 Trottier Bay,
Winnipeg, MB R3T 3R3
Tel: 204-284-0164
Toll-Free: 1-800-478-0447
Email: priority@priority.mb.ca
http://www.priority.mb.ca/

SmartTrend Manufacturing Group
Single source supplier of customer specific engineered components and assemblies to OEMs.
6 – 1249 Clarence Avenue
Winnipeg, MB R3T 1T4
Tel: 204-489-7237
https://smartrendmfg.com/about-us

EASTERN CANADA

ONTARIO

Artaflex Inc.
Integrated CEM serving high–mix and high-complexity OEMs.
174 West Beaver Creek Rd,
Richmond Hill, ON L4B 1B4
Tel: 905-470-0109
Toll Free: 1-866-502-3378
https://artaflex.com/

AAC – Accu-Automation Corp.
R&D, software and hardware design, and pcb manufacturing.
141 Dearborn Place,
Waterloo, ON N2J 4N5
Tel: 519-725-9090
Email: info@accuauto.com
http://www.accuauto.com

BHC
Specializing in custom electronic assembly solutions including cable harness, fiber optic, box builds and electro-mechanical assemblies.
3291 Mainway #9,
Burlington, ON L7M 1A6
Tel: 905-634-1415
Toll Free: 877-755-5242
Email: mail@bhccable.com
http://www.bhccable.com/

Bittele Electronics Inc
2680 14th Ave Unit 1&2, Markham, ON L3R 5B2
Tel: 416-800-7540
Toll free: 1-888-812-1949
Email: sales@7cpb.com
https://www.7pcb.com/

Celestica
Canadian multinational electronics manufacturing services company.
1900-5140 Yonge Street PO Box 42
Toronto, ON M2N 6L7
Tel: 416-448-5800
Toll Free: 1-888-889-9998
https://www.celestica.com

Creation Technologies
Global EMS solutions partner from design, prototyping, to logistics for OEM products.
6820 Creditview Rd,
Mississauga, ON L5N 0A9
Tel: 905-814-6323
Toll Free: 1-877-812-4212
https://www.creationtech.com/

Crest Circuits Inc.
Markham pcb board shop.
2701 John St,
Markham, ON L3R 2W5
Tel: 905-479-9515
http://www.crestcircuit.com/

Custom Rapid Solutions Inc.
Medical products design and development - embedded systems design.
377 Canarctic Dr,
North York, ON M3J 2P9
Tel: 416-663-1277
Email: info@customrapidsolutions.com
https://customrapidsolutions.com/

Data Cable
DATA CABLE is a world class Canadian manufacturer of custom cable assemblies for OEM's, including wire harnessing, electro-mechanical assemblies, sub- assemblies, box builds and more. Since 1980 we've been customizing connectivity solutions for a wide and diverse range of industries.
31 Robb Boulevard, Orangeville,
Ontario L9W 3L1
Toll Free: 1-877-395-5133
Email: information@datacable.ca
www.datacable.ca

Escort Manufacturing Corporation
Contract manufacturing specializing in automotive radar detectors and servicing.
3730 Laird Rd
Mississauga, ON L5L 5Z7
Tel: 905-828-1002
www.escortradar.com

Fidus Systems
Specializes in leading-edge electronic product development with offices in Ottawa & Waterloo.
375 Terry Fox Drive
Ottawa, ON K2K 0J8
Tel: 1-613-595-0507 x200
https://fidus.com/

Flex
Design services and prototyping
3001 Solandt Rd.,
Kanata, ON K2K 2M8
Tel: 613-895-2050
https://flex.com/connect/global-locations

Kingstec Technologies Inc
One-stop engineering, manufacturing and logistics business partner.
2335 Argentia Road,
Mississauga, Ontario L5N 8K4
Canada
Tel: 905-712-2171
http://www.kingstec.com/

Mektronix
Specializes in setting up SMT lines, including equipment specification, line/plant layout, training and process development.
186 Manitoba Street,
Stouffville, Ont L4A 4Y3
Tel: 705-795-4467
https://www.mektronix.com

Microart Services Inc.
Electronic manufacturing and design services company providing pcb layout, bare board manufacturing, pcb assembly testing and box build for proto-type and low-to-mid volume productions.
190 Duffield Dr,
Markham, ON L6G 1B5
Tel: 905-752-0800
Toll Free: 1-833-PCB-FAST (722-3278)
Email: inquiries@microartservices.com
https://microartservices.com/

M.I.S. Electronics Inc.
End-to-end EMS player and pcb board specialists.
174 West Beaver Creek Rd.,
Richmond Hill, ON L4B 1B4
Tel: 905-707-2305
https://miselectronics.com/

Nica Power Battery Corp.
VAR-battery packs for OEM market.
5155 Spectrum Way,
Mississauga, ON L4W 5A1
Tel: 905-624-0000
https://www.nicapower.com/

OCM Manufacturing Inc.
Electronics manufacturing services (EMS) for low-to mid-volume products, plus turnkey product development for industrial controls.
2183 Thurston Dr,
Ottawa, ON K1G 6C9
Tel: 1-800-268-3961
Email: info@ocmmanufacturing.com
https://ocmmanufacturing.com/

PenCom Canada
Custom components.
420 Thompson Dr #4,
Cambridge, ON N1T 2K8
Tel: 519-620-4222
https://www.pencomsf.com/

SigmaPoint Technologies Inc
Turnkey contract manufacturer, with satellite facility at Catalyst 137 in Waterloo.
2880 Marleau Ave,
Cornwall, ON K6H 6B5
Tel: 613-937-4462
http://www.sigmapoint.com/

SMTC Corporation
Corporate HQ & operates as Center of Excellence (COE) to global advanced EMS locations.
7050 Woodbine Ave #300, Markham, ON L3R 4G8
Tel: 905-479-1810
Email: contact.us@smtc.com
https://www.smtc.com/about/locations/toronto-canada

Starfish Medical
Award-winning medical device development, design and flexible manufacturing outsourcing services. Box build, complex low-mid volume production.
HQ address:
455 Boleskine Road Victoria, BC, Canada V8Z 1E7
Tel: 250-388-3537
139 Mulock Ave,
Toronto, ON M6N 1G9
Toll Free: 877-822-3537
Email: info@starfishmedical.com
https://starfishmedical.com/

Stim Canada Inc
Specialists in pcbs and assemblies.
85 Toro Rd,
North York, ON M3J 2A4
Tel: 416-636-4584
https://stimcanada.com

Symtco Inc.
Provider of surface mount equipment for the electronics manufacturing industry.
190 Degraaf Cres.,
Aurora, Ontario L4G 0X1
Tel: 416-346-1222
http://symtco.com

Thornhill Medical Research Inc.
Global medical device designer and developer and manufacturer.
60 Wingold Ave,
Toronto, ON, M6B 1P5
Toll Free: 1-888-597-1325
Email: info@thornhillmedical.com
https://thornhillmedical.com

Torontronics Circuit Technology Inc.
Handles all production needs from low to high volume runs, while delivering cost-effective solutions and expertly crafted products.
110 Ironside Crescent, Unit 20,
Toronto, Ontario M1X 1M2
Tel: 647-400-0018
https://www.torontronics.com

Urtech Manufacturing Inc.
Product prototyping, engineering, production-scale manufacturing & post production.
835 Harrington Ct, Burlington, ON L7N 3P3
Tel: 905-667-2310
Toll Free: 1-877-369-6099
Email: sales@urtechmfg.com
https://www.urtechmfg.com/

Vexos
Full service, high-mix, low- to mid-volume electronics manufacturing and custom material solutions provider.
195 Royal Crest Ct,
Markham, ON L3R 9X6
Tel: 1-905-479-6203
Toll Free: 1-800-965-4446
https://www.vexos.com/can-markham

Vision Circuit Technologies
Pcbs developed, manufactured, assembled, tested, and qualified.
HQ; 1755 Woodward Dr., Suite 200, Ottawa, ON K2C 0P9
Tel: 613-729-1022
Toronto Location: 399 Denison St, Markham, ON L3R 1B7
Tel: 289-846-3394
http://visioncircuits.com/

WESTON MODULAR
With more than 35 years of experience, specializes in creating superior custom cable assemblies and harnesses. We have the capabilities to customize cables to your unique needs and specifications, and we can meet your tightest deadlines.
271 Glidden Road (Unit 8)
Brampton, ON L6W 1H9
Website: www.westonmodular.com
Phone: 905-866-5555 Ext. 226
Email: info@westonmodular.com

QUEBEC

A1 Electronics Inc.
3160 Rue De Miniac, St-Laurent, Montréal, QC, H4S 1N5
EMS services including BGA and mixed, surface mount technology, through-hole technology, prototype and rapid turn-around pcb assembly.
Tel : 514-956-0777
http://www.a1-electronicsinc.com/en

AKT Electronics Inc.
Electronic pcb assembly.
5595 Chemin de la Cote-de-Liesse, Suite:205,
Saint-Laurent, QC
Tel: 514-747-5960
Email: info@aktelectronics.com
https://www.aktelectronics.com

C2MI - MiQro Innovation
Collaborative Centre
Fundamental link between applied research and the rapid commercialization of microelectronic products.
45 Boulevard de l'Aéroport,
Bromont, QC J2L 1S8
Tel: 450-534-8000
https://www.c2mi.ca/en/

CMAC
Manufacturer of high reliability electronics solutions for harsh environments – including automotive, aerospace, industrial & medical electronics assembly solutions.
3000 Industrial Boulevard,
Sherbrooke, QC J1L 1V8
Tel: 819-821-4524
https://cmac.com/

Circuits Imprimés De La Capitale
Comprehensive range of services, including quick prototype production, CAD design, pcb assembly, conformal coating, technical validation and pcb system integration.
925 Avenue Newton #104,
QC, G1P 4M2
Tel: 418-877-9047
https://www.pcbcic.com/en

DB Lectro Inc.
Provides a wide range of standard and customized electronic & electromechanical components.
3755 Place de Java #140, Brossard, QC J4Y 0E4
Tel: 450-444-1424
https://dblectro.com/en

Digico
Specialists in complex electronic material, including printed circuits, cables and harness, conformal coating, performing client test and electromechanical integration.
950 rue Bergar, Laval,
QC, H7L 5A1
Tel: 450-967-7100
http://www.digico.cc/en

LeeTwo Metal Inc.
Precision metal and precision machining industries.
18025 Trans-Canada Hwy,
Kirkland, QC H9J 3Z4
Tel: 514-695-5911
https://www.leetwo.com/

Meatec Inc.
PCBA electro-mechanical assemblies and cable harness assemblies
6405 Rue Abrams,
Saint-Laurent, QC
Tel: 514-340-0033
Toll Free: 1-866-246-0033
Email: info@meatecinc.com
http://meatecinc.com/

Micro PCB
Printed circuit board assembly.
1480 Hymus Blvd,
Dorval, QC H9P 1J6
Tel: 514-542-4424
https://micropcbinc.com/

Orbit Technologies Inc.
Specializes in pcb design, manufacturing and assembly services.
2020 Trans-Canada Hwy, Suite 107,
Dorval, QC H9P 2N4
Tel: 514-856-0451
Toll-Free: 1-855-344-0451
Email: sales@orbittech.com
https://www.orbittech.com/

Prodexport Technologie Inc
Specializes in the manufacturing of electronic products.
4780 Rue Saint-Félix, Entrée #1,
Local 205,
Saint-Augustin-de-Desmaures, QC
G3A 2J9
Tel: 418-266-7977
http://prodexport.ca/

T A Wire and Harness Inc.
Full range of services to provide complete solutions for all kinds of customized cables and harnesses.
183 Chemin Bates,
Mont-Royal, QC H3S 1A1
Tel: 514-341-2131
Email: info@tawireandharness.com
https://tawireandharness.com/

Varitron
End-to-end services in electronic design and manufacturing services.
4811 Ch de la Savane,
Saint-Hubert, QC J3Y 9G1
Tel: 450-926-1778 #245
Email: plavoie@varitron.com
https://varitron.com

ATLANTIC PROVINCES

Allendale Electronics Ltd.
41 S Water St, Lockeport, Nova Scotia
B0T 1L0
Tel: 902-656-2652
https://www.allendale-electronics.com/

CE3 Electronics Inc.
Specializes in advanced pcb assembly and complex cable and wire harness manufacturing.
1055 Aviation Ave.,
Dieppe, New Brunswick E1A 9S5
Tel: 506-858-7817
Email: info@ce3electronics.com
www.ce3electronics.com

Sunsel Systems Manufacturing Corp.
433 Cutler Ave,
Dartmouth, Nova Scotia B3B 0J5
Tel: 902-444-7867 ext. 433
North America: 1-855-718-4787
Email: sunsel@sunsel.ca
https://www.sunsel.ca

Partnership is paramount at M.I.S.

CEM leverages its patents to convert customer's success

BY STEPHEN LAW, EDITOR EP&T

A self-made entrepreneur, Saeid Mohmedi's award-winning contact electronics manufacturing (CEM) business M.I.S. Electronics Inc. has come a long way from its raw beginnings - manually assembling pcb box builds in his basement at home. Incorporated in 1999, the Richmond Hill ON-based CEM has achieved success carving out its niche as a high-quality, full service, turn-key manufacturer serving such specialized design sectors as medical (ISO 13485), aerospace, automotive, security, military, LED lights, AV and commercial communications to name some.

Adding to the firm's level of comprehension when dealing directly with its customers, Mohmedi comes to the table with a formal education in electronics – not to mention a full complement of product patents that he is willing to leverage for his customer's benefit.

"Each of these patents have the capability to establish many new spin-off companies. If any of these patents relates to what my customers are working on, I will give them licence to use it. This is something not every CEM can do," he stressed.

As a recent example, an existing M.I.S. customer involved with mining on behalf of Bitcoin, required a device that works cooperatively with existing field machinery. So, the M.I.S. engineering team applied its patented 'live' fingerprint-touch biometric authentication to the customer's product design.

"This made it more secure and reliable – thus, eliminating such issues as hacking," states Mohmedi. "Each of these patents has the potential to spawn another 10 to 15 different businesses."

Leveraging patents

Mohmedi explains how his patent for 'live' touch technology could conceivably be used in multiple design sector areas, such as security, home or garage door entry, automobiles, banking credit cards, etc. Some other patents currently held by M.I.S. include those relating to fluid dispensing systems, control systems for public washrooms,

Saeid Mohmedi, founder of M.I.S. Electronics Inc., says he will leverage his firm's patents to benefit customers of the Richmond Hill-based CEM.

and drive systems for electric vehicles.

"We are trying to bring manufacturing to Canada in a sustainable way. We are not going to compete with China when it comes to strictly costs of manufacturing consumer electronic items - nobody can," says the founder's son Tiam Mohmedi, director of sales and marketing at M.I.S." "Our end goal is to bring manufacturing locally – as we want Canadian products to be made in Canada by Canadians. Also by finding the most economical and sustainable way to do so."

Tiam refers specifically to the arrival of new customers – which have chosen to re-shore after experiencing challenges with CEMs overseas – often relating to part shortages and longer lead-times.

"When you are dealing with a large (CEM) company that is pumping out products on a mass scale, they are not really worried about the 'nitty-gritty' of any given project. And, when problems arise relating to traceability, the language barrier and time-zone differences - it's very hard to find solutions to these problems," the younger Mohmedi reasons.

"It's the right decision to make for a lot of companies, to relocate manufacturing operations here in Canada. Obviously it's not a move some OEMs can make – especially right now, but things are changing," he says, referencing increased automation used within the CEM arena at home, not to mention the level of quality delivered in Canada.

Elite service

While most of the CEM's diverse clients are based in Canada, M.I.S. has longstanding, loyal relationships with its customer base. Product quality remains a top priority, all while staying competitive on pricing, Tiam notes.

"Some of our customers have been with us for more than two decades. They recognize the level of service we provide," says Saeid. "I'd rather have 40 good quality customers with solid relationships than 400 routine clients. This way I can really focus on those select customers and deliver a level of quality that is hard to duplicate elsewhere. If you are not engaged with your customer – it could lead to miscommunication, thus lost time and money on a project. Our customers recognize M.I.S. as a member of their own team."

"We service a customer base that wants a reliable source for manufacturing – without headaches," Saeid says. "We are a very capable partner," Tiam adds EP&T

Photo: M.I.S. Electronics Inc.

Digital platform enables part exchange between EMS & OEMs

StockCQ allows peer-to-peer trading of electronic components

Photo: StockQC

At a time when most players within the electronics ecosystem seem to be struggling with the availability of components in the supply stream, a somewhat unique solution has emerged. CalcuQuote, Murphy TX, a supply chain solutions provider for the electronics manufacturing services (EMS) industry, has unveiled StockCQ, a peer-to-peer platform for OEM and EMS companies to directly trade inventory with each other.

A collaboration between CalcuQuote and IPC, a global electronics industry association, allowed a rapid, iterative response to the collective concerns of the electronics manufacturing executives about the impact of component shortages. Through a series of roundtable discussions hosted this spring, and with more than 75 executives in attendance, consensus was reached that a fair way of sharing inventory directly with each other would help mitigate the impact of the ongoing component shortages, free up working capital and reduce waste.

The overlap between component shortages and excess inventory is the reason why StockQC can help alleviate supply chain challenges

100+
electronics manufacturers across the globe have shown an enthusiastic willingness to participate in this newly formed beta community.

Address significant need

"Global component shortages have clearly been a top pain point voiced by virtually every EMS leader, especially over the past few years. IPC and our member-driven EMS Industry Council are very excited to facilitate this strong collaboration between CalcuQuote and a growing group of EMS / OEM companies. We believe that we have a very real opportunity to address this significant industry need," says Mark Wolfe, IPC executive EMS advisor.

CalcuQuote's research across millions of searches shows that cases of sufficient stock responses from the supply chain have dropped more than 20% during the past year. This leads to a significant number of assemblies being stuck without the components they need in order to be completed. However, findings also show that in 30% of cases where authorized distributors are out of stock, the same component was also identified as excess inventory by another company within the CalcuQuote ecosystem. This overlap between shortages and excess inventory is the reason why StockCQ can help alleviate the supply chain challenges.

"It's great to be working with OEM and EMS companies from across the globe who are interested in working together to solve the biggest challenges of the industry. Allocations have negatively impacted many businesses and this solution is one way of striving to alleviate the disruption that electronics manufacturers are facing," adds CalcuQuote CEO Chintan Sutaria.

200 CEMs use service

CalcuQuote improves the speed, accuracy and efficiency of the quoting and supply chain process by optimizing operations and implementing sustainable digital solutions. Founded in 2014, the sourcing platform serves more than 200 EMS companies and has a global customer base. StockCQ derives its name from the idea of a global stockroom where electronics manufacturers can virtually store their excess and slow moving inventory. The listed inventory can then be easily searched and safely purchased directly by other electronics manufacturers.

Individual and group discussions with 100+ electronics manufacturers across the globe have shown an enthusiastic willingness to participate in this newly formed beta community. In just two weeks of beta access dozens of electronics manufacturers have started listing their excess inventory and finding matches too hard to source parts.

"The CalcuQuote team is excited to address a significant challenge facing the electronics supply chain with a technological solution. StockCQ will become the trusted digital community for OEM and EMS companies to trade fairly with their peers," notes Sutaria. "The spirit of collaboration has already shown to be very strong with dozens of electronics company executives attending executive roundtable sessions and sharing their feedback so that we can build a solution that works for everyone." EP&T

Participation is by invitation only for all electronics manufacturers (OEM and EMS companies). To request your invitation, contact stockCQ@calcuquote.com or visit calcuquote.com/stockcq.

The role of solderability testing

Its importance in successful electronics production

BY REID HENRY, PRESIDENT, HENTEC INDUSTRIES/RPS AUTOMATION

One frequently asked question is what is solderability testing and what function does it perform. Solderability testing is not component preconditioning but is a measure of the ease with which a solder joint can be formed. Solderability testing is used to assess the solderability of device package terminations and varies depending on the type of solder alloy used. For example, when using various lead-free alloys, solderability can differ significantly from solderability when using lead-based solder.

Background

In 1983 the US Department of Defense (DoD) determined that over 40% of military electronics system field failures were electrical in nature and some 50% of these failures were due to poor solder connections. Plated finishes, usually nickel (Ni) or tin (Sn), were found to be porous and non-intermetallic allowing oxide penetration to the base metal which led to poor solder joint integrity and therefore resulted in field failures. As a result, the MIL-STD-883 solderability testing standard was instituted to assure that all components in high-reliability applications were indeed solderable and plated finishes gave way in favor of a hot solder dip finish performed by the robotic hot solder dip process which provides a fused tin-lead (SnPb) homogeneous surface finish to enhance overall solderability.

Solderability test methods

The MIL-STD-883 Method 2003 is one of the oldest and most widely used standards for solderability testing within the electronics assembly industry. It is used as the basis for the following discussion to provide details on how solderability testing is normally performed. The MIL-STD-883 standard employs the dip-and-look solderability method, requiring the following equipment: 1) a solder pot of sufficient volume that can maintain solder at a specified temperature, 2) steam aging equipment for aging of the samples prior to testing, 3) a dipping mechanism capable of controlling the rates of immersion and exit speed, as well as dwell time, of the terminations, and 4) an optical inspection and lighting system that facilitates a minimum of at least 10X magnification.

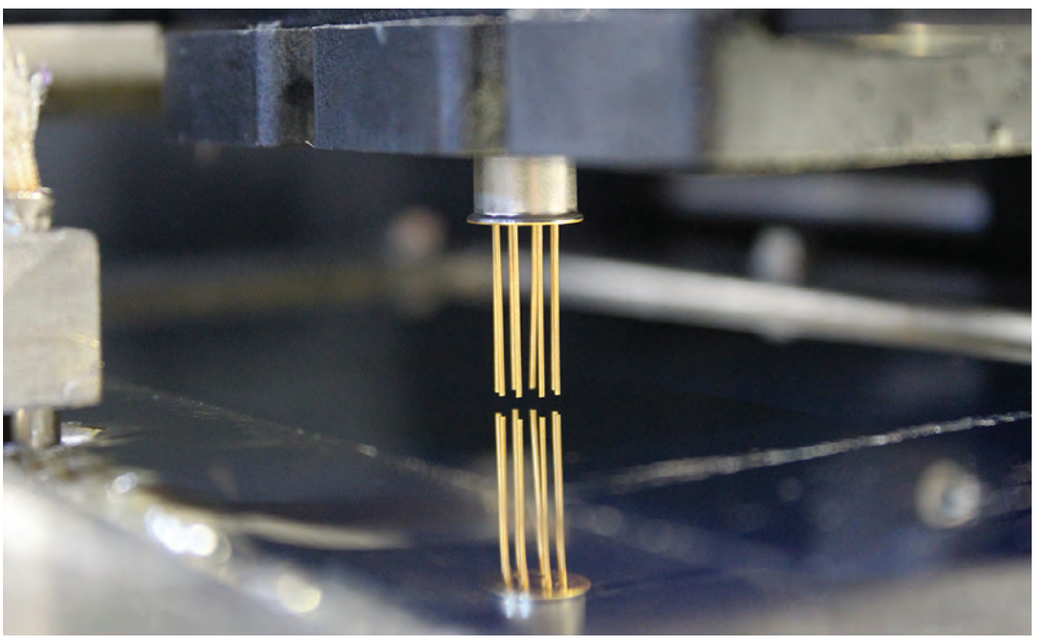


FIGURE 1: Test specimen dipped in molten solder bath during dip-and-look solderability testing protocol

Why perform test solderability?

Solderability testing provides a means of determining the solderability of device package terminations that are intended to be joined to another solderable surface using either tin-lead (SnPb) or lead-free solder alloys. The reason for performing solderabilty testing is to detemine if a component provides the degree of wetting necessary to form a robust solder connection. A poor solderabilty test result indicates that a less-than-optimal connection could be formed. Solderability testing is also effective during various aspects of printed circuit board production, such as when evaluating different printed circuit board coatings, various solder alloys, solder paste, or flux materials.

In addition to today's consumer driven electronics marketplace, there are many industries that require semiconductor devices to have a longer lifecycle such as the industrial, automotive, medical, aerospace and defense sectors which dictates long-term component storage. Whenever long-term storage is required it is critical to ensure electronic components are reliable with a key measure of their quaility being solderability testing.

Testing protocols

Solderability testing is designed to determine how well molten solder will wet on solderable surfaces. Most common categories of solderability testing are qualitative testing and quantitative testing. The most common qualitative testing method is the dip-and-look method which involves subjective examination via comparative analysis of test samples. The most common quantitative testing method is the wetting balance method that requires interpretation of a wetting balance curve.

The wetting balance test is used to measure the wetting forces between molten solder and the surfaces of a test specimen as a function of time. Solderable surfaces differ in speed and strength of adhesion therefore the

Photo: Hentec Industries

wetting balance test measures the time for various solder alloys to wet a components terminations or pads.

The dip-and-look test is a method in which a test specimen is completely immersed in molten solder and then visually inspected. The test piece is dipped into a molten solder bath, usually by an operator. The component surfaces to be wetted are first wetted with flux and then completely immersed in a molten solder bath followed by visual examination (Figure 1).

The most prevalent suppliers of dip-and-look solderability test equipment are Cemco (UK) and Hentec/RPS (USA), while the major wetting balance test equipment suppliers include GEN3 Systems (UK), Malcom/Seika (Japan), Metronelec/Quiptech (Germany), Microtronic (Germany) and RHESCN (Japan) along with other minor suppliers.

In addition to aging of samples prior to solderability testing, steam aging equipment can also be used for accelerated life testing to simulate elongated storage conditions of surface mount or through-hole components. If additional testing is required for mission critical applications, X-ray fluorescence (XRF) can be used to measure the solder thickness of the component terminations and scanning electron microscopy (SEM) can be employed to probe the intermetallic layer if necessary.

Acceptance criterion

The main acceptable criterion for solderability testing as defined by the MIL-STD-883 Method 2003 standard is 95% coverage of the dipped portion of the terminations with a new and continuous solder coating. Therefore, pinholes, voids, porosity, non-wetting, or de-wetting must not exceed 5% of the total dipped area of the terminations. Besides the MIL-STD-883 Method 2003 standard, other common solderability test standards include the IPC J-STD-002 standard. Other solderability test standards include MIL-STD-202 Method 208, J-STD-001 Space Addendum, J-STD-001ES, J-STD-003, JEDEC JESD22-B102 and MIL-STD-750 Method 2026.

FIGURE 2: **Hentec/RPS Pulsar dip-and-look solderability test system designed to meet IPC J-STD-002 requirements**

FIGURE 3: **Hentec/RPS Photon component steam aging system designed for accelerated life testing simulating elongated storage**

Photo: Hentec Industries

Qualitative vs. Quantitative

Solderability testing determines how well molten solder will wet on solderable surfaces of electronic components with the most common solderability test methods being the dip-and-look method and the wetting balance method. The dip-and-look method is a qualitative type test performed by comparative analysis after specimens are dipped in a bath of flux and molten solder. The wetting balance method is a quantitative type test based upon the interpretation of a wetting curve measuring the buoyancy of a specimen using a load cell. There are several solderability test standards, but the most common standards are MIL-STD-883 Method 2003, IPC J-STD-002 and MIL-STD-202 Method 208.

While the wetting balance test method is precise and measures the wetting forces between molten solder and a test specimen as a function of time, it requires the interpretation of a wetting curve by skilled personnel in a laboratory environment. Another disadvantage is that wetting curves can be easily distorted if the system is not properly calibrated or if a wetting balance test is performed incorrectly by unskilled, or inadequately trained personnel.

An advantage of the dip-and-look method is since it is based on comparative analysis it can be performed rapidly by shop floor personnel with minimal training as well as requiring significantly lower capital investment then a wetting balance test system which is considerably more expensive. An additional advantage of the Hentec/RPS Pulsar dip-and-look test system is it can also be configured for low-volume lead tinning of component terminations that exhibit poor solderability due to excessive oxidation or prolonged storage (Figure 2).

For some high-reliability applications additional solderability testing may be required and can include steam aging which is used for accelerated life testing to simulate elongated storage conditions. The Hentec/RPS Photon steam aging system is designed to generate artificial aging simulating elongated storage conditions of electronic components and is especially suited for high-reliability applications or end-of-life product builds (Figure 3).

The Hentec/RPS Photon steam aging system is multi-purpose as it can perform both aging of samples prior to solderability testing, as well as simulating elongated storage conditions of surface mount or through-hole components and accelerated life testing.

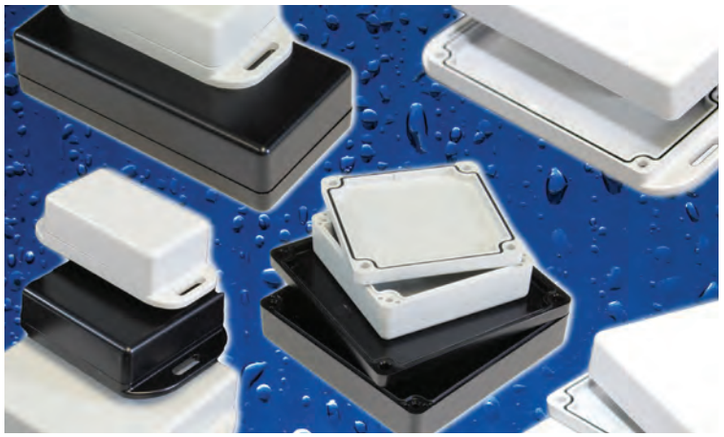
Solderability test procedure

The general solderability test procedure as noted by the MIL-STD-883 Method 2003 standard consists of the following steps: 1) proper preparation of the samples as defined by an acquisition document, but which must not include wiping, cleaning, scraping, or abrasive cleaning of the terminations to be tested, 2) aging of the samples in a steam ager, which consists of exposing the surfaces to be tested to water vapor for eight (8) hours and drying them either by baking at 100°C for no more than one (1) hour in a dry atmosphere or air drying them at ambient temperature for a minimum of fifteen (15) minutes; 3) proper application of flux to the terminations; 4) solder dipping, which consists of immersing the terminations in a static solder bath at a uniform temperature of 245C ±5°C; followed by 5) examination of the terminations at 10-15X magnification.

Summary

Solderability testing is essential to ensure that robust and reliable solder joints are formed for most electronic packaging and circuit board assembly applications. Solderability should no longer be consider as an option for many high reliability segments of the global electronics assembly industry, particularly whenever long-term component storage is involved. Therefore, to ensure product quality solderability testing is a highly recommended component testing protocol. **EP&T**

Hentec Industries/RPS Automation designs and manufactures a complete line of high precision selective soldering, lead tinning, and solderability test machines. https://rpsautomation.com

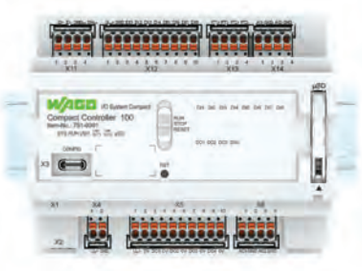


IP68 SEALED ENCLOSURES ARE MINIATURE

HAMMOND MANUFACTURING

1551W Series IP68 sealed miniature enclosures come in five sizes, available with a plain or flanged lid. The UL94-V0 polycarbonate enclosures are suitable for use inside or outside, and are available in black and grey with a soft texture finish. All units are fitted with pcb stand-offs in the base and the preformed silicone sealing gasket provides excellent protection against the ingress of dust or water. The initial five sizes range from 60 x 35 x 22 to 100 x 59 x 25.

www.hammfg.com



COMPACT CONTROLLER COMBINES PLC, REMOTE I/O

WAGO

Compact Controller 100 (CC100) is a small-scale PLC with a wide variety of remote I/O for use in smaller applications. Device can interface with industrial devices using protocols such as MODBUS TCP/UDP, EtherNet/IP or EtherCAT with the two on board EtherNet ports. The flexibility of the two Ethernet ports allows for the use of a switch or two unique IP addresses, with one port for field devices and the other for SCADA or Cloud services. Unit uses Codesys 3.5, allowing users to program in one or more of the IEC 61131-3 compatible languages and utilize the controller's built-in Web Server to develop HTML 5 visualizations at no additional charge.

www.wago.com/us/press-contact

250W DC-DC BUCK CONVERTERS ARE RUGGEDIZED

TDK-LAMBDA AMERICAS

RGA series 250W rated ruggedized non-isolated dc-dc converters can operate from an input voltage of 9 to 40V or 9 to 53V. The step-down converter delivers output voltages that can be adjustable from 3.3 to 15V, 3.3 to 24V or 3.3 to 40V with output currents of up to 20A. Product series is designed to be used in harsh environment applications. In a 1/16th brick form factor, measuring 35.6 x 25.6 x 13mm, units are encapsulated to provide a higher resistance to shock and vibration.

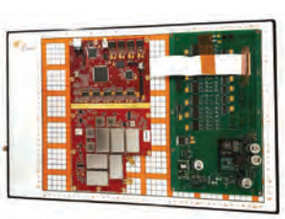
https://www.us.lambda.tdk.com

EMC/EMI NEAR FIELD SCANNERS MINIMIZE IN DEV RISK

COMTREE

Y.I.C. Technologies EMC/EMI advanced scanning test and measurement equipment with newly developed software assists designers and developers rapidly diagnose and solve EMC/EMI challenges. The pre-compliance solutions minimize risk and cost at the critical stage of development. Product ensures that new designs adhere to quality, technical safety and performance to regulatory standards.

A significant percentage of products fail to meet the targets required for EMC certification the first time they are tested.

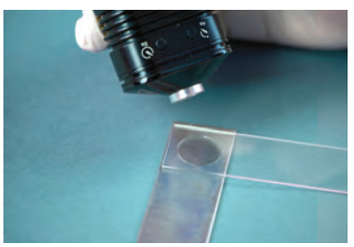


www.comtreeinc.com

BIOCOMPATIBLE UV CURABLE ADHESIVE FORMULATED FOR TPU BONDING

MASTER BOND

UV17Med one part, no mix, UV curable system is specially formulated to provide improved adhesion to many TPUs (thermoplastic polyurethanes), which are widely recognized as challenging substrates for bonding. The compound boosts toughness with a high elongation of 50-60%. Product passes stringent



ISO10993-5 cytotoxicity standards, and cures in 10-30 seconds when exposed to a UV light source emitting at a wavelength of 320-365nm with an energy output of 20-40 milliwatts/cm2.

https://www.masterbond.com/properties/biocompatible-adhesives

DIN-RAIL MOUNT ADAPTOR KITS COME WITH METAL CLIPS

SCHURTER

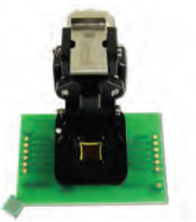
DIN-Rail mount adaptor kits come with metal clips and provide a simple solution for converting panel mount block filters to DIN-Rail mount for use inside control cabinets. Simply affix the clip to the filter using the screws provided in the kit, then snap the converted filter onto the DIN-Rail. Panel mount block filters are commonly used in equipment to filter interferences that are potentially harmful to the operation of the equipment and other equipment nearby.

www.schurter.com

40GHZ BANDWIDTH BGA SOCKET BOOSTS PERFORMANCE

IRONWOOD ELECTRONICS

CG25-BGA-2002 socket high



performance elastomer socket for 0.5mm pitch BGA package is designed for a 6mmx6mm package size and operates at bandwidths up to 40GHz with less than 1dB of insertion loss (GSSG configuration). The contact resistance is typically 20 milliohms per pin. Network analyzer reflection measurements for the G-S-S-G case were taken with all except the pins under consideration terminated into 50 Ohms. The socket is mounted using supplied hardware on the target pcb with no soldering, and uses smallest footprint in the industry.

https://www.ironwoodelectronics.com/press-releases/

12W DC-DC CONVERTER IN SIP-8 PACKAGE DELIVERS 4:1 RANGE

TRACO POWER

TMR 12WI series of 12 Watt dc-dc converters deliver high power density of 4.73W/cm³ in a standard SIP-8 package (12 watts in a 0.87" x 0.32" footprint). Product series consists of 24 models offering 4:1 input ranges of 4.5~18 / 9~36 / 18~75Vdc and output voltages of 3.3 / 5 / 12 / 15 / 24 / ±5 / ±12 / ±15V Outputs. Full load operation is -40°C to +65°C convection, with an operating range of -40°C to +85°C.

https://www.tracopower.com/series/tmr-12wi

DEV KIT HELPS CREATE SECURE INTELLIGENT EDGE APPLICATIONS

AVNET

MaaXBoard 8ULP starter kit features the i.MX 8ULP processor from NXP Semiconductor and will help facilitate the development of ultra-low power, secure, intelligent edge applications. Implemented as a compact System-on-Module (SOM) plus carrier board (in popular single-board computer format), this platform includes a multifunction development interface plus well supported communication and expansion interfaces, to maximize its overall utility for developers of new custom products.

https://www.avnet.com/wps/portal/us/products/avnet-boards/avnet-board-families/maaxboard/maaxboard-8ulp/

FLEXIBLE HEATERS BEND, CONTOUR TO SPECIFIC APPLICATIONS

ITC ELECTRICAL COMPONENTS

Line of flexible silicone heating elements or flexible heaters can

bend and contour to various specific application requirements. Products can be attached to flat or curved surfaces, to allow for better and more effective heat transfer. This makes them suitable for equipment where standard operating conditions would prevent usage of conventional heating methods. Flexible heating elements encapsulated in silicone provide protection against moisture, chemicals, and are often more robust than other heating solutions.

https://www.itcproducts.com/

MULTISENSOR PROTOTYPING PLATFORM SPEEDS IOT DESIGN

NORDIC SEMICONDUCTOR

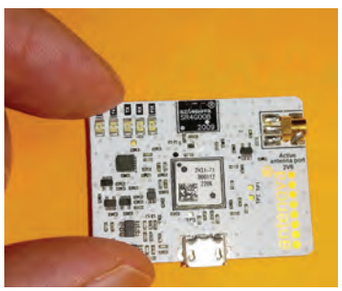
Nordic Thingy:53 is a multisensor prototyping platform with multiprotocol short range wireless connectivity and support for embedded machine learning (ML). Suitable platform for building advanced wireless proofs-of-concept and prototypes with ML capabilities on the shortest development schedules. Device is based on firm's nRF5340 dual-core Arm Cortex M-33 advanced multiprotocol System-on-Chip (SoC) and incorporates the company's nPM1100 Power Management IC (PMIC) and nRF21540 Front End Module (FEM), a power amplifier/low noise amplifier (PA/LNA) range extender. Prototyping platform is equipped with a rechargeable 1350mAh Li-poly battery and multiple motion and environmental sensors.

https://www.nordicsemi.com/Products/Development-hardware/Nordic-Thingy-53

COMPACT GNSS RECEIVER EXTENDS RUNTIME 500%

ANTENOVA

GNSSNOVA M20071 GNSS receiver module reduces power consumption five-fold to enable smaller tracker designs and trackers that run for five times longer. Module is for small tracking devices that operate from Li-ion batteries, where a lower power requirement is a clear advantage. Device tracks the GPS, Galileo, GLONASS and BeiDou constellations simultaneously, improving position accuracy particularly in urban environments.



Based on the latest generation chip from Mediatek, it draws 17mW of power when receiving GPS only, and 21mW receiving all constellations. Device measures 9.0mm x 9.0 x 1.8mm.

https://www.antenova.com/product/m20071/

ULTRA-WIDE INPUT AC-DC CONVERTERS IMPROVE RELIABILITY

AIMTEC

Firm expands its pioneered 90 to 528Vac input voltage range product offerings with two open frame and one encapsulated package options. AMEOFL5-480HANZ and the AMEOFL10-480PEVZ series are compact

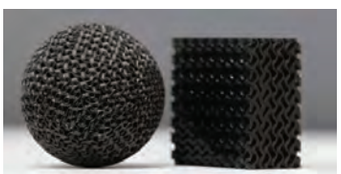
and efficient 5 and 10W open frame ac-dc converters respectively that accept input voltage ranges of 90 - 528Vac or 100 - 745Vdc. Products have an operating temperature range of -40°C to 85°C and provide 4000Vac for improved reliability and system safety. Products are designed with CLASS II reinforced insulation and can be configured to meet the various EMC requirements of multiple industries. Units meet IEC/EN/UL62368-1 standard, applicable in most industrial applications.

www.aimtec.com

PRINTABLE DIELECTRICS DELIVER 2.8 CONSTANT, LOW LOSS CHARACTERISTICS

ROGERS

Radix 3D Printable Dielectrics products feature a dielectric constant of 2.8 and low loss characteristics at microwave frequencies. These printable dielectric materials give radio



frequency (RF) designers design freedom in creating new components, eliminating the need to consider typical manufacturing design constraints. Proprietary composite materials are designed for the scalable manufacture of gradient index and controlled dk 3D structures, through a scalable, high-resolution printing process for end-use RF dielectric component manufacturing.

www.rogerscorp.com

10BASE-T1S CONTROLLER ADVANCES INDUSTRIAL ETHERNET

ONSEMI

NCN26010 10BASE-T1S Ethernet controller provides reliable multi-point communication in industrial settings, enabling more than 40 nodes on a single twisted pair, exceeding five times the amount of nodes requested by the IEEE 802.3cg standard, to reduce installation cost and set-up complexity. For in-cabinet wiring, Product reduces wiring up to 70% while significantly increasing bandwidth. In backplanes, it simplifies the layout and power distribution without impacting data rates or latencies. Device enables

multi-drop networks, reducing the total number of networks for large installations. Controller implements multi-drop 10BASE-T1S (802.3cg) Ethernet that is an effective replacement for legacy point-to-point and multi-point industrial communication standards.

https://www.onsemi.com/products/interfaces/ethernet-controllers/ncn26010

BEAMFORMERS ENABLE PRECISION IN BEAM STEERING FOR MMWAVE

NXP SEMICONDUCTORS

MMW9012K and MMW9014K 4-channel dual polarized analog beamformers support dual-polarization to improve 5G reliability and offer a high degree of integration to help reduce 5G base station size and costs, as well as reduce current consumption for 5G mmWave solutions. The dual-polarized,

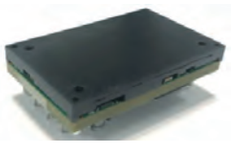
4-channel analog devices enable more precise steering of simultaneous beams to users, mitigating the

propagation loss common to 5G mmWave deployments and improving overall system reliability.
www.nxp.com

1500W QUARTER-BRICK CONVERTER BOOSTS POWER DENSITY

ABB POWER CONVERSION

Barracuda line of dc-dc bus converters includes a 1500-watt module that provides power densities of up to 810W per cubic inch and are available in both digital (QBDS128A0B) and analog (QBVS128A0B) versions. This high power density coupled with efficiencies of 97% or higher and IPC 9592B Class II qualification help to meet the quality and reliability needs of OEMs.



https://www.abbpowerconversion.com

SEALED TACTILE SWITCH PROVIDES 7.2 OR 7.7MM ACTUATOR

E-SWITCH

TL6170 Series Mid-sized, Sealed Tactile Switch provides either a 7.2mm or 7.7mm tall actuator with a firm tactile response. Rated IP67 for dust and moisture protection, devices provide a 300,000-cycle life expectancy and operates in temperatures ranging from -40°C to 85°C.
https://www.e-switch.com

ALIGNED CHASSIS MANAGER PLUGS INTO REAR SIDE OF BACKPLANE

PIXUS TECHNOLOGIES

SHM300 SlotSaver SOSA aligned VITA 46.11 compliant chassis manager that sits behind an OpenVPX backplane. This mezzanine-based approach allows for chassis management without sacrificing a slot. The VPX chassis manager is designed to the latest SOSA requirements and utilizes 100% US-based software/firmware. Product is used to monitor/manage the FRUs (Field Replace-

ment Units) plugged into the SOSA/OpenVPX chassis platform. Features include chassis discovery of plug-in boards, information storage, cooling management, SDR-based sensor initialization, and other chassis control and event handling.
https://pixustechnologies.com/

200W IP66-RATED RAILWAY DC-DC CONVERTERS OFFERS WIDE INPUT RANGES

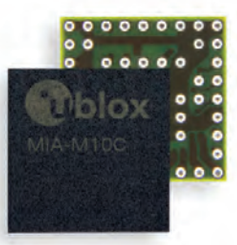
ABSOPULSE ELECTRONICS

RWY 200-D2 series of IP66-rated railway quality dc-dc converters employ field-proven design topology to generate 200W output power. Units operate from input voltages of 24Vdc, 48Vdc, 72Vdc, 96Vdc or 110Vdc with wide EN50155 input ranges. Available outputs include 12V, 24V, 48V or 110Vdc. Custom I/O values available on request. Products meet the requirements of EN50155 for electronic equipment used on railway rolling stock.
www.absopulse.com

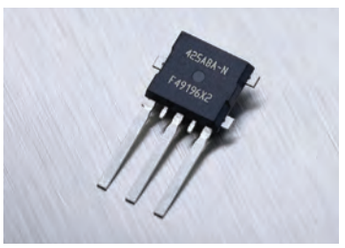
TINY GPS MODULE DELIVERS ULTRA-LOW-POWER

U-BLOX

MIA-M10 tiny GNSS (Global Navigation Satellite System) module series is built on firm's ultra-low-power M10 GNSS platform. Device provides a power-efficient solution for size-constrained battery-powered asset tracking devices. Roughly half



the size of competing products, the 4.5 by 4.5-millimeter miniature form factor allows developers to design more attractive and comfortable solutions, further driving the adoption of positioning technology in consumer and industrial solutions. The module offers ultra-low power consumption without compromising GNSS performance.
https://www.u-blox.com/en/product/mia-m10-series



3D MAGNETIC POSITION SENSORS SERVE AUTOMOTIVE DESIGN

MELEXIS

MLX9042x series 3D magnetic position sensing solutions are primarily intended for automotive customers working on applications such as powertrain actuators, transmission sensors, pedal position sensors and chassis sensors. Industrial customers will also benefit from the improvements they enable. Based on firm's Triaxis Hall sensor technology, devices feature analog signal conditioning, data conversion and signal processing, as well as output stage drivers.
www.melexis.com/MLX9042x

BLUETOOTH SOC DELIVERS FLEXIBILITY, LOW POWER

INFINEON

AIROC CYW20820 Bluetooth & Bluetooth LE (low energy) system on chip (SoC) is a Bluetooth 5.2 core spec compliant device tailor made for IoT applications. Product provides reliable connectivity and low power with high performance compute capability integrating an ARM Cortex-M4 microcontroller unit with floating point unit. Device is highly integrated with multiple digital interfaces, optimized memory subsystem, and power amplifier delivering up to 11.5 dBm transmit output power in LE and BR (basic rate) modes.
www.infineon.io

PRE-ASSEMBLED OVER-MOLDED CABLES SERVE M12 CONNECTORS

BINDER USA

Pre-assembled and pre-tested over-molded cables for use with M12 connectors are ready-to-connect cables that eliminate the need for

single-core wiring, reducing errors and speeding up installations. Devices are essential to plug & play and plug & work solutions in M12 field installations. Cables are suitable for usage in industrial networks including CAN, Profibus and Profinet. With a pin count of 3 to 12, products come in a wide range of connector codings. Built without any single-core wiring, devices are available as straight or angled, as well as molded on one or both sides.
www.binder-usa.com

FRAMELESS SERVO MOTORS ARE ROBOT-READY

ELECTROMATE

Kollmorgen TBM2G series of frameless servo motors simplifies the design of collaborative, surgical, aerospace and defense and other robots while delivering optimal performance in a lighter, more compact package. Products provide high-performance torque in a compact electromagnetics package. Next-gen devices enable robots with lower joint weight, higher load-carrying capacity, improved energy efficiency, lower thermal rise and faster, smoother movements. Motors remove this limitation through advanced windings and materials that boost power, torque and efficiency consistently across a wide speed range.
https://www.electromate.com

DISTRIBUTION

INDUSTRY CHANNEL PLAYERS GO GREEN

Representatives of Canada's electronics ecosystem invested their time and energy towards building a greener future by participating in a tree planting activity in Markham Ontario this spring.

Local contract electronics manufacturers Vexos joined power component manufacturer Murata Electronics Canada Inc. and Mississauga-based manufacturers' representatives GMA Inc. in a jointly organized tree planting event. The green initiative, 'Trees for the Future', was conducted in association with TreeCanada, a Canadian non-profit organization dedicated to planting and nurturing trees in rural and urban environments, in every province across the country. The activity brought together industry leaders, customers and suppliers, who jointly planted more than 375 trees at the Milne Dam Conservation Park in town.

Early in May 2022, Vexos , Murata and GMA announced their association with Tree Canada, which helps to grow Canada's tree canopy through its programs, research, and engagement efforts and by offering grants to communities and schools. Together with their partners and sponsors, they have planted more than 84-million trees.

"We are more focused than ever on working towards ecological and environmental awareness. We made our first steps towards fostering awareness about the environment and our ecology whilst building a new, purpose-driven and growing culture. Our partnership with Murata, GMA and Tree Canada reflects those values" says Cyril Fernandes, senior vice-president, global business development, Vexos.

ARBELL NOW EXCLUSIVE CANADIAN DISTY FOR AAT

Arbell Electronics, Canadian-based distribution specialists in production supplies has reached an agreement to become the exclusive partner with Austin American Technology (AAT), manufacturers of industrial grade cleaners for the electronics assembly industry.

AAT is an industry leader and specialized manufacturer of batch cleaners, in-line cleaners, solvent cleaners, stencil cleaners, and many more. The products are used in the many applications, including: printed circuit board (pcb) cleaning, surface-mount technology (SMT), stencil & misprint, flip chip, and BGA, in several industries including automotive, medical, military, and aerospace. All cleaners are manufactured and built to each customers' specific needs in Austin Texas.

"Our exclusive arrangement with Zestron for its chemistry, and now with our partnership with AAT for the equipment, we are providing the best options for customers that have cleaning requirements and needs. AAT is a leader in the market, and we are excited to work with their team," says Arbell president Lee Wise.

SMT INDUSTRIAL SUPPLY OPENS DEMO FACILITY

SMT Industrial Supply Inc., a North American distributor of electronics production materials and equipment – new and used, has expanded its printed circuit board (pcb) recycling center in Orillia ON and opened a brand-new 2,200-square-foot demonstration facility in Barrie ON.

In addition to the full range of Indium brand soldering products and maintenance supplies, the new office and warehouse in Barrie will host Hanwha SMT assembly equipment, which includes both new and refurbished products, according to Geoff Zacour, president of SMT Industrial Supply.

"The recently unveiled demo centre and warehouse allows us to add to our stock of dry storage cabinets and demonstrate a complete SMT line, including print, place reflow, X-ray counting and inspection," says Zacour. The Barrie-based property will also feature new and used conveyors, AOI, SPI, AXI, wave, selective soldering and test.

SMT Industrial Supply currently collects pcb waste, and other types of E-waste including finished goods and does pay customers in some cases, according to Zacour.

"Our principal (recycler) is at the top of the food chain and our waste goes right to the shredding machine, which is adjacent to our shop. We can get excellent value and pay top dollar for all non-ferrous metals including gold," he says.

Staff representing Vexos, Murata and GMA participated in a tree planting event in Markham Ontario this June.

DIGI-KEY ROLLS OUT IMMERSIVE INNOVATION HUB

Digi-Key Electronics has added an Innovation Hub to its online presence, providing an immersive experience for users to virtually explore a modern engineer's workshop.

Innovation Hub users can explore the immersive space and discover how Digi-Key can help bring their latest vision to reality by interacting and engaging with multiple experiences and features. New and current Digi-Key customers can access the Innovation Hub for a curated way to access the many resources and content the company offers, including products, videos, technical information, calculators and more.

"The Innovation Hub enables students, makers and engineers around the world to engage with Digi-Key in a new and dynamic immersive web format," said David Sandys, senior director of technical marketing at Digi-Key. "There is simply no better way

Digi-Key's Innovation Hub provides an immersive web experience of a modern engineer's workshop, including featured products, tools, boards, calculators.

Photo: Murata; Digi-Key

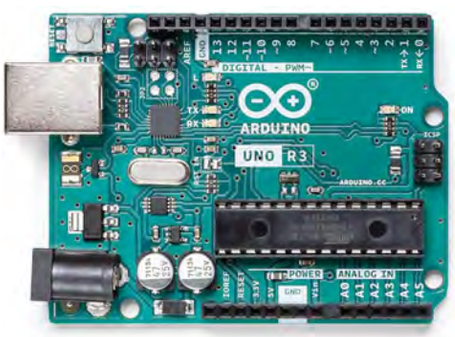
to learn about Digi-Key, the products and markets we serve, and the content and solutions we develop. We are looking forward to bringing it on the road with us to upcoming trade shows and conferences.

SEMICONDUCTORS

RENESAS INVESTS $10M IN ARDUINO

Semiconductor maker Renesas Electronics Corp., has investment $10-million into Arduino's Series B round of $32 million. The partnership with Arduino enables Renesas to make its broad range of products available for Arduino's technology platforms used by its worldwide developer community.

Arduino was first developed as an easy-to-use tool for fast prototyping aimed at students without a background in electronics and programming. Arduino expanded to offer tools for education and professionals. Now, the company is focusing on



empowering a new generation of professional engineers with enterprise scale applications. Arduino recently unveiled plans to expand its portfolio of hardware, software, connectivity and developer tools for professionals and into the enterprise, broadening its offering beyond makers and students. The strategy is designed to deliver more of the speed, simplicity and power inherent in Arduino's innovative platform to the enterprise.

GAN SYSTEMS PARTNERS WITH POWERSPHYR ON WIRELESS POWER

GaN Systems, an Ottawa-based provider of GaN (gallium nitride) power semiconductors, and PowerSphyr Inc., a global player in wireless energy for industrial and automotive applications, have collaborated to deliver an industry-first portfolio of end-to-end wireless power solutions (30-Watt, 100-Watt, and 500-Watt) for industrial and automotive applications

worldwide.

The new portfolio, combined with new and enhanced levels of customer service and support, provides industrial and automotive customers with an easy path to obtain the most compact, wireless power solutions with industry-leading performance and cost.

The development builds on a multi-year strategic partnership to bring customers state-of-the-art GaN-based wireless power systems. The partnership combines PowerSphyr's years of power technology expertise and GaN Systems' industry-leading GaN semiconductors. For example, PowerSphyr is now implementing GaN Systems' power semiconductors on the receiver of the wireless charging solution in addition to the transmitter. The combination is a game-changer in delivering easy-to-use, high-performance, and completely wireless charging solutions—the ongoing collaboration results in continuous innovation of hardware and firmware solutions that adhere to wireless charging standards.

TEST

KEYSIGHT UNVEILS SIMULATION SOFTWARE FOR RF

T&M giant Keysight Technologies Inc. has introduced its PathWave Advanced Design System (ADS) 2023,

an integrated design and simulation software that rapidly addresses increasing design complexity and higher frequencies in the radio frequency (RF) and microwave industry.

The PathWave ADS 2023 includes enhancements to electromagnetic (EM) simulation for circuit designers. It also streamlines integration of multi-technology circuit assembly and simulation into enterprise electronic design automation (EDA) design workflows.

The simulation software enables RF and microwave product development teams to easily address signal complexity, design densification, multi-technology integration and frequencies moving to 60GHz and beyond. As a result, customers can shorten time-to-market, improve engineering team productivity and deliver competitive design wins.

"This product directly addresses the needs of customers developing multi-technology high speed, high-frequency designs," said Joe Civello, director of RF and microwave simulation at Keysight. "This new solution offers workflow and simulation performance improvements that accelerate the design and simulation process while delivering the analysis results necessary to ensure designs meet critical electrical and thermal performance requirements."

PRODUCTION

VENDORS COLLABORATE ON ADDITIVES

BOFA Americas, Inc. has partnered with Würth Additive Group in an effort for both firms to reinforce their positions as leading players in the additive manufacturing (AM) industry.

BOFA Americas, Staunton, IL, is a leader in fume and dust filtration systems, with a growing product portfolio developed specifically to meet the needs of 3D print technology.

Würth becomes a partner of BOFA Americas in North America, anticipating to extend the partnership on a global basis. Würth Additive Group, Greenwood IN, operates as a partner, distributor and reseller of AM equipment, consumables and maintenance, repair and operations (MRO) parts and offers AM engineering services and training. The company's industrial 3D printing and digital inventory products and services streamline the supply chain, reduce lead times and increase adaptability. **EP&T**

Photo: Arduino; PowerSphyr Inc.; Keysight Technologies

PRODUCT SOURCE GUIDE

AD INDEX

TO ADVERTISE *in an upcoming issue of* **EP&T**, *contact* ***Scott Atkinson****, Publisher, satkinson@ept.ca or (416) 510-5207) or* ***Joanna Malivoire****, Account Manager, jmalivoire@ept.ca or direct 866-868-7089.*

Logitech PowerPlay

Wireless charging pad

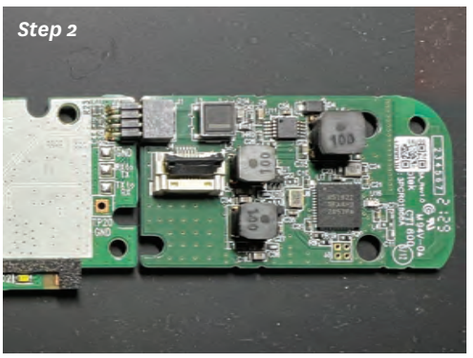
BY IFIXIT

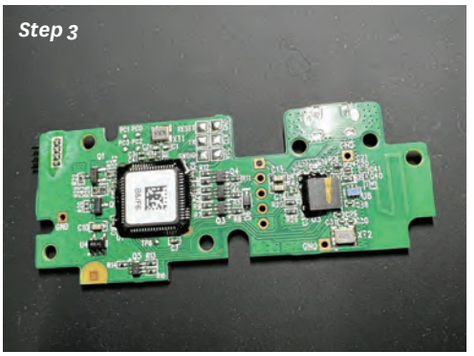
These findings are from iFixit, the open source repair guide. The popular online site teaches people how to fix just about any electronic device, and sells the parts and tools to make it possible. For this teardown, the engineers at iFixit tackle Logitech PowerPlay wireless charging pad for their wireless mice (LIGHTSPEED ones only).

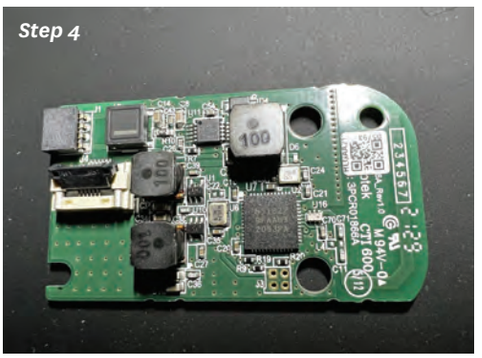
This teardown will briefly explain how it can be done, but mostly intended to show what parts are inside the device for reference if doing self-repairs.

Let's open it up and see if it makes any logic.


Step 1


Step 2


Step 3


Step 4

Step 1 Removing The Screws

The picture shows the sticker and screws removed.

Option 1: You can choose to cut out holes in the sticker where the screws are if you want.

Option 2: You can choose to rip the sticker off carefully if you want to put it back on again, if that's what you prefer

Now be careful when you open it, there is a ribbon cable connecting the charging pad to the housing PCBs. See next step for reference.

Step 2 Opening & Getting PCBs Out

So as mentioned in the previous step, there is a connector for a ribbon/flex cable on the charging board.

You need to take out the 3 screws from the PCBs then carefully take them out and disconnect the cable

Now you're left with two connected modules. There is a 4 pin connector that you can just disconnect.

That should pretty much be it for the teardown. Look at the next steps to get a closer and more detailed look at the internals.

Step 3 Main Module - Closer Look

This is the main module that handles the USB-connection for the data connectivity for the wireless receivers as well as power for both the receivers and the charging module (see next step).

This module alone can act as a receiver for your Logitech LIGHTSPEED devices. Though I'm unsure how many devices it can connect simultaneously.

Step 4 Charging Module - Closer Look

This is the charging module that connects to the wireless charging transmitter coil.

In the first picture you can see the connector on the left side of the board (white with slightly open lock).

Although I haven't tested, it should work just fine for charging if you can supply power to the 4 pin connector on the board.

Without being an expert on the topic, I'm assuming that the 4 pin connector is just a USB 2.0 spec connector to communicate some information from the charging module to the main module. (so 2 pins for power and 2 for data)

Last picture is of the ribbon cable that connects to the power output port on the charging module.

These findings are from iFixit, the open source repair guide. The popular site teaches people how to fix just about any electronic device, and sells the parts and tools to make it possible. Anyone can create a repair manual for a device or edit the existing guides to improve them. iFixit empowers individuals to share their technical knowledge and teach the rest of the world how to fix their stuff.
https://canada.ifixit.com

Introducing the world's smallest high-frequency wirewound chip inductor!

Actual Size
(Tiny, isn't it?)

Once again, Coilcraft leads the way with another major size reduction in High-Q wirewound chip inductors

Measuring just 0.47 x 0.28 mm, with an ultra-low height of 0.35 mm, our new 016008C Series Ceramic Chip Inductors offer up to 40% higher Q than all thin-film types: up to 62 at 2.4 GHz.

High Q helps minimize insertion loss in RF antenna impedance matching circuits, making the 016008C ideal for high-frequency applications such as cell phones, wearable devices, and LTE or 5G IoT networks.

The 016008C Series is available in 36 carefully-selected inductance values ranging from 0.45 nH to 24 nH, with lower DCR than all thin film counterparts.

Find out why this small part is such a big deal. Download the datasheet and order your free evaluation samples today at **www.coilcraft.com**.

Coilcraft®

WWW.COILCRAFT.COM

HAMMOND MANUFACTURING®

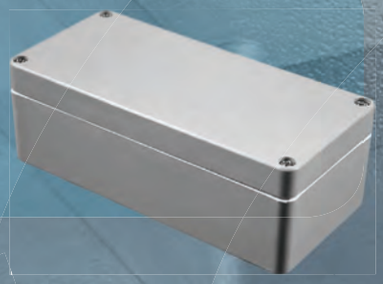
Hundreds
of industries served

Thousands
of models IN STOCK

Unlimited Applications

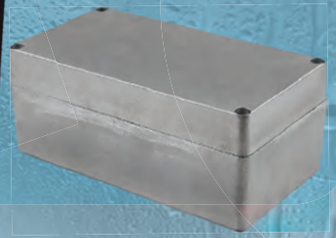
Polycarbonate Enclosures

Glass-Reinforced Polyester Enclosures



Industrial Wall-Mount Enclosures

Die-Cast Aluminum Enclosures



Stainless Steel Enclosures

www.hammondmfg.com