# EP&T

ELECTRONIC PRODUCTS & TECHNOLOGY

SEPTEMBER 2022

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# SUPPLY CHAINED-UP

*Perfect storm of supply chain challenges continues to disrupt the design process p.10*

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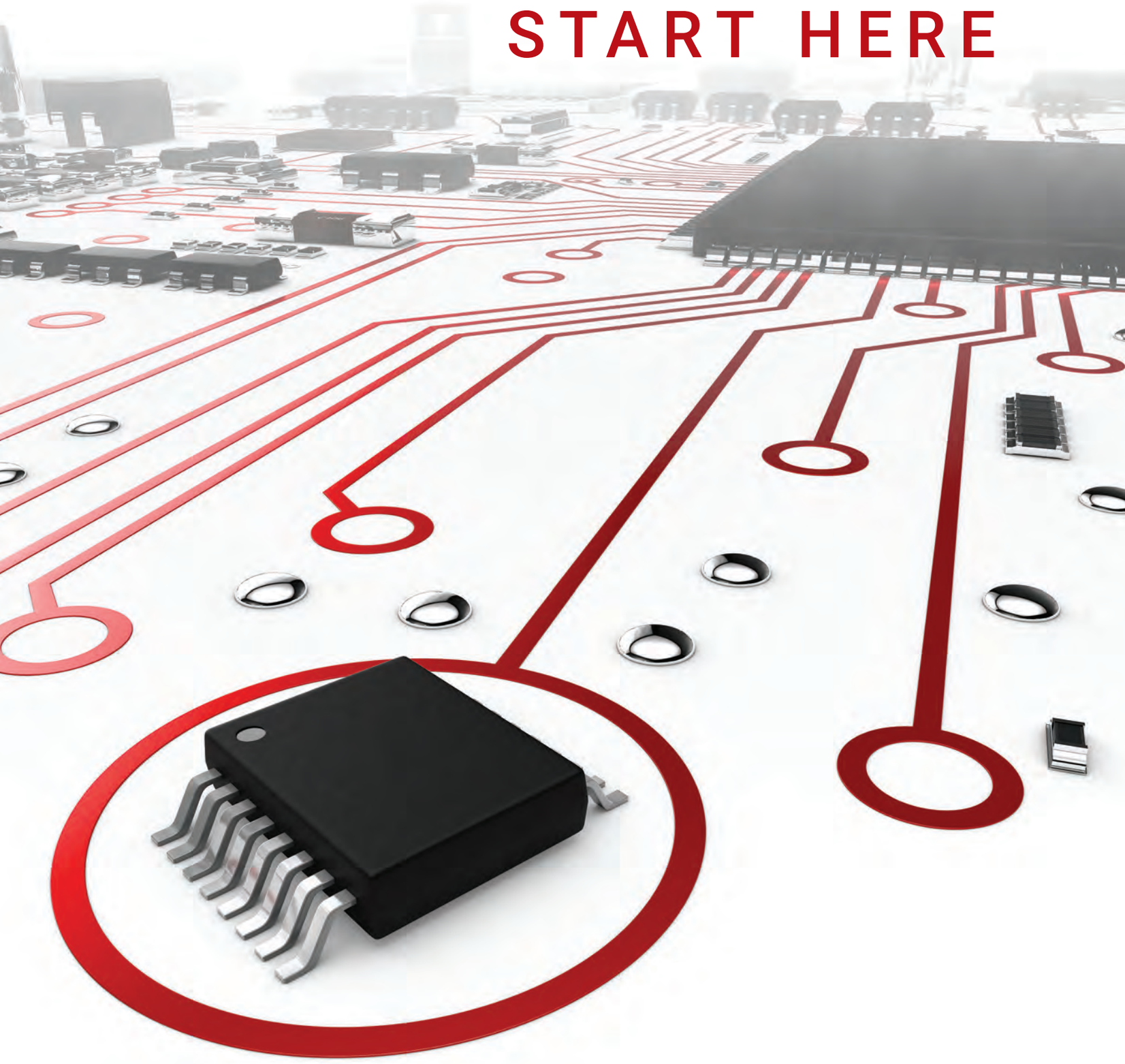

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# INSIDE

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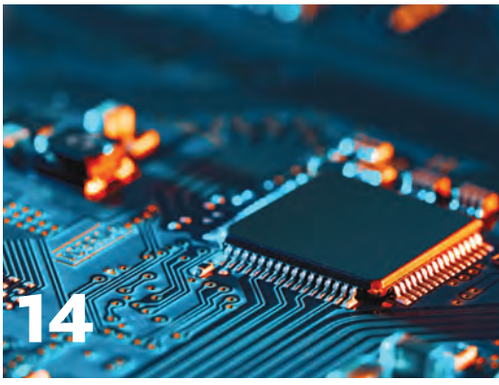



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Photos (this page, from top): Digi-Key; Adobe Stock

# Which end is up?

## *Electronic component supply remains puzzling*

Between ongoing geopolitical tensions, semiconductor shortages and unprecedented widespread volatility, it's fair to say that the global supply chain for electronic components has never been more unstable.

The list of 'hard-to-get' items appears to be growing as the year progresses. The problems initially surfaced during the early stages of the pandemic, when a combination of factory shutdowns and panic buying quickly emptied store shelves. By early 2021, the issue had expanded into the industrial space, where container shortages, a lack of truck drivers, port congestion and ongoing pandemic effects have taken a steep toll on the world's supply chains.

Semiconductors continue to grab the most headlines. The direct impact of chip shortages alone has been both universally felt and substantial. For example, IHS Markit estimates that the chip scarcity issue has contributed to more than 10-million units of lost global automobile production since the problem began in late 2020. Also, virtually all publicly-traded automakers and suppliers still cited chip shortages as adversely impacting their financial results.

### *Reshoring chipmaking*

While the global shortage is arguably the most complex issue facing automotive supply chains, significant upfront capital investment is required for new chip manufacturing plants. Several major contract chipmakers have announced plans to establish significant new fabs in the United States. Some of the sector's top players sought to address the infrastructural problems by considering producing a 'homemade' product.

The Semiconductor Industry Association (SIA) found that building a fab in the United States is 25 to 50 percent more expensive than in other countries. Thus, we may have to wait and see if these chip makers are successful in securing U.S. government funding to support their initiatives. Since experts believe demand for electronic components will double within the next 10-years, maybe Washington will help component makers operating within its borders capitalize on that explosive growth sooner rather than later.

### *OEM cutbacks*

Adding to the overarching industry angst, several significant consumer electronics brands have signalled cutbacks or reductions in actual device shipments. Apple has reported that it expects to lose $4 to $8-billion due to supply chain problems alone. Market watchers predict an uncertain global economy moving forward. It seems consumer demand has declined due to macroeconomic and public health challenges.

Intel, the largest maker of computer processors, recently backed-up this theory, stating it believes the era of ballooning consumer electronics revenues is about to end. It also went a step further by issuing a warning to OEMs, CEMs, and EMS providers should prepare for the 'pop'.

According to recent data provided by Supplyframe, overall component demand does remain strong, and global supply chain issues will likely persist into 2023. While electronic component availability is improving and prices are stabilizing across some categories, Supplyframe's Commodity IQ report indicates extended lead times, geopolitical uncertainty and elevated logistics and labour costs will remain problematic for the electronics ecosystem and specific end-markets into next year.

### *Golden screw*

From the engineer's desk – there seems to be an ongoing pursuit of the 'golden screw'. This recurring theme was referenced throughout the EDS show in Las Vegas this May. It serves as the cornerstone to the cover story of this month's edition of EP&T (*pages 10-11*). The article, written by Kim Vettleson of Digi-Key, provides details behind the meaning of the 'golden screw.' From an inventory standpoint, customers have procured some material, but they're still waiting for those one or two critical components to finish production and start generating revenue. According to Vettleson, the quest for a 'golden screw' will ultimately determine market success. **EP&T**

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***While electronic component availability is improving, and prices are stabilizing across some categories - extended lead times, geopolitical uncertainty, elevated logisitics and labour costs will remain problematic for the ecosystem into 2023***

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# NEWSWATCH

PCB BOARDS

## BITTELE ENHANCES PCB FACILITY

Bittele Electronics Inc., a Toronto-based pcb printed circuit board assembly manufacturer, has expanded its Markham-based facility. Bittele grew its component warehouse to provide more storage space for consigned inventory since extended part lead times still plague the component market.

"Now, we can store consigned parts for ongoing and upcoming orders," says Bittele CEO Ben Yang. "We also offer the option of purchasing and stocking critical items from a customer's BOM upon request."

Bittele has also installed a Soltec wave soldering machine, which will be utilized for larger-volume, through-hole assembly. The new equipment will complement its current Ersa selective soldering machine and will be operational later this summer.


*Pcb board assembly manufacturer Bittele has expanded its component warehouse.*

SEMICONDUCTORS

## SPARK MICROSYSTEMS TEAMS WITH UWB ALLIANCE

SPARK Microsystems, a Montreal fabless semiconductor company specializing in next-generation ultra-wideband (UWB), and UWB Alliance, an international non-profit organization dedicated to the promotion and growth of the UWB industry, has initiated a joint effort to test the coexistence and aggregation capabilities of UWB technology in environments where other wireless protocols and radio devices are in use.

This first phase includes testing the interoperability and compatibility of a pair of UWB technologies operating in a single environment simultaneously with UWB transceivers from SPARK Microsystems and other industry players.

"Generating empirical data through scientific testing is critical for understanding how UWB devices can coexist with other devices," said Benjamin Rolfe, CTO, UWB Alliance. "The testing we are doing will enable the industry to progress forward on collaborative coexistence strategies that optimize spectrum sharing while minimizing interference. It will also provide standards-making bodies with factual documentation to aid in amending or modifying spectrum rules, allowing more UWB-enabled solutions to come to market."

Preliminary results of phase one with multiple UWB devices indicate generally good coexistence performance, with the tested devices showing no measurable performance impact from other interfering UWB devices. Testing of multiple devices in aggregation was also conducted. Phase two will expand the coexistence testing to include UWB with U-NII devices in 6 GHz (802.11ax). The full results will become available shortly after the conclusion of the testing.

WIRELESS

## BEC TECH TO EXPAND INTO CANADA

BEC Technologies Inc., a developer and manufacturer of 4G LTE and 5G wireless broadband network connectivity solutions is expanding its business across Canada. The move is part of BEC's plan to enhance its global capabilities to serve customers and partners in all the world's major markets.

BEC has a market presence in the Americas as a provider of 4G LTE and 5G solutions and is reportedly positioned to help communications service providers and solution integrators capitalize on the demand for wireless network connectivity.

BEC reports that they have been involved in designing solutions for various sectors, including enterprise, retail, education, healthcare, industrial, transportation, energy, and smart city.

"The expansion is a great opportunity for us to help businesses broaden their service offerings, create value and drive revenue growth," said D'Andre Ladson, VP of marketing. "We are eager to make our solutions available to more customers and contribute to accelerating 5G adoption in Canada."


*The latest 5G wireless connectivity devices from BEC Technologies.*

SOFTWARE

## BLACKBERRY QNX ACHIEVES FACE CERTIFICATION

BlackBerry's QNX Software Development Platform 7.1 has achieved conformance to the latest Future Airborne Capability Environment (FACE) technical standard as a General Purpose Profile Unit of Conformance (UoC), enabling developers to rapidly deploy safe and secure software solutions based on the BlackBerry QNX platform to deliver defense vehicle capabilities.

The FACE Technical Standard is an open standard for making computing more robust, interoperable, portable and secure. Software conformance with the FACE Technical Standard can be used—and easily reused—by suppliers and integrators of systems across different global defense programs. The FACE framework is supported by over 90 international government and industry member organizations. By achieving FACE conformance, BlackBerry QNX can reportedly help manufacturers and service providers reduce procurement costs and prevent supplier lock-in.

"Aerospace and Defense systems manufacturers need to rapidly deploy their solutions in a wide range of platforms that operate in hostile environments against peer adversaries," said Grant Courville, Vice President, Products and Strategy at BlackBerry QNX. "BlackBerry QNX solutions enable embedded developers with an independently certified software foundation that is designed for safety, security, reliability, and standards conformance, allowing developers to focus on delivering competitive defense capabilities."

ARTIFICIAL INTELLIGENCE

## UBC UNVEILS ENERGY EFFICIENT AI CHIP

CMC Microsystems research group recently introduced an energy efficient AI chip, using one of the world's most advanced semiconductor fabrication technologies, the 12LP 12nm FinFET process offered by its partner, GlobalFoundries (GF).

Photo: Bittele Electronics; BEC Technologies;

A development team comprised of Ph.D. student Avilash Mukherjee, and associate professors, Dr. Sudip Shekhar and Dr. Mieszko Lis, at the department of electrical and computer engineering, University of British Columbia worked on the tape-out. Their research has applications in machine learning (ML) and Deep Neural Networks (DNNs), which are promising solutions to incorporate artificial intelligence (AI) in our daily lives. Workloads are ubiquitous in datacenters and mobile devices. Training of these workloads, however, faces severe challenges due to increasing model sizes and corresponding energy and latency costs. This is one of the biggest limitations facing the ML community today.

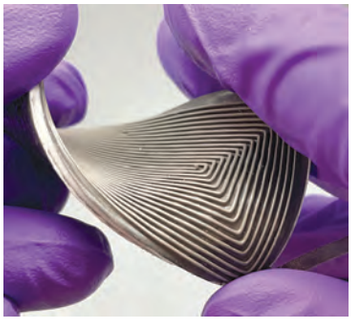
To enable training of DNN models with low latency and energy, the team fabricated a DNN accelerator which leverages sparsity to skip computations and reduce runtime and energy by up to a factor of 3x on ResNet-18 and MobileNet-v2 over their corresponding dense versions, without compromising any accuracy.

"Through CMC's partnership with GlobalFoundries, we provide simplified access to world class technologies to support innovation in advanced technology design and manufacturing," says CMC president and CEO Gordon Harling.

**FLEX TECH**

## FLEXIBLE DEVICE HARVESTS THERMAL ENERGY FOR WEARABLES

University of Washington researchers have developed an innovative solution to continuously powering wearable electronic devices, such as health and fitness trackers to virtual reality headsets. But finding ways to continuously power these devices is a challenge. Researchers have uncovered what they call the "first-of-its kind" flexible, wearable thermoelectric device that converts body heat to electricity. The device is soft and stretchable, yet sturdy and efficient — properties that can be challenging to combine.



***Researchers develop a flexible, wearable device that converts body heat to electricity.***

"It's a 100% gain if we harvest thermal energy that would otherwise be wasted to the surroundings. Because we want to use that energy for self-powered electronics, a higher power density is needed," said Mohammad Malakooti, a UW assistant professor of mechanical engineering. "We leverage additive manufacturing to fabricate stretchable electronics, increase their efficiency and enable their seamless integration into wearables while answering fundamental research questions."

Even after more than 15,000 stretching cycles at 30% strain, the researchers' prototype device remains fully functional, a highly desirable feature for wearable electronics and soft robotics.

The device also shows a 6.5 times increase in power density compared to previous stretchable thermoelectric generators. To create these flexible devices, the researchers 3D printed composites with engineered functional and structural properties at each layer.

The filler material contained liquid metal alloys, which provide high electrical and thermal conductivity. These alloys address limitations in previous devices, including an inability to stretch, inefficient heat transfer and a complex fabrication process.

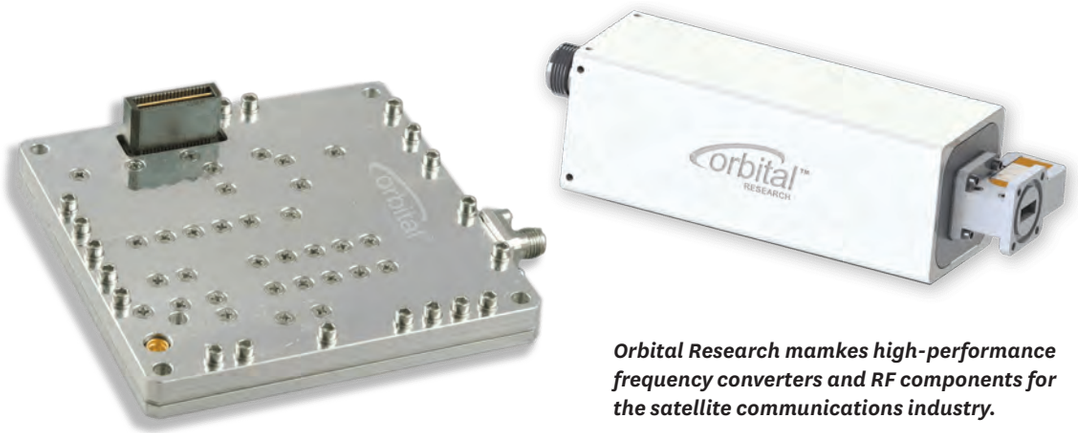
Photo: University of Washington

# Orbital Research takes SATCOM performance into orbit

**BY SOHAIL KAMAL, WEST COAST CORRESPONDENT**

Touted to have some of the highest quality and reliability scores, even in the most challenging conditions, Orbital Research continues to manufacture high-performance frequency converters and RF components for the satellite communications industry. Their products support customers in military, aeronautical, satellite news gathering and other satellite industries.

The firm also represents another highlight in an impressive group of satellite communications companies that have been founded out west. West Tech Report recently had the opportunity to chat with Ian McEachern, CEO of Orbital Research, an experienced engineer who has worked in the past for Telesat, MPR Teltech, Norsat International at different stages of his career. In our conversation he shared how Orbital caught his eye, how the company is growing, and how the pandemic has impacted the firm's sales cycle.




*Orbital Research mamkes high-performance frequency converters and RF components for the satellite communications industry.*

### *A bit of history*

Canada launched its first satellite, the Alouette, in 1962, making Canada the third country in the world to have a satellite in orbit, after the Soviet Union and the United States. The Alouette was an atmospheric studies satellite that was unfortunately unreliable because the signals are often disrupted due to the effects of aurora borealis. Perhaps in response to this, in 1972, Telesat Canada launched the first domestic communications satellite in the world.

"A large earth station was built in Cowichan, BC, to allow for connections between eastern Canada and the west and also link into the undersea cables and international satellites," explains McEachern. "Later that decade, the satellite started being used to get entertainment into remote communities and work camps. At that time Orbital Research founder, Mike Stevens launched a company that went on to be Norsat International Inc. and started building and installing satellite receive stations."

BC, like the rest of Canada, has a lot of remote areas. BC Telecom developed and installed satellite dishes throughout the province in order to provide telephone service to remote areas. All this is to say that there is an ecosystem that has developed into a thriving satellite communications industry. Fast forward to five years ago when McEachern acquired Orbital – based on his trust of its potential. He had been working with them as a consultant, working with designs, and really believed in the company's path. He also understood that they were constrained due to quality systems such as ISO, and by solving this, he would improve the value of the company.

"We created more structured operations, we hired operations people to run ISO 9001 processes, and systemize how products were built. And, those hunches were correct. We almost doubled the revenue before the pandemic, and we are still on an upward trajectory," McEachern adds. "Moving forward, I'm especially excited about how the industry is at a crossroads. Small satellites are causing a paradigm shift. They are much less expensive to launch and build, which means there will be more opportunities moving forward in small satellite communications."

In the past decade Orbital has grown from a small business with five people working out of their garages to more than 25 people and a 10,000 square-foot facility.

"Our space includes a clean room, advance pick and place assembly line, R&D labs with thermal chambers, RF Shielded rooms, and the requisite assembly of test equipment. We received our ISO9001 certification a few years ago and are now completing our AS9100D certification," boasts McEachern.

### *High performance LNBs*

Orbital has grown its product lines from a few proprietary and white labeled products to a whole line of proprietary high-performance Low Noise Block down converters (LNBs).

"Our converters have been designed to be easily customizable and the biggest pain point we typically solve is where the customer needs something just a little different than standard," states McEachern. "Our LNBs typically have the lowest noise figure and the lowest phase noise in the class and industry."

This translates to faster download speeds, with wider and more reliable coverage, even in inclement weather conditions. It isn't always rosy, however. The pandemic delayed a number of projects, as customers could not enter the sites where the installation of equipment is housed. However, with restrictions on foreign travel mostly lifted - international projects seem to be picking-up again. Furthermore, following two years devoid of face-to-face activity - Orbital Research's customers are clamouring back to see what's new.

"We are also starting to hear from our customers that they're open to in-person meetings and visits," says McEachern, while detainling some new products.

"Detailing our newest frequency converter is a Wide Band KaLNB. In addition to being the highest performing LNB on the market it is also covers the entire KaBand downlink spectrum. This means that it can be used with any (Ka-Band) satellite anywhere in the world," enthuses McEachern. "We have also put a higher performance processor on board that allows us to have an Ethernet interface for control and monitoring operation, another first in the industry."

Through thick and thin, McEachern underscores the benefit of being a member of a roundtable of peer CEOs.

"It's been a great experience where we all can share our experiences about running tech companies during troubling times," he says. "I still love learning new things every day." **EP&T**

**www.orbitalresearch.net.**

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

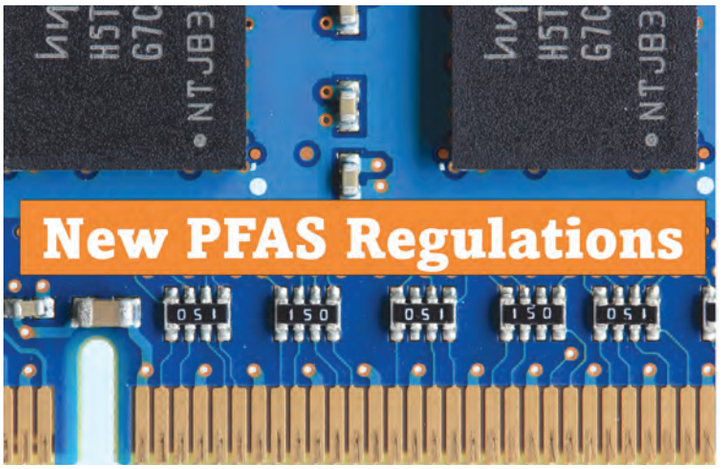
Photo: Orbital Research

# New Rules for PFAS Chemicals in Canada & U.S.

BY GLORIA ANASTASOPOULOS, PROJECT MANAGER, ENVIROPASS EXPERTISE INC.

Alarmed by recent studies on PFAS toxicity, several U.S. States have implemented laws restricting the sale of articles containing substances from the chemical group. In addition, the United States has proposed new rules in its Toxic Substances Control Act (TSCA).

Furthermore, the government of Canada is proposing to repeal the Prohibition of Certain Toxic Substances Regulations, 2012 and replace it with a stricter set of laws.




### What are PFAS?

PFAS stands for perfluoroalkyl and polyfluoroalkyl substances. Namely, they are a group of synthetic chemicals which contain a chain of bonded carbon and fluorine atoms. Generally, PFAS are desirable for their heat resistance, corrosion resistance, and ability to repel oil and water.

Most notably they are in: electronics; along with plastics; non-stick cookware; fire-fighting foams; water-proof clothing; treated wood; and many more. PFAS are restricted because they are persistent, bio-accumulative, and toxic (PBT). Specifically, they damage the liver, immune system, and endocrine function.

### PFAS restrictions in U.S.A.

Significantly, several U.S. states have recently implemented restrictions on the distribution or sale of products containing PFAS. Below is an outline of the new regulations regarding electronics:

**Maine:** Manufacturers must report the presence of PFAS in their products by January 1st, 2023. Also, Maine prohibits the sale of any product containing PFAS as of January 1st, 2030.

**California:** Products cannot be labelled as "recyclable" if they intentionally contain PFAS in the article or packaging for a functional reason or above 100ppm.

**Vermont:** Manufacturers or importers must report information on the use of PFAS chemicals perfluorohexane sulfonic acid, perfluoroheptanoic acid, or perfluorononanoic acid in children's toys sold in Vermont.

### TSCA PFAS test orders

Moreover, the US Environmental Protection Agency (EPA) has added rules to TSCA, targeting companies that utilize PFAS chemicals in their products.

Firstly, EPA may oblige manufacturers to gather information on chemicals they use in their products if the substance:

**Poses an unreasonable safety risk:** Causes significant exposure to humans or the environment. If a manufacturer does not respond to a test Order or otherwise comply with TSCA requirements, it will be liable for penalties in the United States.

**Manufacturers may respond to the Order by:** Developing the information through tests; Submitting existing facts EPA may not have considered; Requesting an exemption; Claiming not to be subject to the Order; Ceasing the manufacturing or processing of the chemical.

### TSCA PFAS recording rule

Secondly, on June 28th, 2021, EPA proposed a rule to require manufacturers to report information on any PFAS they have synthesized since 2011.

The Small Business Advocacy Review (SBAR) Panel convened on April 6th, 2022, to discuss the proposed rule on behalf of small businesses. EPA may give the final rule by the end of this year.

### TSCA PFAS significant new use rule

Lastly, on September 25th, 2020, the EPA implemented its significant new use rule (SNUR) on long-chain perfluoroalkyl carboxylate (LCPFAC) and perfluoroalkyl sulfonate chemical substances, as part of the PFAS substances family.

In short, the rule requires anyone manufacturing, processing, or importing the chemicals for a new use to notify the EPA at least 90 days in advance. Additionally, manufacturing may not begin until EPA has reviewed the notice.

### New Canada PFAS regulations

Last May, the Canadian government proposed the Prohibition of Certain Toxic Substances Regulations, 2022 to replace the regulations implemented in 2012. In particular, the new rules would introduce additional restrictions on the use, import, manufacture, and sale of PFOS, PFOA, and LCPFCA, which are PFAS chemicals. The Canadian Environmental Protection Act, 1999 (CEPA) has declared these substances toxic.

### New Canada PFAS regulations exemptions

Notably, certain exemptions apply to the new regulations, such as the ongoing use and sale of Electrical and Electronic Equipment (EEE).

However, the proposed regulations would also repeal many exemptions effective in its 2012 counterpart, including the sale and import of:

- PFOS in photographic films, paper, and printing plates;
- PFOA and LCPFCA for personal use;
- PFOA and LCPFCA in manufactured items (some exemptions still apply);
- PFOA and LCPFCA manufactured before December 23rd, 2016.

### Other Regulations Concerning PFAS

Globally, several regulations target the use of PFAS in articles. For example:

- California Proposition 65;
- European Union (EU) REACH Regulation on Substances of Very high Concern (SVHC);
- EU Regulation on Persistent Organic Pollutants (EU POP).

### How Can Manufacturers Ensure they Comply with PFAS Regulations?

Keeping track of and following so many environmental regulations can seem daunting. Manufacturers can do their due diligence to maintain compliance by:

- Staying informed on current and upcoming laws;
- Performing an audit of activities, services, and products;
- Conducting a material risk assessment;
- Testing medium to high-risk components;
- Educating supply chains.

Ultimately, employing skilled experts to manage these tasks can make environmental compliance straightforward. **EP&T**

*https://www.getenviropass.com/contact*

Photo: Enviropass Expertise

# ‘Golden screw’ will determine market success

## *Changing dynamics between design & production teams, suppliers & distributors*

**BY KIM VETTLESON, REGIONAL BUSINESS DEVELOPMENT DIRECTOR – CANADA, DIGI-KEY ELECTRONICS**

This year is well on its way to being another strong year for the electronic distribution industry, but as we’re looking at the final few months of 2022, the speculation is that we’re starting to see some softness in the broader market. Consumer spending is down, but demand remains extremely strong across all industries and verticals and is expected to remain strong, although specific components remain a big challenge.

The issues that Digi-Key Electronics is witnessing globally are the same challenges that companies are facing in Canada, from decreasing consumer spend to continued COVID issues and new variants. Add in extreme weather incidences, high demand, carrier delays and lack of staffing and it’s enough to make any engineer’s head spin.

### *Waiting on the golden screw*

There is an assumption from our industry that many are waiting for the ‘golden screw.’ Meaning that from an inventory standpoint, customers have procured some material, but they’re still waiting for those one or two critical components to finish production and start generating revenue.

There’s been some thought that as consumer builders get ready for the holidays, since all that product needs to hit the market between September and October, many of those companies are going to play the supply and demand game and not wait for the elusive golden screw. They’re going to weed off their inventory and may not have as much on the shelves for consumers at the holidays, but they’re hoping that the overdrive of the price from an inflation standpoint will make up the difference.

So, we’re experiencing some softness on the passives side and some increase in support on components, but there are still those hot items for automotive and some data center design that are still in critical need, and the lead times are still long there.

Overall, at a macro level, there’s softness, but there are still folks who are feeling the pinch and we’ve really been trying to keep a close eye on the data, because it’s not any one specific industry or component, it’s still pretty grey.

For many customers who have transitioned from a just-in-time inventory to a just-in-case strategy due to the supply chain issues of the past couple of years, we’re witnessing many who were used to holding X amount of inventory, and now they’re holding 4-5 times that, which causes challenges with cash flow.

Specific to Canada, we’ve seen a lot of medical designers and manufacturers specifically be hammered by the supply chain disruption, and any little change or modification to a design in that industry requires a very lengthy process, consequently in many cases the customers are just holding and waiting. They might be able to find the component they need on the broker market, but they’re probably going to pay twenty times the regular cost of the product, which doesn’t make it worth it in the long run.

**IoT**

Designs are everywhere, driving up component demand globally

### *Challenges ahead*

The biggest challenge we’re facing right now as a distributor is the golden screw, or lingering needed component. If I had a dollar for every call or email I’ve had regarding an expedite, I could be a very rich man! And although we might see some of the market softening, a lot of the customers are very bullish about what they’re seeing and what their future is, because they don’t see their demand going down – they don’t see customers backing away. In fact, they’re getting more and more customers to start depositing on future builds just to guarantee the inventory they think they’ll need and make sure they have their place in line, so that when the inventory is produced, it can be delivered.

The world is changing, with all the Internet of Things (IoT) driving demand, everyone is going to live differently than we have in the past. The phones are going to start talking to the refrigerators to tell you what to procure from the store or what to get delivered. The demand isn’t going to go away, we’re going to experience a softness of sorts, but the manufacturers are bullish, and that’s one of the reasons why there’s so much investment in their fabrication plants. And the locations they’re choosing – they’re not just going back to their traditional spots in Asia-Pac, they’re

Photos: Digi-Key



bringing some of that manufacturing back to North America to optimize the supply chain.

The manufacturers see that the need will be there moving forward, and the demand isn't disappearing in the future. We can look to the next generations as our gauge – they don't bank the same way; they don't purchase the same way – it's a very different world for them and they're the customers we'll be supporting moving forward.

**60%**

Disty growth is not scalable year over year, due to market fluctuations

### *Digital continues to drive*

Digital will continue to be a big push – those who are going to have the data faster are going to be able to decide faster, and the one who makes the decision the quickest will be the one to win. You can't make the call if you don't have the information, and the fastest way to get that is digitally. That's going to be a big push as we head into 2023, to make sure that our efficiencies are in line and we're doing as much with automation as possible for speed, accuracy and quality.

Humans will still be completely necessary, but if you can provide that human with a better tool, and better data integrity, that human is going to be able to make a better decision, which in the end should be a better decision for the company. Engineering staffs are really being pushed in this market, they are selecting components not based on what they need or what the design is requiring, but when they can get it. And that's not always the best for the product and the overall cost, so it's really pushing the engineering community.

A lot of customers are trying to do a lot more with a lot less, so the digital connection becomes even more critical, whether it's through an API or submitting a digital order to reserve inventory. The days of the paper purchase orders are nearing an end since most companies are having a hard time hiring people to enter those POs, so they sit and wait. But if you click submit on the web, those parts are reserved automatically.

Finding folks to enter those POs isn't the end of the labor shortage – the Great Resignation is a significant outcome of the pandemic, and many people have been evaluating their lifestyles and making alternate choices, which is resulting in staffing shortages everywhere from restaurants to manufacturers to Silicon Valley. The world is coming back online, but it's a struggle everywhere to find the people to work.

On the business side, customers are looking for more tools to self-serve, self-quote and easily check availability – as quickly as possible. They also want to manage their bill of materials (BOM) and share it with others. Customers can now do all this and more with Digi-Key's myLists tool which allows them to upload a list of components or BOM for quick analysis. This is an enhancement that is really improving efficiencies for the customer and making their jobs easier.

### *Continued supply chain chaos*

The perfect storm of supply chain disruptions that we've been experiencing for two and a half years now between COVID, extreme weather, high demand and international conflicts will continue the rest of this year, especially as new COVID variants continue to disrupt every location and facet of life. A lot of people are sitting on a bunch of inventory right now and waiting for that one special part and just trying to weather the storm until they can start shipping and making revenue for themselves. Some of the bigger manufacturers have been restructuring their inventory forecasts and we expect others to follow that trend. We're also looking ahead to the holidays which are always a big driver.

### *Growth will continue*

While some of these trends and forecasts aren't the most uplifting, the positive is that customers are experiencing exceptional growth year over year. Now the question is if it will maintain towards the end of the year and into 2023. Of course, the 40-60% growth they've been experiencing just isn't scalable year over year.

The good news is that we're already planning for the next growth cycle, because in our industry it's never a matter of if, it's a matter of when. As the market fluctuates, one thing will always remain: We will continue to support our customers and suppliers to ensure we're delivering on our promise to enable the world's ideas and remain a trusted distribution partner. **EP&T**

***Kim Vettleson*** *is regional business development director – Canada for Digi-Key Electronics. Digi-Key is a leader and continuous innovator in the high service distribution of electronic components and automation products worldwide.*

# Component supply chains continue to be disrupted

## *Electronics design ecosystem remains resilient*

**BY STEPHEN LAW, EP&T**

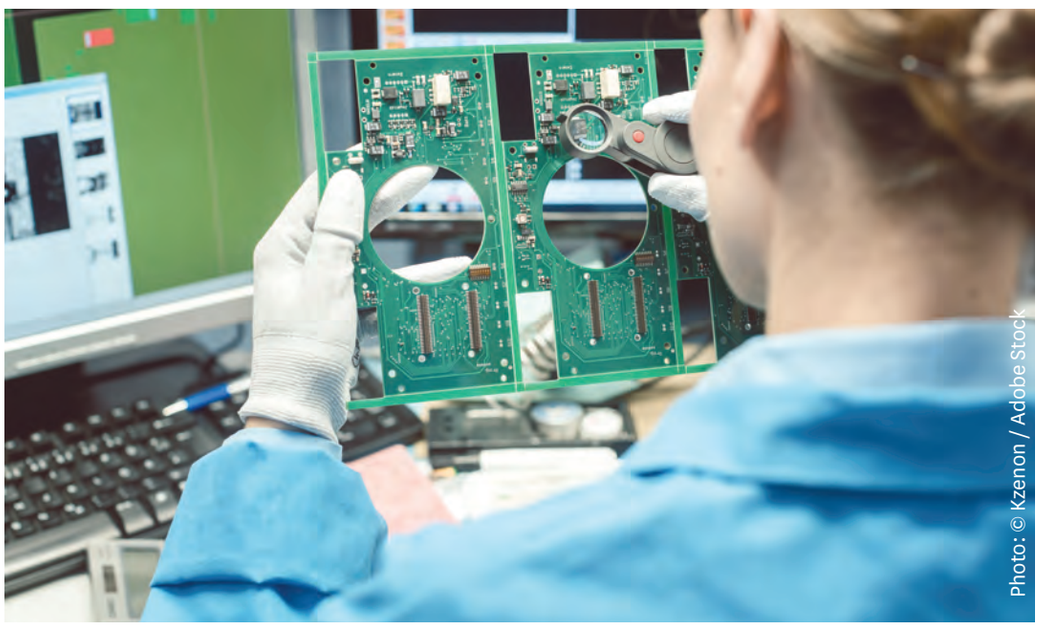
As supply chain disruption continues to befall the electronics industry globally and – of course – closer at home here in Canada – electronic engineering teams struggle in their journey to obtain necessary components required to achieve end-designs.

Shortages across all product categories, rising part prices, questionable lead-times, time-to-market pressures are compounding the challenges within the field of assembling an electronic application these days. To delve deeper into the topic of supply chain within the electronic component arena, EP&T took the opportunity to discuss many of these various issues with Jeff Newell, senior vice-president of products at Mouser Electronics.


*Jeff Newell, (above) senior vice-president of products at Mouser Electronics.*

**Q. *Is there any way to predict disruptions in the supply chain, which way to relate to transportation, positive or negative demand shocks and production issues?***

A While some predicted the global pandemic would disrupt supply chains across many industries, it was most definitely worse than projected. Still, the electronic component industry continues to show positive growth. For 2022, the Semiconductor Industry Association (SIA) is projecting growth of about 8.8%. As for predicting further disruptions, we do our best to anticipate demand. For Mouser, our strategy to invest in inventory regardless of business conditions has allowed us to grow and be well positioned for the future ahead.




**Q. *As we emerge from the first quarter of 2022, do you anticipate lead times will increase?***

Lead times are showing small signs of improvement, however we do expect supply chain instability and inflationary pressures to persist for the rest of 2022. Customers are placing orders many months ahead, and the industry outlook shows robust demand for semiconductors and electronic components, particularly in the data, communication and transportation sectors. At Mouser, our inventory position and wide selection continues to set us apart.

**Q. *What about the outlook on potential price increases on such component staples as analog, complex semiconductor (ASICs, MCUs, MPUs, PLDs), flash memory, non-ceramic capacitor, resistor and standard logic devices.***

We expect continued price increases for products that remain in high demand. For products where lead times are getting back to normal it's possible that pricing will stabilize. Of course, we are doing what we can to keep prices from increasing through strategic purchasing, product selection, and working directly with our manufacturers to minimize any impact for our customers.

**Q. *How does component demand compare this spring versus the spring periods of 2020-21?***

Business continues to be strong. Customers are naturally frustrated by the product shortages and are placing orders ahead. Distributors are not immune to global factors and there have been extended lead times and restricted allocation. Our Product teams are closely monitoring and working with manufacturers to restock products as needed. Innovation is still happening and some of major growth drivers are 5G, artificial

intelligence, robotics, industrial automation and transportation.

**Q. *Are active components more constrained than passive components? Do they both suffer from raw material challenges?***

We have seen shortages across all product categories. Passive lead times are improving and we expect lead times for active products to improve over the next few quarters. Of course, inventory and selection are key in times of shortages. Last year, Mouser added a record 100-plus new manufacturers to our lineup, and we stock the industry's widest product selection. Still, we are not immune to global factors and there have been extended lead times and restricted allocation due to shortages of products and raw materials.

**Q. *What tips would you provide to engineering teams to help keep design projects on track and minimize the effects of supply chain disruptions? What resources do you offer?***

Having real-time information and inventory is key. Our website shows availability of stock and lead times on products. Customers can order products and get on a waiting list to receive stock once available. We can suggest product alternatives if needed.

It's really important to continue using authorized sources and genuine products for design, even with extended lead times, as this can prevent problems down the road. We are a go-to resource for engineers and buyers, whether it's to purchase new products or ask technical questions. Our extensive online library of services and tools and technical resources, includes a Technical Resource Center and content hub, along with product data sheets, supplier-specific reference designs, application notes, technical design information and engineering tools.

**Q. *Contract electronics manufacturing are facing increased pressure to meet unprecedented demands. Customers need lower costs, increased scope of services, and faster turn times – at the same time as lead times a climbing. What advice would you give to CEMs and EMS players today.***

There's no question that customers are feeling time-to-market pressures, plus we are seeing inflation impact our industry. Working with a reputable, well-resourced, authorized distributor is essential. We work closely with our 1,200+ manufacturer partners to provide the fastest and easiest access to the industry's newest components. Having the most advanced technology to develop cost-efficient prototypes limits costly redesigns, manufacturing delays or even the termination of a project. It also leads to a design edge in delivering more product features and capabilities, as well as longer lifecycles.

**Q. *More than before, component buyers are contemplating purchase of aftermarket parts, which is encouraging counterfeiters to be bold. How important is it for designers to take measures to protect themselves accordingly.***

Definitely now more than ever, it is crucial to obtain genuine parts from authorized sources, confident that they are 100% certified and fully traceable from each manufacturer. Design engineers should be careful when buying from an unauthorized source. The risk of being supplied with counterfeit or grey market products is high — and it is impossible to know where that product has come from, how it is has been handled, and how it will perform. Counterfeit products can lead to unexpected failures, quality and warranty issues. **EP&T**

# Risk management essential for strengthening global chip supply chain

BY ZACHARY A. COLLIER, PH.D., ASSISTANT PROFESSOR, RADFORD UNIVERSITY

Semiconductors are commonly described as the brains of modern electronics. For example, in modern vehicles, there might be over 3,000 chips that enable telematics, infotainment, and other features. Similarly, household appliances, like refrigerators, microwaves, and washing machines, increasingly rely upon chips to power their 'smart' features.

Amidst a global chip shortage, many industries have been impacted by the lack of access to the supply of chips they need, and issues related to the semiconductor supply chain have been brought to the forefront. Supply chain risk management practices are instrumental and needed more than ever to mitigate the impacts of these concerns.

The chip shortage has a number of causes. The primarily cited reason is the COVID-19 pandemic, which caused a sudden increase in demand for laptops and other devices to facilitate the shift to work-from-home. However, even before the pandemic, there was a trend toward the Internet of Things, as well as increasing adoption of electric vehicles, driving up demand for semiconductors. Meanwhile, as demand continued to rise, supply chain issues like the winter storm in Texas that brought down the power grid and a fire in a Japanese chip facility have disrupted supply.

### *More supply needed*

The war in Ukraine further complicated the supply problem, as Ukraine produces between 45%-54% of the world's neon gas used in semiconductor production. As a result of these issues, US Secretary of Commerce Gina Raimondo noted that the median inventory of chips has fallen from 40 days in 2019 to less than 5 days in 2022. Companies report 12-month lead times or more to get the electronic components they need.

To alleviate these lead times, more supply is needed. However it costs billions of dollars to construct a new semiconductor fabrication facility (or fab). The trend for many years was to offshore the manufacturing to locations with reduced labor costs, largely in Asia. This has resulted in an industry where firms are hyper-specialized – so-called "fabless" firms specialize in the design of the chips, and contract their manufacturing to third-party foundries that specialize in the technologically sophisticated manufacturing processes, while other companies specialize in the assembly and testing steps. This all results in a complex global ecosystem, with many points of failure.

Geopolitically, one of those potential points of failure is Taiwan. Taiwan accounts for almost two-thirds of global chip manufacturing capacity, with the firm TSMC capturing a 54% share of the global semiconductor manufacturing market – by far the market leader (South Korea's Samsung is in second place with 18% market share). With concerns mounting that China may attempt to invade Taiwan, it is worth thinking about what impacts that might have on the global semiconductor supply chain.

**5**

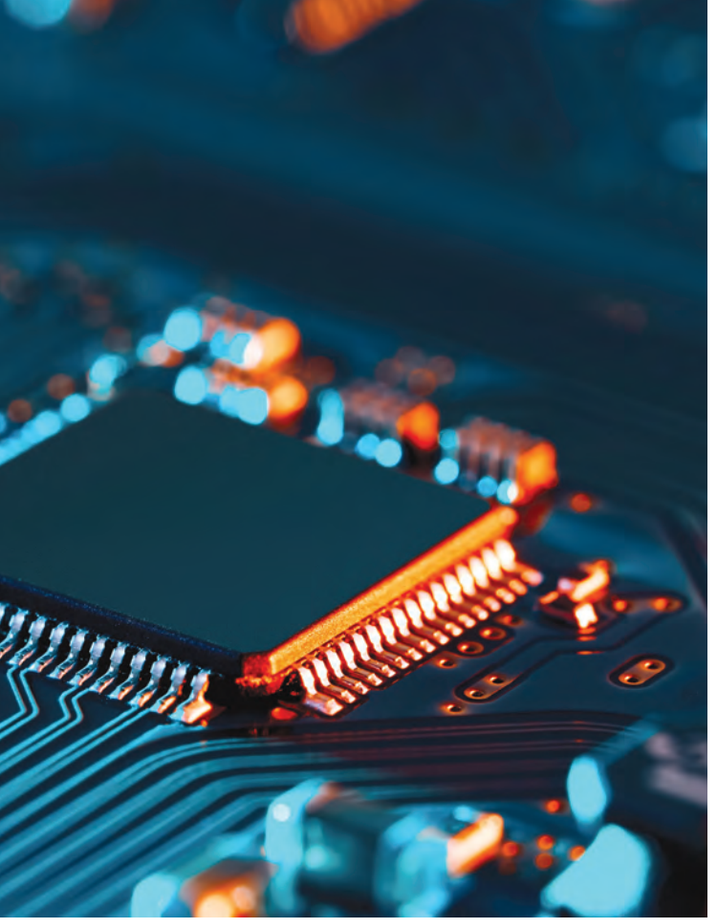
The median inventory of chips has fallen from 40-days in 2019 to five days in 2022

### *Harvesting semis*

Imagine the failure of the energy grid, which increasingly relies upon digital technologies. What would life look like for an extended period without power and without a reliable supply of replacement chips? In a world where there are already shortages, a scenario in which a foreign nation like China cuts off exports could be catastrophic. As an example of what this could look like, US sanctions and export controls on Russia have resulted in Russians resorting to harvesting semiconductors from dishwashers and refrigerators to use in their military equipment.

Another concern is the trustworthiness of the components. Recent reports, for instance, claim that equipment installed on cell towers throughout the United States, manufactured by the Chinese telecommunications company Huawei, have the ability to disrupt US nuclear arsenal communications. As another example, a hardware attack impacting almost 30 companies, dubbed the "big hack", involved the covert insertion of a tiny chip on a motherboard at a Chinese manufacturing facility that created a

***A hardware attack impacting almost 30 firms involved the covert insertion of a tiny chip on a motherboard at a manufacturing facility in China***



stealth doorway allowing unauthorized access to the networks of the tampered systems.

A further concern is the increase in counterfeit components. As supply shrinks and demand increases, this opens the door for counterfeit components to flood the market. One source of counterfeit electronics is electronic waste (or e-waste) that comes from discarded items containing chips. Around 70% of e-waste ends up being dumped in China, where informal recycling operations have popped up to harvest potentially valuable electronic components and materials. These parts are then often repackaged or relabeled and make their way back into the supply chain, having been found in applications such as US military aircraft. Further, it is expensive to remove and replace counterfeits once they are identified – an order of 100,000 counterfeit capacitors (at one cent each), totaling $1,000, could cost millions of dollars to fix.

**70%**

Of the globe's e-waste gets dumped into China

With the CHIPS Act recently passed by Congress, providing $52-billion in incentives to build manufacturing facilities and a 25% tax credit, it will still take time for these new facilities to be built and begin operating. In the meantime, there are a several tools available that supply chain professionals can use to manage their supply chain risks.

### *Hardware & software assurance*

Importantly, companies do not need to start from scratch - there are a number of international standards that can be leveraged to assist with risk management. For example, ISO 31000 provides general enterprise risk management guidance, applicable across any industry sector, whereas certain industries have more specific guidance, such as ISO/SAE 21434, which addresses vehicle cybersecurity. Related to counterfeit electronics, there is, for example, SAE AS6171, which provides guidance on testing methods to use for suspect counterfeit electronics. Another standard, SAE JA7496, provides guidance on cyber-physical systems security across the entire systems engineering lifecycle. The committee responsible for this standard's development is currently working on additional guidance specific for hardware assurance and software assurance. Furthermore, industry groups such as GSA TIES are working on developing secure and trusted frameworks for the IoT value chain, leveraging tools for supply chain traceability and data analytics.

While some indications point to the global chip shortage beginning to ease, there are still plenty of issues with the global supply chain, including persistent inflation, long backlogs at container ports, and disruptions of goods out of China due to its strict zero-COVID policy.

Supply chain risk management practices such as onshoring (or 'friendshoring') production, strategically sourcing from a diversified pool of vendors, consolidating procurement functions, selecting the right level of buffer inventory, and enhancing supply chain visibility, are all proposed levers that can be pulled. Additionally, companies need to develop models for stress testing their supply chain under various scenarios so they can understand how shocks will impact performance.

### *Conclusion*

Finally, organizations need to develop supply chain resilience, or the ability to withstand and bounce back from disruptions. According to one study, there are 16 different supply chain capabilities, such as flexibility, adaptability, anticipation, and recovery, that contribute to supply chain resilience.

At the end of the day, the chip supply chain is critical for the functioning of the global economy. Adopting good supply chain risk management practices can help to reduce the impacts of disruptions and enhance security for consumers - ensuring our safety and protecting our way of life. **EP&T**

***Zachary A. Collier, Ph.D.,*** *is assistant professor of management at Radford University, and is a visiting scholar at the Center for Hardware and Embedded Systems Security and Trust (CHEST).*


# How to advance digital transformation to build supply chain resilience

**BY RICHARD BARNETT, CHIEF MARKETING OFFICER AND SAAS SALES LEADER AT SUPPLYFRAME**

Intel CEO Patrick Gelsinger recently said that "the chip shortage cost the U.S. economy $240-billion last year, and we expect the industry will continue to see challenges until at least 2024."

Ford, GM, and Nissan are among the automotive companies that are still dealing with the chip shortage damage – in the form of multi-billion-dollar revenue losses, production stoppages, and flat operating profits, among other problems. AlixPartners reported that global automakers could expect to lose $210 billion in 2021 revenue due to the chip shortage, and AutoForecast Solutions said that as of mid-2022, the industry was short more than 2.2 million cars worldwide.

Chip shortages and volatility have led some medical device companies to miss first quarter revenue forecasts, according to analysts at William Blair. And a 'double-digit de-commit' by a semiconductor supplier led medtech company ResMed to face "a huge shortage of devices."

The chip shortage kept several would-be CES exhibitors away from the giant consumer electronics show this January in Las Vegas. Gary Shapiro, president and CEO of the Consumer Technology Association, explained: "We've heard from exhibitors that are not participating because they just can't get their product, they can't get their prototypes together."

So, the economic impacts of electronics supply chain challenges have been well documented.

### *Consider the healthy demand*

Sourcing lead times show that supply markets remain constrained and will continue to grapple with constraints into next year. Supplyframe Commodity IQ indicates that through the first quarter of 2023, more than 70% of lead times will increase. Despite that and fears of a recession, the outlook remains positive for new global design cycles, growth, and demand.

The CHIPS (Creating Helpful Incentives to Produce Semiconductors) Act, which the U.S. President's top economic advisers are pushing and for which Congress is working to allocate funding, could provide some relief to help address this growing demand. But it could take a long while to work out the details, get new chip fabrication facilities up and running, and bring the chips to market.

Meanwhile, many companies are still struggling with how to make the business case and get the right level of investment internally to respond to the chip shortage and broader volatility.

### *Elevate your thinking*

Today's challenges call for business leaders to expand how they think about supply chain concerns and business resilience. To do this, they must consider how the day-to-day challenges of overloaded teams and immature business processes, which keep employees in firefighting mode chasing needed electronics components, are impacting their business. Then they should analyze how to achieve a higher level of understanding to get resilience right, from product design all the way through to manufacturing and supply chain as products ramp in volume.

It's not just about looking at how long it takes to develop a new product or what the ramp-to-volume assumptions are once a product is released. Companies also need to know the overall process cycle time across all business functions in order to detect a new supply chain risk.

And they should figure out how to make faster internal trade-offs so they have the best possible response to identified risk. Speed and agility enable a company to face the same supply and demand uncertainty and volatility as its peers, but respond faster than the competition.

However, departmental silos are a key barrier to getting there.

### *Look beyond cost containment*

Silos lead teams to focus only on their departmental goals. Engineering may focus on the efficiency of new product throughput but not on the overall profitability and success of products once they are introduced. Procurement manufacturing might be overly focused on cost reduction, and it might not get credit for investing in resilience that translates into capturing new revenues or market share. And most commercial business

unit teams are not fully accountable for the cost of supply lead time, expedited freight, and related considerations because they have been instructed to sell based on a standard product margin assumption.

Meeting incremental cost reduction goals and improving manufacturing throughput efficiencies through Kaizen events is great. But businesses need to break away from this cost-only focus.

### *Come together to collaborate*

CEOs, chief operating officers, and chief financial officers are in the best position to do the end-to-end coordination within an enterprise to make that shift happen. But these top-tier leaders need leaders within engineering, procurement, and other teams to make the case for change.

Yet because there are so many competing priorities, the individual initiatives identified in those different groups or functions may not get funding. However it's easy to make digital transformation efforts to enable supply chain resilience a priority when you take a collective approach.

Engineering, procurement, and supply chain teams must all have a seat at the table if organizations hope to make meaningful progress with their supply chain resilience objectives. Commercial business unit leaders can offer added perspective. Together, they can help formulate and execute strategies to build resilience.

### *Align on goals and incentives*

Together, they should work with top leaders to ask and answer the following questions: What does the business consider a positive outcome? What metrics and incentives will encourage sourcing and procurement teams to achieve those outcomes? What is the right level of investment to onboard and qualify multiple suppliers, rather than just one vendor, for each component? How can the business shift from annual sourcing events in which teams are judged solely on cost reduction to engaging more frequently as market conditions change?

Having multiple sources of supply and alternate suppliers comes at a higher average cost. But it is worth the investment. Clearly, the cost of lost revenue by not getting this right is significant.

### *Make the shift and move ahead*

Siemens Lifecycle Insight study says that digital transformation investments pay off. This research says most progressive companies show a 10% increase in projects that meet or exceed revenue targets and realize a 9% increase in projects that meet or exceed margin targets.

One digital transformation initiative that progressive businesses are pursuing is taking an outside-in view so they can better respond to the quickly changing world. For this, enterprises need new forms of intelligence to provide greater supply chain visibility and collaboration. More than 90% of companies say they want to improve their supply chain resilience, McKinsey & Co. reports, but only 2% of companies say that they have the visibility they need.

Businesses that don't invest in building supply chain resilience now will find themselves behind the competition when things begin to stabilize in 2023 and 2024. And it will be exceedingly difficult for them to build those capabilities when they're chasing everyone else in the market.

It's time to face the reality that lengthy, linear, siloed approaches to product development and sourcing no longer work. In today's world, you need to build supply chain resilience, and that's a company-wide initiative. This will allow you to move more quickly to make the right trade-offs related to inventory, prioritization of demand, and other factors. When your competitors are chasing component parts due to external supply variability, you can accelerate your design cycles by using available components to manufacture equivalent products and meet demand. **EP&T**

***Richard Barnett*** *is the chief marketing officer and SaaS sales leader at Supplyframe Inc., a leading provider of design-to-source intelligence for the global electronics value chain. https://supplyframe.com*

## TOUGHENED, NON-DRIP EPOXY MEETS NASA SPECS

**MASTER BOND**

EP40ND two component epoxy system is designed for bonding, sealing and coating applications. It is a non-drip, toughened system with an easy to use 1:1 mix ratio by weight or volume. Product meets NASA low outgassing specifications and has a high elongation of 80-90% at 75˚F. It adheres well to many plastics, such as polycarbonates and acrylics, making it appropriate for applications that use substrates prone to stress cracking. The flexible system provides a low tensile modulus of 1,000-1,500 psi, and a relatively high lap shear strength of 1,600-1,800 psi. EP40ND has a Shore D Hardness measuring between 50-60 at 75˚F.

**https://www.masterbond.com/properties/flexibilized-and-toughened-adhesive-systems**

## FLEXIBLE PRINTED CIRCUIT ANTENNAS MOUNT EASILY

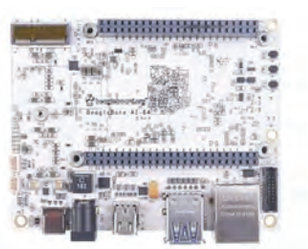
**LINX TECHNOLOGIES**


FPC series 2.4GHz adhesive flexible printed circuit (FPC) antennas serve ISM applications including Bluetooth and ZigBee, and single-band WiFi. Devices provide a ground plane independent dipole internal/embedded solution with compact, low-profile design. Flexibility with an adhesive backing eases mounting in RF transparent (e.g. plastic) enclosures, enabling environmental sealing and protection from antenna damage. Connection is made to the radio via a coaxial cable terminated in an MHF1/U.FL-type plug, or MHF4 plug connector.

**https://linxtechnologies.com/wp/lp/ant-2-4-fpc-series**

## 64-BIT OPEN HARDWARE SINGLE BOARD COMPUTER AIDS EMBEDDED DESIGNS

**BEAGLEBONE**



AI-64 SBC board is a 64-bit open hardware single board computer designed for building performance-optimized embedded applications and brings a complete artificial intelligence (AI) and machine learning system to developers. Board provides the convenience and expandability of the platform with all of the on-board peripherals required to start learning and building applications. The BeagleBone cape headers provide expansion possibilities with hundreds of open-source hardware examples and dozens of readily available off-the-shelf embedded expansion options.

**https://www.newark.com/beagleboard/beaglebone-ai-64/bbone-ai-64-bit-arm-cortex-a72/dp/26AK8283**

## IR CAMERA BOOSTS PERFORMANCE, IMPROVES TIME-TO-MARKET

**TELEDYNE FLIR**

Neutrino IS series model LC CZ15-300 of mid-wavelength infrared (MWIR) camera modules with integrated continuous zoom (CZ) lenses are suitable for integrated solutions requiring crisp, long range, SD or HD MWIR imaging. The ITAR-free modules provide size, weight, power and cost (SWaP+C) benefits to OEM and system integrators for airborne, unmanned, C-UAS, security, ISR, and targeting applications. Units provide high performance, 640x512 HD MWIR imagery and 15mm to 300mm CZ capability for ruggedized products requiring long life, low power consumption, and quiet, low vibration operation.

**www.teledyneflir.com/neutrino**

## OPEN FUSE HOLDER IS THROUGH-HOLE REFLOW COMPATIBLE

**SCHURTER**

OGN series open fuse holder for 5x20 mm fuses is compatible with Through-Hole Reflow (THR) solder processes. Rated 16A at 500Vac/Vdc according to UL and CSA and 10/16A at 500Vac according to VDE, devices can be enclosed with an optional cover. Rated power acceptance is 4W / 16A at Ta 23˚C for the version without cover. A black cover offers a power acceptance of 4W / 10A and a transparent cover is approved at 2.5W / 10A. Admissible ambient air temperature range is -40˚C to 85˚C. Products comply with enhanced fire safety requirements and features glow wire resistance according to IEC 60335-1.

**https://www.schurter.com/en/datasheet/OGN**

## SEALED BASIC SWITCH IS ULTRA-SUBMINIATURE

**OMRON**

Omron D2GW sealed ultra-subminiature basic switch delivers tiny class size and a volume ratio 62% the size of conventional types. Device measures 8.3mm x 6.5mm x 5.3mm and features a 13.5Vdc rated voltage, as well as a 10mA resistive load. Product's fixed slit saves space on customer units and provides a slim form, while a bilaterally symmetrical shape contributes to simpler designs. Devices deliver versatile actuator variation, which enables support for various operating bodies (e.g. shapes, materials, and operations). Device's press-fit terminals enable solderless contact. Double-sided twin sliding contacts provide quiet operation and improved performance.

**Omron D2GW Sealed Ultra Subminiature Switches**

## VACUUM-TIGHT CONNECTOR EXTENDS TEMPERATURE RANGE

**LEMO**

M series field-proven HY vacuum-tight connector comes in all sizes and low voltage configurations. Fixed socket model is designed for all applications requiring vacuum-tight integrations in harsh environments. Product's potting material enables vacuum-tight sealing with ultra-low leak rates over a broad temperature range. Device also integrates optimized pcb tails enabling easier pcb routings even on high density configurations. The mass connection also has been improved and now offers the possibility to use either

standard ground pins or special anti-vibrations threaded holes for 'screw through' pcb fixation.
**https://www.lemo.com/en/products/new-connectors/m-series-vacuum-tight**

## HIGH-POWER CONNECTORS OPERATE AT 2.0KVAC (RMS) VOLTAGE

**AMPHENOL**

Raptor range of high-power, high-voltage connectors are suitable for high-voltage and high-current systems in E-Flight, E-VTOL and hybrid applications. Devices benefit from partial discharge free performance at an operating voltage of 2.0KV ac (rms) at 35.000 ft. Devices are available in shell sizes 15 to 25 and deliver high temperature capability of up to +200°C, IP68 sealing, increased creepage and clearance distances as well as an anti-decoupling ratchet mechanism on both coupling ring and backshell, ensuring a reliable connection even under high vibrations.
**https://www.amphenolpcd.com/markets/aam-evtol/power-generation-propulsion**

## BUCK CONVERTER IC DELIVERS INTELLIGENT, ADAPTIVE POWER SHARING

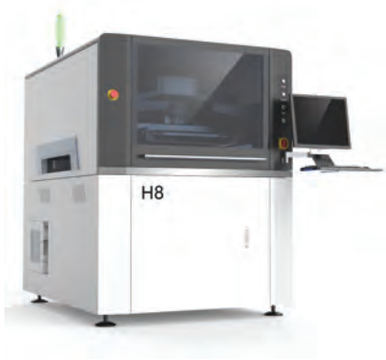
**SILANNA SEMICONDUCTOR**


SZPL3002A buck converter IC with a built-in USB PD/FC port controller reduces the number of components needed to implement 65W fast charger and adapter applications with up to four ports. The 'Power IC' combines a high-efficiency synchronous buck converter and an advanced port controller into a single QFN package measuring just 5mm x 5mm. Product delivers proven wide-voltage, high-frequency point-of-load dc-dc converter technology that operates with efficiencies in excess of 98%. The integrated port controller offers full support for USB PD V3.0 Type C interfaces and QC2.0/3.0/4.0/5.0 support for Type A/C connections.
**https://www.powerdensity.com**

## SCREEN PRINTER IS FULLY AUTOMATIC

**SASINNO**

H Series screen printer is fully automatic by separating the cleaning unit from the CCD camera. Unit minimizes the motor load and improves positioning precision and speed. Additionally, the double sliders ensure that the printer head is accurate and stable while the scraper runs back and forth. The programmable printing head and motor controls ensure precise pcb control. Product provides automatic conveyor width adjustment, auto stencil cleaning (dry/wet/vacuum) and automatic 2D paste inspection.
**www.sasinno.com**




*Keysight AresONE 800GE*

**TEST**

## KEYSIGHT COLLABORATES WITH NOKIA

Keysight Technologies Inc. has collaborated with Nokia to successfully demonstrate the first public 800GE test, validating the readiness of next-generation optics for service providers and network operators.

With the move to the 800GE pluggable optics on front panel ports, interconnect and link reliability requires a new round of validation cycles to support carrier-class environments. These high-speed interfaces create a unique challenge as new 800GE capable silicon devices, optical transceivers and high bandwidth Ethernet speeds must be accurately tested.

The readiness testing was conducted at Nokia's private SReXperts customer event in Madrid in June 2022, and included Keysight's AresONE 800GE Layer 1-3 800GE line rate test platform and the Nokia 7750 Service Routing platform. The AresONE was used to test and qualify Nokia's FP5 network processor silicon along with 800GE pluggable optics. Specific Nokia platforms used in the validation were the FP5 based 7750 SR-1x-48D supporting 48 ports of 800GE and the 7750 SR-1se supporting 36 ports of 800GE.

Nokia's FP5 silicon delivers 112G SerDes which enables 800GE support in hardware. FP5 enables networks to efficiently scale capacity and concurrently IP subscriber services while maintaining integrity, providing advanced protection against escalating network security threats, and lowering power consumption. Nokia is the first vendor to ship high-density 800GE systems this year with platforms supporting a range of 36 x 800GE in compact fixed platforms to 432 ports of 800GE in the flagship 7750 SR-14s.

## SGS JOINS FORCES WITH CNIS

SGS, a leading global testing, inspection and certification company, has joined forces with the China National Institute of Standardization (CNIS) to launch what it is calling "the world's first" low visual fatigue certification scheme.

SGS and CNIS have worked in collaboration to develop a ground-breaking certification scheme that provides improved support to the electrical and electronic (EE) industry as it addresses changing market demands and greater consumer health concerns relating to visual fatigue from using electronic devices. The low visual fatigue certification – the Weighted Visual Fatigue (WVF) index – is based on applicable international standards, general industrial specifications and accumulated data. Products are evaluated according to the level of visual fatigue they cause during use.

Certification assessment involves the objective optical testing of displays, simulating human visual perception for blue light and flicker evaluation, as well as human factor testing using volunteers to assess brain activity, eye movement and visual function via electroencephalogram (EEG) and Critical Flicker Frequency (CFF) tests.

**ACQUISITION**

## TE CONNECTIVITY ACQUIRES LINX TECHNOLOGIES

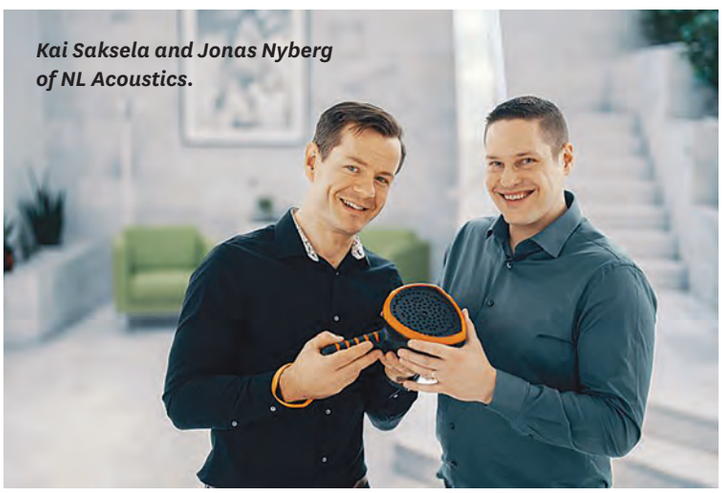
Further strengthening its portfolio and capabilities for IoT, TE Connectivity (TE) has acquired Linx Technologies, a leading RF components supplier in IoT markets. The deal complements TE's broad connectivity product offerings, particularly in antenna and RF connectors for IoT.

"Combining TE's wireless connectivity portfolio breadth, manufacturing scale and distribution with Linx Technology's market-leading RF portfolio and deep understanding of IoT customers' behaviors, we can significantly enhance the value we bring to our customers. This acquisition is a critical milestone in our strategic vision to expand in the high-growth Edge Access and IoT markets," says Sudhakar Sabada, senior vice president and general manager of TE's data & devices business unit.

## TELEDYNE ACQUIRES MAJORITY OF NL ACOUSTICS

Teledyne Technologies Inc. has acquired majority interest in Finnish technology firm Noiseless Acoustics Oy. US-based but globally operating Teledyne operates in enabling technologies within four major segments: digital imaging, instrumentation, engineered systems and aerospace and defense.

"Together we are now able to agree on the best way forward and leverage the benefits of our shared resources," describes NL Acoustics CEO Kai Saksela.



*Kai Saksela and Jonas Nyberg of NL Acoustics.*

"Having worked with NL Acoustics since 2019, we are delighted to strengthen our partnership with the company," says Rickard Lindvall, GM of Teledyne FLIR Solutions. "Collectively, the firms provide a wide range of condition monitoring and safety solutions, including acoustic imaging systems, optical gas leak detection cameras, and hazardous gas and flame detection instrumentation."

## LITTELFUSE ACQUIRES C&K SWITCHES

Littelfuse Inc., a global circuit protection manufacturing company, announced the completion of its acquisition of C&K Switches, a leading designer and manufacturer of high-performance electromechanical switches and interconnect solutions. C&K has a strong global presence across a broad range of end markets, including industrial, transportation, aerospace, and datacom.

"The combination of our companies significantly expands our technologies and capabilities, enabling us to deliver comprehensive solutions offering to our broad customer base, across a wide range of vertical end markets," says Deepak Nayar, senior vice-president and general manager, Littelfuse Electronics Business.

**PRODUCTION**

## HENKEL AND CITC FORGE PARTNERSHIP

Henkel has partnered with the Chip Integration Technology Center (CITC) in the Netherlands to formalize an agreement to collaborate on the development of high-thermal die attach solutions for radio frequency (RF) and power electronics. Under the terms of the partnership, Henkel will supply commercialized and developmental pressureless sintering die attach formulations and CITC will provide testing and analysis of the materials within next-generation package designs.

CITC's thermal high-performance packaging program focuses on thermo-mechanical design strategies and device packaging platforms that integrate low-stress, high-reliability interconnect solutions. **EP&T**

Photo: Keysight; NL Acoustics

# **PRODUCT** SOURCE GUIDE



## AD INDEX

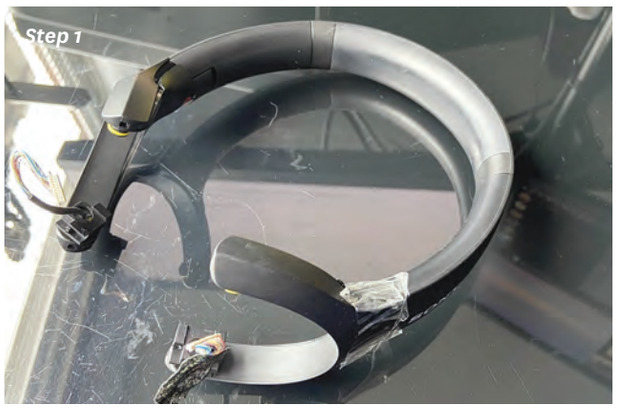


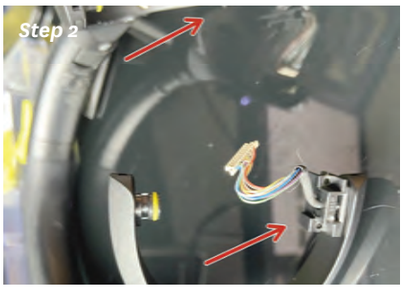
**TO ADVERTISE** *in an upcoming issue of* **EP&T**, *contact* ***Scott Atkinson****, Publisher, satkinson@ept.ca or (416) 510-5207) or* ***Joanna Malivoire****, Account Manager, jmalivoire@ept.ca or direct 866-868-7089.*

# Sony h.ear on 3 Headband Arch teardown

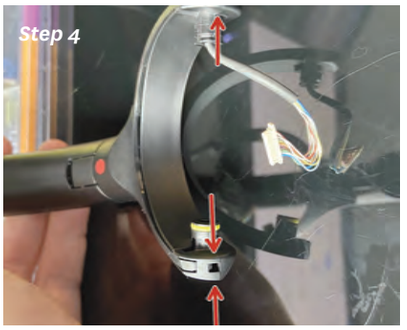
**BY IFIXIT**

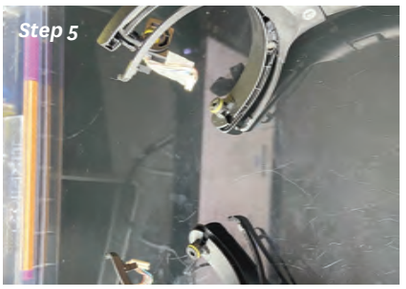
These findings are from iFixit, the open source repair guide. The popular online site teaches people how to fix just about any electronic device, and sells the parts and tools to make it possible. For this teardown, the engineers at iFixit tackle Sony h.ear on 3 Headband Arch.
This teardown will briefly 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 how it sounds.










*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*

### Step 1 Identify headband components

The headband arch has two kinds of attachments at the end that mirror each other:
Pins that insert into the speaker housings with no cables.
Pins with a loose bracket each that screws into the speaker housings. These have the headband cable threaded through them.

### Step 2 Unthread the pin brackets

Turn the headband flat with the pins with the cable running through them on the bottom.
Gently thread the brackets through and out of one cable, then repeat on the other side.
When reassembling, you do not need to keep track of which one is on which side (they are identical), but you do need to make sure the flat side faces the headband arch.

### Step 3 Unhook the rubber rings on the rear pegs

Keeping the headband in the same position they were in for the last step, use the pointed end of a spudger to gently unhook the yellow rubber rings from each of the rear pegs (that had the brackets around them). Gently thread the rubber rings out of the headband cable.
The rubber rings on the front pegs do not need to be removed because they don't hold anything in place.

### Step 4 Unhook the thin case segment of the headband arch

Insert the pointed end of a spudger into one of the holes at the very end of one of the headband arches.
Gently push upwards towards the thin arch casing above. This should unlatch the hook.
Repeat for all four ends of the headband arch.

### Step 5 Unclip and slightly separate the thin arch segment

Gently lift or pry away at the thin parts of the headband arch to separate the thin case segments from the deep case segments. This part of the arch breaking is an incredibly common point of failure on these headphones, this step may not be necessary.
Gently separate the two, but do not fully separate them as they are still connected by the cable (held in with retaining brackets).

### Step 6 Unscrew the cable retaining bracket from the deep arch segment

Gently swivel the thin arch casing from the deep arch casing. This reveals two pairs of screws holding a cable retaining bracket in place at the base of the deep arch segment.
Unscrew the screws and remove the retaining bracket. Don't remove the cable yet.

### Step 7 Remove the cable from the headband arch

It would probably be a good idea to mark where the cable is seated in the casing exactly so the cable is the right length when reassembling.
At this point you can pull the cable out from the deep casing of the headband arch. This also means you can finally separate the thin arch casing from the deep arch casing.

### Step 8 – You're done!

Photos: iFixit

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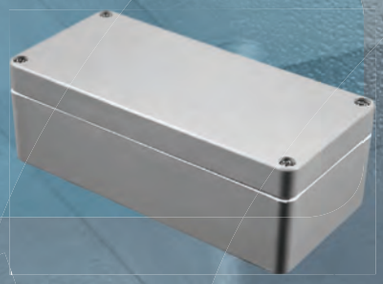

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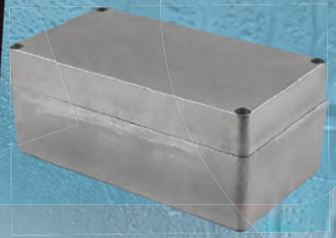

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