

ELECTRONICS

JANUARY 2023 | ANNUAL EDITION

sourcing

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On the cover – January 2023

Electronics Sourcing 2023
Annual Edition

Editor's Word



2023: year of the digital twin and API

I wonder if it's time to swap 'just-in-time' supply chains for 'efficient and robust' supply chains. To me, using the JIT descriptor suggests every supply chain process is in perfect lockstep with every other to the nearest minute. That isn't the case and never will be. Ultimately, someone, somewhere is always 'holding the baby'.

Driving 'work in progress' towards zero, for every component on a bill-of-materials, across every process step—from mining raw materials to soldering parts to a PCB—is a laudable goal. Imagine this could be achieved for a moment in time. A second later, some form of geopolitical, financial or technical change could render it useless.

Instead, what is required is the most efficient, flexible and robust supply chain for every point in time, regardless of the level of unpredictability. Is this achievable? I believe so, due to the widening availability of digital twins and APIs. It's all about capturing and sharing just the right amount of data, the full length of the supply chain, in real time. I can be sure of this for two key reasons?

Firstly, when I'm not editing *Electronics Sourcing* I'm involved in the development of digital platforms. Staring January 2023 I've decided that future development projects will always be 'API first' using, presently, authenticated RESTful JSON technology. Secondly, many of the conversations I had with distribution organisations during my visit to Electronica were as much about data flows as they were about the components themselves.

Trust me, once you have connected two applications via a common interface you quickly discover the whole is greater than the sum of the parts.

Jon Barrett

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NEWS



High stability oscillators
ready to ship

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All the facts and figures
to help you buy

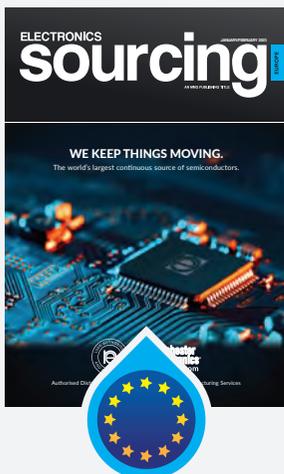
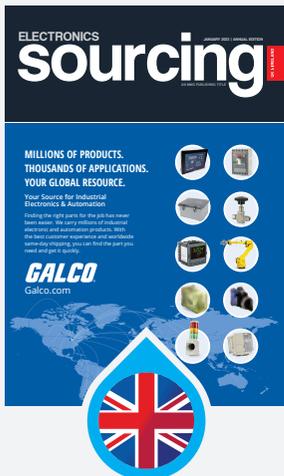
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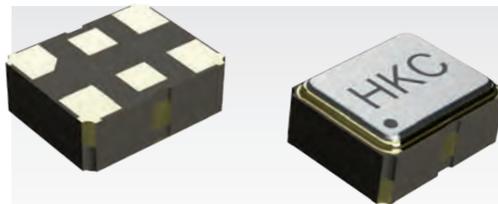
Farnell has strengthened its semiconductor portfolio by signing a global distribution agreement with Analog Devices. Farnell is offering fast delivery on its Analog Devices portfolio, including the latest products. Applications include aerospace, defence, automotive, communications, consumer, datacentres, energy, industrial automation, instrumentation and digital healthcare markets.

The portfolio of analogue, mixed-signal and digital signal processing ICs suits equipment used in 5G, IoT, cyber security, radar systems and RF solutions.

Farnell's VP of product and supplier management, Simon Meadmore, said: "We are committed to strengthening our global product portfolio and Analog Devices is uniquely positioned to drive innovation across our key markets with high quality, integrated solutions."

Analog Devices' VP of revenue, strategy and operations, Bryan Tallman, added: "The power of Farnell's element14 Community, regional technical and customer support services, as well as robust distribution network were key drivers in establishing this new global partnership."

www.farnell.com



High stability oscillators ready to ship

Hong Kong X'tals' high frequency crystal oscillators are designed to ensure high stability and low noise. The company states this is made possible thanks to a differential output and low-phase jitter. The manufacturer is addressing growing demand for low-cost, low-jitter timing references in telecommunications applications such as LTE/5G, PCI-e Express and 10-Gbit Ethernet.

The oscillators with LVDS/LVPECL/HCSL output are available with, for example, 100.00, 100.0025, 125.00, 148.3516 or 148.50MHz and all frequently used frequencies. The LVPECL variant operates at 3.3V. General frequency stability is ± 50 ppm.

Operating temperature range is -40 to 85°C or 125°C—crucial for applications in industrial environments. Measuring 3.2 by 2.5mm or 2.5 by 2.0mm, the design is considered very compact.

www.rutronik24.com

Sales infrastructure underpins RF connectivity

Arrow Electronics has signed an agreement with Sunway Communication that will see it offering and supporting Sunway's portfolio of RF connectivity components and modules throughout the Americas, Europe, Middle East and Africa.

The initial focus will be Sunway Ultra-Wideband solutions including modules and development kits based on NXP Semiconductors' Trimension UWB portfolio for applications including device tracking, real-time locating systems and access control. The devices use time-of-flight and angle-of-arrival measurements to determine relative positions in three dimensions.

Sunway Communication's VP, Robert Berg, said: "Arrow's extensive engineering and sales infrastructure is perfectly suited to support new customers in the adoption of our expanding standard product portfolio, as well as for customised products."

NXP Semiconductors' senior marketing manager for UWB mobile and IoT solutions, Peter Pirc, added: "This agreement with Arrow, with whom NXP has a strong and well-established relationship, is a welcome development that will enhance the choice and possibilities available to the market."

www.arrow.com



Sourcing genuine components in a turbulent market

In the current market, design engineers frustrated by interruptions to their supply chain may resort to sourcing components from unfamiliar distribution sources. However, this decision is fraught with risk because some unauthorised distributors choose to source their components from the “grey market.” The provenance of such parts is often unknown, meaning their authenticity cannot be determined. It can be difficult to distinguish a counterfeit component from the genuine part because they are deliberately packaged to appear identical — featuring the same manufacturer branding and part number. Determining if a part is fake or genuine can only be done by carefully examining the internals of the package, a task that requires the use of an X-ray machine and specific testing skills.

A major concern associated with counterfeit components is that there is a high probability that they have not undergone the same rigorous levels of testing and quality control procedures that genuine parts have been subjected to. This means that they are more likely to exhibit inferior levels of performance, or even fail, in the field. Engineers who use counterfeit components could be exposed to legal actions relating to product faults. With component shortages

projected to continue into 2023, individuals and OEMs are advised to only source components from authorised distributors with systems in place that allow them to trace their components back to the point of manufacture. This is especially important for components intended for use in medical or aerospace applications, which must have relevant documents and certification.

Mouser Electronics was the industry's first authorised distributor to be accredited with AS6496, the aerospace industry's high standard for anti-counterfeit measures in authorised electronic component distribution.

The AS6496 aerospace standard sets requirements for the avoidance, detection, mitigation, and disposition of counterfeit products in the authorised distribution supply chain. This international standard requires authorised distributors to have a counterfeit mitigation policy and a counterfeit electronics parts control plan. AS6496 is geared for all industries and individuals looking to reduce the risk of counterfeit electronic parts entering the supply chain.

Mouser is also registered to AS9100D, ISO 9001:2015, and ANSI/ESD S20.20-

2014, the industry's gold standards for quality, control, and electrostatic discharge (ESD). Registration to these standards lets customers know that Mouser is an authorised distributor of the highest quality components by providing traceability, risk management, process control, customer support, product availability and document control.

Mouser has rigorous processes in place to prevent counterfeit products entering its supply chain, so customers can be confident that the components they purchase are genuine. In addition to product integrity, Mouser also assists its customers through real-time stock updates and obsolescence management, and offers a variety of technical tools and resources to assist the design engineer.

Today, Mouser has 27 offices on four continents, offering localised service for more than 650,000 customers in local language, currency and time zone. Inside Mouser's vast Global Distribution Centre, you will find the industry's widest selection of products from over 1,200 manufacturer brands, with new products being added on a daily basis — all authorised, of course!

eu.mouser.com/quality



Mark Patrick
Technical Marketing Manager
EMEA Marketing

As Mouser Electronics' Technical Marketing Manager for EMEA, Mark Patrick is responsible for the creation and circulation of technical content within the region — content that is key to Mouser's strategy to support, inform and inspire its engineering audience.

Prior to leading the Technical Marketing team, Patrick was part of the EMEA Supplier Marketing team and played a vital role in establishing and developing relationships with key manufacturing partners. In addition to a variety of technical and marketing positions, Patrick's previous roles include eight years at Texas Instruments in Applications Support and Technical Sales.

A “hands-on” engineer at heart, with a passion for vintage synthesizers and motorcycles, he thinks nothing of carrying out repairs on either. Patrick holds a first class Honours Degree in Electronics Engineering from Coventry University.



In Brief

Second most trusted profession

Eighty-seven per cent of people trust engineers to tell the truth, says Ipsos' latest Veracity Index. The profession, which makes up 19 per cent of the UK workforce is trusted to tell the truth by 87 per cent of the population, closely following nurses (89 per cent) and moving ahead of doctors, teachers and museum curators.

www.ipsos.com

Boost for next gen wireless

Pharrowtech has opened its first UK design centre which will help bolster the company's resources and talent pool as it grows its product offering. Pharrowtech CEO and co-founder, Wim Van Thillo, said: "With its well-established history in wireless systems and silicon design, the UK is an ideal location for the next phase in our growth."

www.pharrowtech.com

Electronica attracts 70,000 visitors

In its post event summary, electronica 2022 saw 2,144 exhibitors (64 per cent from outside Germany) showcase their innovations to some 70,000 visitors. ZVEI's president Dr Gunther Kegel, said: "The mood is positive—back again live in Munich after four years, the booths were well-frequented, there were lots of conversations and valuable contacts made."

electronica.de

Partnership for power

Avnet Abacus has announced a supplier agreement with Mornsun, a manufacturer of power products and technologies. Avnet Abacus' senior director marketing, Hagen Götze, said: "Mornsun's commitment to spending a significant percentage of its revenues on R&D, in conjunction with its pledge to provide world-class customer support, promises a great future for our partnership."

www.avnet-abacus.eu

New channel for rectangular interconnect

PEI-Genesis has been named an authorised distributor for Nicomatic. The partnership is designed to offer quality rectangular connector products for board-to-board, board-to-wire, and PCB mount applications.

As PEI-Genesis normally provides connectors for 'outside the electronics box' applications, this new offering provides additional solutions including the flagship harsh environment CMM connector product line with over 20 million power, data and signal configurations.

PEI-Genesis' senior VP & MD Europe, Jonathan Parry, said: "Between PEI-Genesis and Nicomatic, we have a combined

experience of over 120-years of meeting our global customers' demanding requirements for high-reliability connector solutions in multiple markets including defence, industrial, aviation, energy and medical.

Nicomatic's CEO, Olivier Nicollin, added: "We are pleased to announce this partnership with a distributor who assists customers to design engineered solutions that meet specific application requirements. Additionally, PEI Genesis mirrors many of Nicomatic's core service principles, including fast delivery, service and consistent quality."

www.peigenesis.com

Buying into low-power microcontrollers



Mouser Electronics is now offering Microchip's PIC32CM LE00, LS00 and LS600 ultra-low-power microcontrollers. Offering 32-bit performance, ultra-low power consumption and memory configurations up to 512kB flash and 64kB SRAM, the PIC32CM Lx family provides three product options for solving challenges in the IoT, consumer, industrial and medical markets.

The microcontrollers feature a 32-bit Arm Cortex-M23 CPU running up to 48MHz. Based on picoPower technology, the devices provide 1.5µs wake-up times, plus SleepWalking and Event System peripherals. The products feature on-chip analog operational amplifiers, digital-to-analog converters and analog-to-digital converters. Other features include capacitive touch capabilities offering enhanced PTC, Driven Shield+ and the ability to add buttons, wheels, surfaces and sliders to smartwatches, fitness trackers, headsets and other peripherals.

The LS60 combines a secure subsystem and Arm TrustZone technology in a single package, allowing the CPU to be separated into 'secure' and 'non-secure' regions. It also integrates an enhanced peripheral touch controller with the Driven Shield+ feature that prevents false touches due to moisture.

www.mouser.com



Tap into combined display expertise

Volex has acquired Review Display Systems, a UK-based supplier of electronic displays, embedded and IoT solutions operating in sectors including medical, military, industrial and smart buildings.

RDS will be integrated within GTK UK, retaining its existing brand identity and management structure, while continuing to operate from its UK and USA offices. The integration is designed to strengthen the group's engineering capabilities and market opportunities for customised electronic solutions.

GTK UK's MD, John Morath said: "The integration of Review Display Systems will strengthen our combined design and engineering capabilities, increase our share in the display marketplace and advance our position in the IoT solutions space. Both our organisations pride ourselves on our engineering expertise, ability to provide custom solutions for OEMs and excellent customer service."

Review Display Systems' MD, Russell Gilbert, added: "GTK and Review Display Systems have a remarkably similar approach to business. We are both strongly engineering led organisations. Becoming part of GTK and the Volex group provides a sound financial platform to accelerate market growth."

www.gtk.co.uk



Expanding anti-counterfeiting facilities

Princeps has received renewed AS6081 accreditation following its relocation to larger premises. Princeps specialises in sourcing traceable components for customers in industries including aerospace, defence, energy and transportation.

Princeps' sales director, David Nash, said: "The risks that counterfeit or fraudulent electronic components pose cannot be underestimated and this continues to be a significant and increasing problem to procurement managers, especially in times of component shortages.

"As one of less than three UK distributors to hold AS6081 accreditation, we have invested heavily in our laboratory, recently adding a further £150,000 worth of new equipment since our move here a few weeks ago. Even with our stringent procedures and in-depth knowledge of the global components marketplace, we are uncovering an average of one or two fraudulent or counterfeit items every month.

"This demonstrates the level of vigilance necessary, especially when trying to source obsolete parts. When sourcing through Princeps, our customers are assured through a range of risk mitigation solutions, including fully bespoke test and inspection plans following AS6081, AS6171 or any of the other methodologies available."

www.princeps.co.uk

Counterfeit Electronics and Materials Symposium dates announced

The Anti-Counterfeiting Forum, CALCE and SMTA have announced the *Counterfeit Electronics and Materials Symposium* will be taking place at the Manufacturing Technology Centre, Coventry on 14 and 15 March 2023. The event will feature speakers from Europe, the UK and USA.

The event will focus on current trends/threats and new developments in combating counterfeits in the supply chain. Delegates will hear about best practice counterfeit management, methods for detecting counterfeits and how to access further information.

An industry-wide technical committee will determine the programme in coming months. There will be opportunity for delegates to raise questions, participate in discussions and interact with speakers during the day.

Delegates can meet potential solution providers in the co-located tabletop exhibition space. Online booking will soon be available on the event website.

www.anticounterfeitingforum.com

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mouser.co.uk





Distribution lights up Electronica 2022

Electronic component distributors showed up in full force at Electronica Munich, partly to celebrate the resumption of physical events but also to sign up new suppliers and continue beefing up their rosters and inventories

Component distributors put up a grand show at the 2022 Electronica Trade Fair in Munich and were, arguably the soul of the event.

They were impossible to miss. Bright lights of varying colors adorned their stands.

The booths were bigger. Food and drinks flowed freely. Fun and gaming activities ran non-stop. It looked like a festival, rather than an industry exhibition but as they were being feted, customers and other guests were simultaneously courted, welcomed, and educated about product offerings and services.

Exhibitors and attendees were glad to be back at the biennial event, which had been cancelled in 2020 because of the outbreak of Covid-19. By number, semiconductor suppliers from all over the world outnumbered any other group.

The co-location of Electronica 2022 with Semicon Europa, the trade fair for semiconductor equipment and materials, resulted in the overwhelming presence of enterprises focused on the chip sector, including research firms.

Still, distributors stole the show. One could say, as usual.

The November 2022 event

was different, though. Almost celebratory.

All the leading component distributors were out in full force, highlighting their offerings, hosting suppliers and visitors, and helping to reinforce the idea that the industry was ready and eager to resume hosting and participating in the international conferences, seminars and other physical events that had been interrupted by the pandemic.

The distribution booths were packed with visitors. The companies demonstrated offerings utilising a variety of media, including video, and had product demos and gaming events for customers and suppliers.

Digi-Key expanded its main booth and added service stations at Hall B, including a booth for live interviews and product demonstrations held with more than 30 of its biggest suppliers. Companies fielded included Analog Devices, Eaton, Laird Connectivity, Littelfuse and Würth Elektronik.

At another booth, Digi-Key presented its history, using objects that highlighted its beginning in the 1970s. Attendees could take a visual walk through the company's history and see its growth into the multi-billion-dollar enterprise it has become. As usual, visitors

“The Internet-of-Things is enabling innovations that we may have only imagined before and turning them into reality”



Dave Doherty, president and COO, Digi-Key

to Digi-Key booths could participate in a variety of games, to while away the time or enjoy the digital games electronic companies were offering gamers.

The company's technical and service employees were at hand to guide visitors and provide information on components and sub-systems from Digi-Key's more than 650 suppliers.

“It's a great time to be in the electronic component industry,” said Digi-Key president and chief operating officer, in a pre-event statement. “The Internet-of-Things is enabling innovations that we may have

only imagined before and turning them into reality.”

Good Times

It is certainly a good time to be in the electronic component distribution business.

The recent painful supply shortage experienced by OEMs and electronic manufacturing services (EMS) providers proved a boon for component distributors. They benefitted from previous investments in component inventory, automation, and additional warehousing.

Efforts to shore up their supplier-base, which most of them accelerated over





the last 5 years paid off.

As they scrambled for parts in 2021 and through the first half of 2022, OEMs and contract manufacturers opted for second sources and alternatives to preferred parts where available. This favored distributors that added to inventories and suppliers during the pandemic.

As a result of the strong demand for components over the last couple of years, distribution has enjoyed unusual growth, despite initial shutdown of some manufacturing facilities during the pandemic.

All the different tiers of distribution grew strongly over the last year. The biggest and medium-tier distributors benefitted more, though, because they had the resources to invest in component stocks and warehouse. As a group, sales of the leading distributors grew at a double-digit clip in 2021 and most were still expecting solid expansion as 2022 ended.

Concerns about a global economic weakness did not faze distribution executives who reported that demand for inventories remained strong entering 2023.

Take Mouser Electronics. The company is poised to report 2022 revenue of \$4.1 billion, more than double the approximately \$2 billion it had in 2020, according to Mark Burr-Lonnon, senior vice president of global sales and services at Mouser.

“When we look back at the last years, the last two have shown growth that we never expected,” said Burr-Lonnon, in an interview with the media. “There is not much in the market that has been bad for us. We are in great shape as we go into 2023.”

Mouser executives cheerfully hosted customers and visitors in their Hall C3

booth—shared with TTI—at Electronica, delighted with the company’s performance and prospects for the year ahead. In addition to the traditional drinks and snacks, the company offered visitors games and prizes. Many of the players who participated in the company’s “spin-to-win” game bagged all kind of prizes, including development tools and test devices.

Mouser benefitted from actions previously taken to boost inventory ahead of the pandemic and through it, according to Burr-Lonnon. The company added to its warehouse space to increase storage capacity and automated the stocking process for easier and faster access. This helped to improve overall performance and productivity, he said.

“We put a lot of automation into the warehouse,” Burr-Lonnon said. “We want to get the inventory out as soon as possible.”

Canada-based distributor Future Electronics took the Electronica show one step further. The company flew the green flag at the show, to demonstrate its commitment and service to efforts to improve the environment.

Future’s theme for Electronica was “Empowers A Greener Future.”

The company said it wanted to focus on innovations, products, and services that support the push for green or renewable energy and power efficiency.

“As a leader in the industry, Future Electronics is spearheading the global trend for green-minded tech, recognising how innovation and creativity can make a positive difference toward a greener future,” Future said, in a release following the close of Electronica. “The company looks to continue making ‘green’ a focus for the start of 2023, expecting their leading



“When we look back at the last years, the last two have shown growth that we never expected”

Mark Burr-Lonnon, senior vice president of global sales and services at **Mouser Electronics**

role in the industry brings a constructive impact to business partners, customers, and audiences alike.”

What’s ahead?

Even as they were celebrating the end of another growth year, distributors at the Munich event remained mindful of challenges ahead.

The supply chain shortages the industry went through has not ended, they said. True, some semiconductor suppliers have reported lower demand and are taking steps to curb capital expenditure. A few even announced lower revenue forecasts for the second half of 2022 and the first half of 2023.

However, distributors said the market remains fluid. Inventory shortages persist for certain components especially parts for the automotive industry. Lead times have started shrinking but even this is uneven, according to industry executives.

“It is all about mix now,” said Digi-Key’s Doherty, in a discussion with the media at Electronica. Our mix is not where we want it to be. We have a lot of some products, but we are still waiting for others to arrive

to get to that historic, high stock rate. This should start to occur throughout 2023 first and second quarters.”

Whatever happens in 2023, distributors said they expect to apply lessons learned during the recent inventory shortage. Even though many are entering the new year with more inventory than in the last several years, they do not see this as problematic because the industry is expected to keep growing.

As they hosted customers at Electronica, distribution executives said they were also patrolling the halls to meet new suppliers, review their products and discuss the possibility of adding these companies to their supplier list.

“We’ve put a lot of efforts into getting inventory right, making sure we are building new warehouses to put more inventory and adding new services to our website, and support around the world,” said Mouser’s Burr-Lonnon.

“We are in great shape as we go into 2023 from an inventory standpoint. We are going into 2023 with two-times the inventory that we had going into 2022.”



Distributors play key role in managing risk

Anglia Components' CEO, Steve Rawlins, says strong inventory, good people and innovation will be central to realising opportunities in 2023



Anglia Components' CEO, Steve Rawlins

The global economic slowdown has reduced demand for consumer electronics, smartphones and PCs. This will impact lead times for industrial components, but truthfully, the position won't improve in the short to medium term. Customers whose design is six-months away from market realisation still need to be placing production orders for the bill-of-materials as soon as possible.

Of course, the investment risk when placing firm orders for components to fulfil demand that is hard to forecast is considerable. Distributors like Anglia have a significant role to play in helping manage that risk. By combining the customer's understanding of their end market with Anglia's considerable expertise of the electronic component industry, the ever-shifting supply chain can be successfully navigated. This expertise is instantly accessible to customers through Anglia Live, as well as through dialogue with their individual field application engineers (FAEs) and key account managers (KAMs).

Those FAEs and KAMs, working alongside Anglia's teams in purchasing, operations and warehousing, were key to the company's success in 2022 and will continue to be key next year. One of the long-term impacts of Covid has been a complete reset of the expectations employees have of their employers. Work-life balance has always been important, but in an ever-tighter labour market, it has become essential that employers recognise this to attract the best and brightest. That's why we'll be closing early every Friday and offering all our staff better holidays in a major package of new benefits to take effect at the start of the New Year.

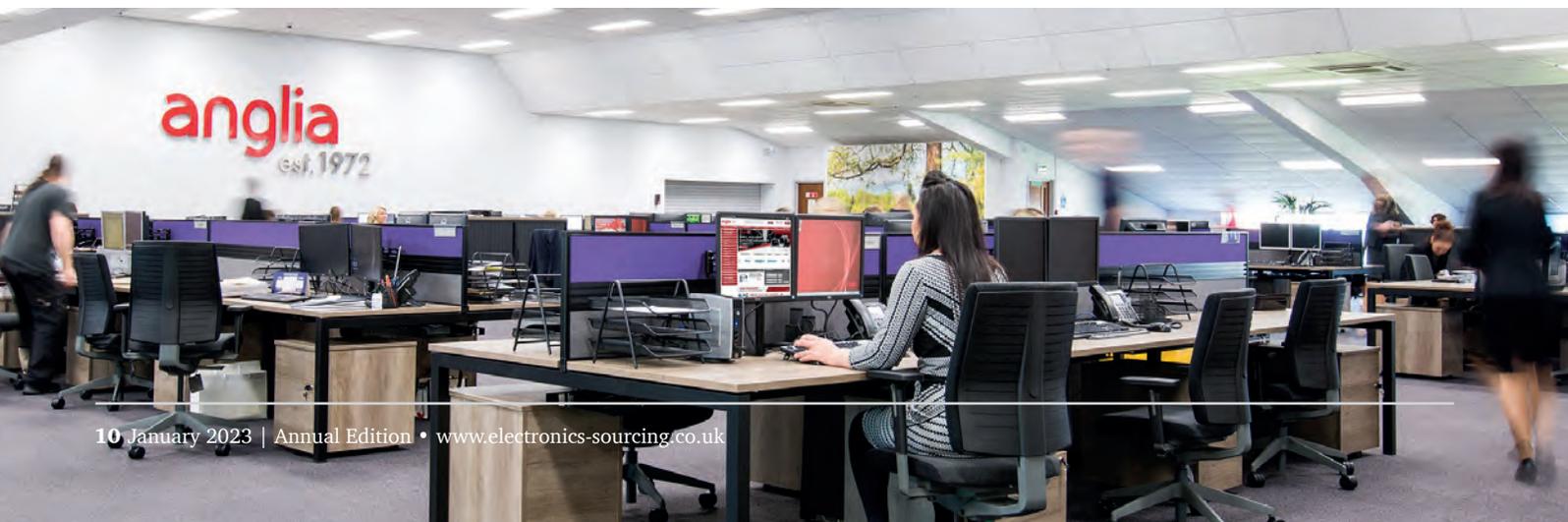
Innovation will be a third ingredient for success in 2023. Whilst it is something that everyone claims to do, not everyone does it successfully. The key is to look at what your customers need from you and make the changes, big or small, that will strengthen your relationship with them and help them. Very few people, even in January 2020, saw the pandemic coming—but past innovations put Anglia and its customers in the

best possible position to weather this and subsequent storms together. We like to think that Anglia was a safe pair of hands for design engineers and purchasing teams seeking to navigate the supply chain difficulties brought by the pandemic. The Anglia Design Partner programme connected customers to much needed design resources when everyone was working from home.

Forecasting is even more difficult than usual in light of global uncertainties but the supply chain situation should ease. Market forecasts for next year are widely scattered, which shows how hard it is to call. Anglia has grown extremely rapidly and usually faster than the market, its prospects are as exciting today as they were 50-years ago when Anglia was established. During its 51st year it will be unveiling further exciting plans to expand the team, enhance its service and continue to grow its share of customers' electronic component business.

www.anglia-live.com

"Work-life balance has always been important, but in an ever-tighter labour market, it has become essential that employers recognise this to attract the best and brightest"

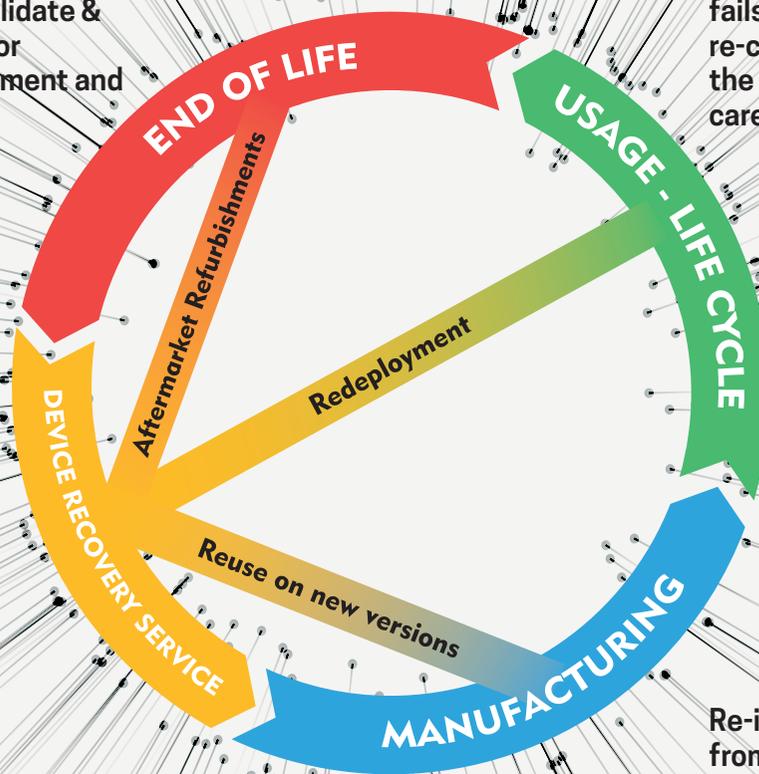


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A circular economy model that is designed to re-use materials, introduce them back into the production cycle & increase operational efficiency. This not only reduces waste and resource consumption but also brings in increased economic & environmental value.

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Using standards to increase quality

ART's MD, Debbie Wade, explains how IPC standards help manufacturers demonstrate better product performance and life, plus compliance with industry requirements

IPC standards are accepted worldwide as the pinnacle manufacturing standards for the electronics industry. They can be adopted for every process stage from design to assembly and even handling and shipping. IPC standards help manufacturing companies demonstrate that products and services offered have high quality and reliability.

Investing in IPC training and certification programmes can help manufacturers: demonstrate they consider rigorous quality control practices important; meet the requirements of electronics manufacturing companies that expect suppliers to have important credentials; gain valuable industry recognition; and facilitate quality assurance initiatives which are important in international trading.

Training alone may help with quality initiatives but when staff have an industry-recognised certification on industry standards, companies have the additional and extra credibility to help source new customers and contracts in today's ever-changing market.

Individuals can become certified to **six key IPC standards**.

1. IPC 6012, Qualification and Performance Specification for Rigid Printed Boards
2. IPC-A-600, Acceptability of (Bare) Printed Boards
3. IPC-A-610, Acceptability of Electronic Assemblies

4. IPC/WHMA-A-620, Requirements and Acceptance for Cable and Wire Harness Assemblies Revision E now available
5. J-STD-001, Requirements for Soldered Electrical and Electronic Assemblies
6. IPC-7711/7721, Rework, Modification and Repair of Printed Boards and Electronic Assemblies

Does your company build aerospace products or is it trying to gain contracts within this field? Advanced Rework Technology is the only IPC Accredited Training Partner (IPC Training Centre) in the UK authorised to teach both IPC Space Addendum training courses for J-STD-001 and IPC-A-620.

Standardisation is a dynamic function of the electronics

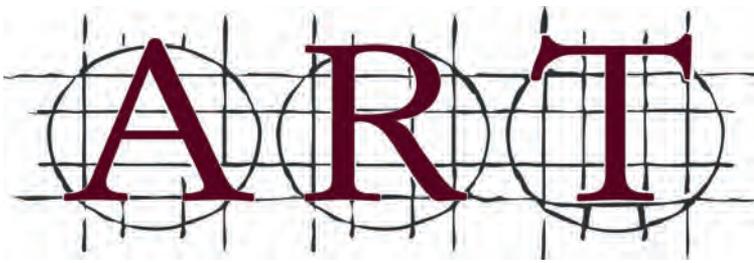
industry and is constantly evolving. ART works with IPC to continually move forward with improvements and best practices to support manufacturing.

Managing Director, Debbie Wade, who chairs many IPC committees including vice chair of IPC Technical Activities Executive Council and Chair of European Standards Development and European Training committees, explained why ART should be manufacturers' training provider: "ART training staff are highly experienced with every part of the industry from design, fabrication, through to assembly and quality and inspection so this will assist the trainer with every step of their teaching which makes our courses second to none. The staff here at ART also dedicate their time to sitting

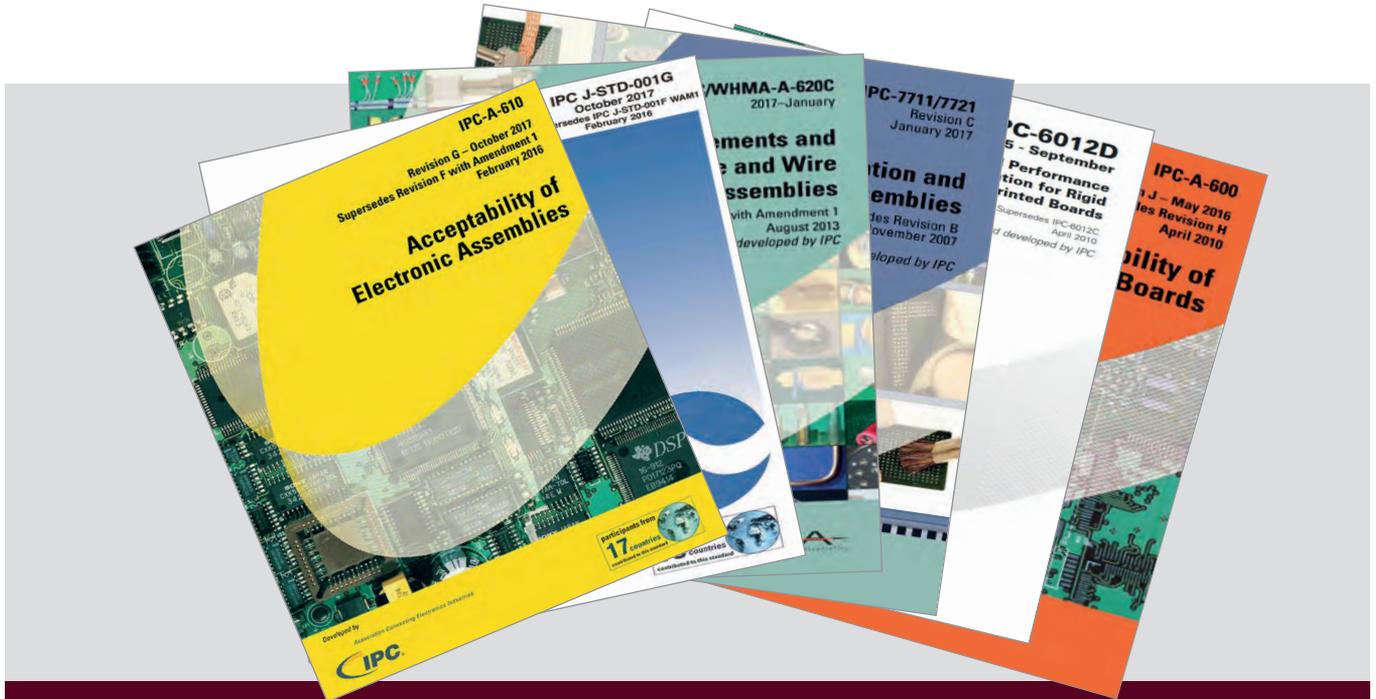
on numerous IPC Standards Development and Training Committees. This gives us the added advantage and skills required to not just teach the latest requirements but fully understand the changes to the technical standards and associated training courses. For our knowledge, skills and dedication, we are proud to be the recipients of many industry and IPC awards. In particular, recipients of the prestigious IPC Presidents Award."

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As an Authorized Training Center. A.R.T Ltd can offer Certified Training to the IPC Standards listed below. A.R.T Ltd are the only training center in the UK able to offer CID PCB Design and IPC6012 training and Space Addendum training for J-STD-001 and IPC-A-620.



Acceptability of Electronic Assemblies



Requirements for Soldering Electrical and Electronic Assemblies



Repair Rework and Modification of Electronic Assemblies



Requirements and Acceptance for Cable and Wire Harnesses



Qualification and Performance Specification for Rigid PCB's



Acceptability of Printed Boards

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Finding the right CEM partner

Esprit Electronics helps OEMs understand what considerations are important when choosing a contract electronics manufacturing partner

There are many UK-based CEMs, selecting the right one is vital. The following is a list of things to consider when shortlisting providers.

Technology: Many CEMs specialise in particular technologies, industry sectors and/or solutions. Select an expert, covering existing and future requirements. OEMs should choose a partner that will grow with them, not hold them back.

Certifications and accreditations: Must

products meet industry standards and accreditations? Consider providers who can meet these requirements.

Logistics and inventory: Many CEM providers can procure, stock and manage materials and deliver end products in exact quantities. Others may require the OEM to manage the supply chain. Selecting a CEM with end-to-end logistics capabilities can streamline processes.

Size: Most customers don't want to be more than 20 per cent of their CEM's turnover. Less and they may feel

under served, more and there is a risk of over reliance.

Investment: The electronics industry moves fast, so a CEM should commit to investing in equipment, training and technology.

Stability: This covers two aspects, is a CEM financially stable, profitable and can demonstrate growth, and is it well established.

Technical support: There is huge pressure on the supply chain, look for a partner who can provide options and advice when needed most.

Partnership: The best relationships are when customers see their CEM as an extension of their own business. A good CEM will be flexible, responsive and provide excellent customer service.

www.espritelectronics.com

Investing in new technology

35
YEARS

35 years' experience creating bespoke CEM solutions across all sectors.

We pride ourselves on delivering:

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- Extensive supply chain capabilities
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Contact us to find out how we can meet your CEM needs today!

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Outsourcing drive by customers

CML Innovative Technologies' commercial manager, Roger Neal, highlights a renewed outsourcing drive led by customers designed to reduce costs and meet deadlines and budgets by adding value to products

CML Innovative Technologies' commercial manager, **Roger Neal**

Manufacturing at CML Innovative Technologies demonstrated continued strength in 2022, building on momentum gained emerging from the pandemic and surpassing many expectations from the prior two years. While overall demand and production capacity have hit recent highs, there are indications and reports that the short-term outlook may be less bright.

There are concerns regarding inflation and

economic uncertainty, while manufacturers struggle with skills and labour challenges that could stagnate or limit growth momentum. Sourcing and supply bottlenecks, logistical backlogs and energy/salary cost pressures all add to 2023's challenges.

Reducing operating costs is high on many organisations' agenda. There is a general onus on head count and a renewed outsourcing drive to ensure customer deadlines are met within budget.

Commercial manager, Roger Neal, said: "Customers have always and will continue to look for opportunities to make savings, these can often be found by outsourcing or adding value to a product or service particularly where a reduction in price may not be possible.

"Close contact with customers through site visits or online meetings helps our technical and design team fully understand the application and

where if possible, CML can help offer those cost effective and value added solutions.

"With over 500 new part numbers created and in excess of 300 plus already planned or in the pipeline, 2023 will be met with high levels of confidence. This can only be achieved with a highly skilled and motivated flexible manufacturing team and CML are well positioned to meet any challenge presented."

www.cml-it.com



High Quality Panel Mount Indicators

CML IT continues to be the number one supplier of panel mount indicators, LED lamp replacements and LED tower lamp solutions.

PMI highlights include:

- Plastic and metal bezels with a wide range of options in stock.
- IP40 and IP67 ratings.
- Development of custom solutions.
- UK manufacturing facilities.

ASK ABOUT OUR STAINLESS STEEL RANGE, NEW FOR 2023



Contact our Customer Services department to discuss your requirements today.



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email: uksales@cml-it.com

Visit our website at: www.cml-it.com

Versatile approach to advanced manufacturing

From oil and gas to life sciences and the industrial sector, QPE's experience in PCB prototyping, assembly, box-build and testing is designed to instil customer confidence and absolute satisfaction

Russell Dillon, Managing Director at QPE

Founded in 1983, QPE is a full-service electronic manufacturing and assembly company specialising in PCB prototyping, assembly, box-build and testing. With over 30 years' experience in the field, the company prides itself on its innovative, high-tech and high-integrity approach to versatile customer requirements.

Specialising in low to medium volume production batches, an impressive suite of state-of-the-art equipment and experienced

and knowledgeable team consistently deliver SMT and PTH solutions. Since 2013, the organisation has made significant investments into its equipment, technology and facilities, to maximise its innovative and high-technology solution offering.

Whether a customer requires a full turnkey package or specific support at a particular part of their process, QPE can provide bespoke solutions to suit their needs. Services include NPI/prototyping, material procurement, PCB assembly, AOI/X-ray inspection,

functional and reliability testing, conformal coating, potting/encapsulation, final assembly/box build and distribution support.

The company operates across a spectrum of industries, so customers can rest assured QPE has the expertise, knowledge and experience to satisfy project requirements. Industries include: oil and gas, defence and security, life sciences, transport, communications and industrial.

www.qpe.co.uk

"Whether a customer requires a full turnkey package or specific support at a particular part of their process, QPE can provide bespoke solutions to suit their needs"

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- Transport
- Communication
- Industrial

Visit www.qpe.co.uk to find out more.



TOP 5 WAYS TO REDUCE RISK IN YOUR SUPPLY CHAIN

Whether due to geopolitical tensions, line halts, natural resource shortages or unpredictable demand resulting from economic volatility, supply chains have taken damage at every turn in the last two years.

To ensure that your business is both fortified and flexible enough to withstand the next disruption, here are five ways you can reduce risk in your supply chain.

1. Forecasting

When done effectively, forecasting can reveal hidden market factors that may negatively affect your supply chain. These factors are often fluid, such as supply, demand and geopolitical situations.

By analyzing your company's data around past supply, plus compiling a comprehensive map of your supply chain logistics, you can determine if one or more of your channels lie downstream from potential threats. Identifying vulnerabilities allows you to pivot preemptively or employ a contingency plan.

2. Buffer Stock

If you spot a potential risk to supply of a critical component, purchasing buffer stock may be a worthwhile strategy. Acquiring just one to two months of extra inventory can be a good way to brace for an incoming shortage.

However, this course of action is heavily reliant on the accuracy of your market forecasting. A misguided buffer stock purchase could leave you with excess, potentially forcing you to lower prices.

3. Obsolescence Management

Not all risks are unpredictable. Component obsolescence is an internal threat, making it a controllable risk.

Obsolescence management starts with keeping track of the end-of-life (EOL) notices and last-time-buy (LTB) dates for all components within your supply chain. Just one of these transitions falling through the cracks can cause immediate shortages.

Once you've identified upcoming obsolescence, you can either find cross-compatible alternatives to plug-and-play, or look to R&D to accommodate plans for the next generation of parts from the manufacturer.

4. Quality Control Process

Regardless of your industry, orders for electronic components should always be properly vetted. A lapse in quality can require massive corrective action with direct impacts to your supply chain, such as scrapping inventory.

5. Supplier Relationships

Choosing the right supplier network to partner with is the most substantial way to manage risk in your supply chain. A good supplier will have offerings that extend far beyond supplying inventory.

Your supplier can often provide invaluable market insight to equip your forecasting. Moreover, finding a supplier with a comprehensive quality control process will not only reduce risk, but is also more cost-efficient than conducting in-house quality control.

Managing Risk Is an Ongoing Process

Risk management is a delicate balance of proactivity and reactivity. Documented processes and fail-safes will keep you prepared for most risks, but with threats appearing unexpectedly, being well informed on supply chain best practices equips you to handle surprises as effectively as possible.

Fusion Worldwide is the optimal partner to mitigate supply chain risk. We provide expert forecasting as well as inventory management, with global warehouses equipped to house surplus and expedite orders. We also conduct in-house quality testing, to ensure your lead times remain minimal.

www.fusionww.com

Supplier &
Distributor Focus

Boiling acid helps confirm authenticity

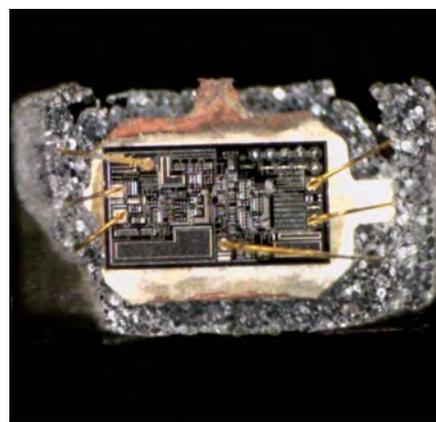
Princeps shows how the precise application of super-concentrated, boiling acid is a key technique used to reveal whether an IC's die is genuine or counterfeit

The plastic encapsulation used for integrated circuits is engineered to provide exceptional protection to the fragile silicon die, bond wires and lead frame. It is these protective properties that make the die at the centre of an IC so difficult to inspect, an essential step in any counterfeit part mitigation inspection.

It is only with the precise application of super-concentrated, boiling acid that internal elements of the part can be safely exposed for evaluation. The TSOT-23 device in the picture is 3mm wide and only 1mm deep, yet it was successfully opened for inspection, keeping all six gold bond wires attached

to the 1.2mm² die. The presence of the manufacturer's logo and the device part number on the die confirmed this part as genuine.

www.princeps.co.uk



Supplier &
Distributor Focus

Investing in productivity, efficiency and skills

Texcel Technology emphasises the role its skilled design and production engineers play when advising customers on component selection, PCB design and production processes

Texcel Technology has been operating for 45-years, growing steadily in size and reputation as a high quality CEM. The company has a UK manufacturing facility and supports OEMs worldwide who operate across a range of different vertical markets. Each year the company reinvests a sizeable proportion of its profits back into the business to improve productivity, efficiency and enhance employee skills.

Texcel's skilled design and production engineers can advise customers on component

selection, PCB design and optimum production processes for their products. Texcel actively encourages communications at departmental levels to exchange knowledge and skills as widely as possible. The company develops strong working partnerships with its customers and encourages early involvement in new product designs so that product designs can be optimised for DFM, functionality and cost.

Texcel prides itself on offering a professional but personal service to its customers.

www.texceltechnology.com



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- We build strong partnerships with our clients
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Texcel Technology Electronic Manufacturing Solutions

www.texceltechnology.com

Battery-pole connectors suit home storage systems

Phoenix Contact is introducing new connectors for home storage applications. Thanks to mechanical and colour coding, the Sunclix connection technology can be used with battery inverters.

DC connectors protected against polarity reversal prevent mismatching in common PV connection technology and short circuiting of the battery poles. Touch-protected battery poles enable safe installation, even when not plugged in. Silver-plated contacts ensure

connection technology with long-term stability.

The products offer protection to IP66 and IP68. The connectors are designed for currents up to 35A (IEC)/50A (UL) and voltages up to 1,500VDC. All products are certified to IEC 62852 and UL 6703. International certifications ensure the connectors meet current and future requirements.

www.phoenixcontact.com



Switching regulators drop in to save BoM

Relec Electronics has introduced Mornsun's K78xxJT-500R3-LB and K78xx-500R3-LB series switching regulators. The family is available in a choice of mounting options and is designed to offer engineers reliable models for price-sensitive, high volume, high efficiency applications.

Both families feature input ranges up to 36VDC and outputs from three to 15V. Operating temperature range is -40 to 85°C, while efficiencies are up to 95 per cent with no requirements for additional heatsinks, even when operating at 85°C.

The regulators are supplied in a SIP3 package. They are pin-compatible with LM78xx linear regulators and can be used as direct replacements. The K78xxJT-500R3-LB series buck converters are in a 12.00 by 12.00 by 4.50mm surface mount package and can be supplied either in tubes or tape and reel.

The regulators suit cost-sensitive, space-constrained applications demanding reliable non isolated DC/DC conversion, such as instrumentation, robotics, street lighting and IoT.

The products are available on four to six weeks lead time in volume.

www.relec.co.uk



www.gelec.co.uk

Unrelenting commitment to quality

Retronix explains how it plays a fundamental role in key supply chains, offering services ranging from component recovery and laser reballing to IC counterfeit testing

Retronix believes in the positive, transforming potential of technology. The company's commitment to protecting the environment is reflected in its innovations which create new, eco-responsible solutions within the electronics industry.

Products are reaching the end of their functional life far sooner than anyone expected. This reality is creating problems for manufacturers, consumers and the environment alike. For instance, the lack of secondary markets has created massive stockpiles of discarded devices that often go directly to landfills or incinerators. Everyday millions of dollars of brand new and used, high-value components are scrapped by electronic manufacturers because they are attached to faulty or obsolete printed circuit boards.

With over 30-years expertise in component recovery and component preparation services Retronix has been at the forefront of the circular economy model for the electronics industry. This model is designed to re-use materials, introduce them back into the production cycle and increase operational efficiency.

Retronix' component recovery solution meets the component manufacturer's specifications of maximum reflow cycles allowed on an electronic component, adhered to extensively by both OEMs and CEMs. This offering not only reduces the amount and cost of

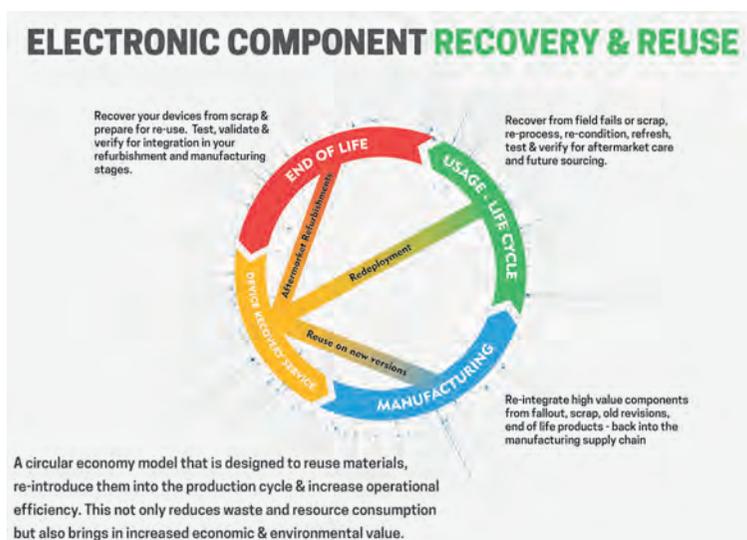
scrap going to landfill but as a bonus, seriously damages the counterfeit industry.

As a business, Retronix is committed to reducing customers' impact on the environment and supporting stakeholders looking to adopt the circular economy ethos. Our sustainability agenda incorporates environmental, social and governance (ESG) considerations that affect the success of the business.

Retronix has an unrelenting commitment to quality and delivering results in everything it makes and does. With industry leading technology solutions like component recovery, laser reballing, retinning, alloy conversion, IC counterfeit testing, PCB services and many more, Retronix plays a fundamental role in key supply chains for the sectors it operates in.

Retronix' service technologies play a crucial role in reducing waste, enable re-use of high value components and reduce dependency on macro pressures of the markets. It's good for business, customers and the planet.

www.retronix.com



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- + Pin and groover coding
- + 2 – 40 contacts / mixed assembly
- + 3 termination types: solder, crimp, print



Series F

- + Push-pull locking or break-away function
- + Half-shell coding
- + 2 – 27 contacts / mixed assembly
- + 3 termination types: solder, crimp, print



www.odu-uk.co.uk



Rebound
Electronics

Happy New Year! We have lots planned in 2023, with some very exciting updates about our investment in quality. More to be announced in the coming weeks!

Watch this space...

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Displays partner supports whole design-in process

Midas Displays' managing director, Mike Halpin, highlights 2023 investments including employee development, recruitment and a new customer focused website

As the world becomes ever more digitalised, displays play an active role in all environments of our lives—providing visual information and data for us to consume easily and at pace. The displays market is showing no signs of slowing down, with available technologies enhancing all the time.

Midas Displays is a specialist electronics company designing, manufacturing and supplying high-quality displays and associated accessories. The company

uses its UK-based, technical teams to provide customers with the best possible support with display solutions. The technical sales team is supported by in-house engineers, assisting customers all the way through the design-in process.

Managing director, Mike Halpin, has set the company's 2023 goal to exceed the percentage growth from 2022, whilst maintaining the high level of service customers have become accustomed to. To achieve this, Midas is continuing

to invest in its existing employees' development, further recruitment at all levels and an increased marketing spend—including two new exhibitions and a new website which Midas believes will vastly improve the customer experience.

2022 was a successful year for Midas and the expectation is that 2023 will catapult the business forwards, with plenty to get excited about.

www.midasdisplays.com

"Midas is continuing to invest in its existing employees' development, further recruitment at all levels and an increased marketing spend—including two new exhibitions"

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- TFT
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- Custom Solutions
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- Technical sales team
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- Custom solutions

Top flight electronics manufacturing

At ETL, we have been delivering exemplary contract electronics manufacturing since 1984. Our broad manufacturing skill extend from design management and procurement of full system build and ship-to-user, with a comprehensive range of outstanding production resources and assembly solutions in between.

Full Service

ETL is a full service contract manufacturer. That means we offer a range of flexible options to meet the specific requirements of some customers. Some only need the skills from part of our portfolio, for instance surface mount pcb assembly, conventional through-hole technology, or special wiring looms. Others use all our services to benefit from a turnkey solution tailored to their exact needs.

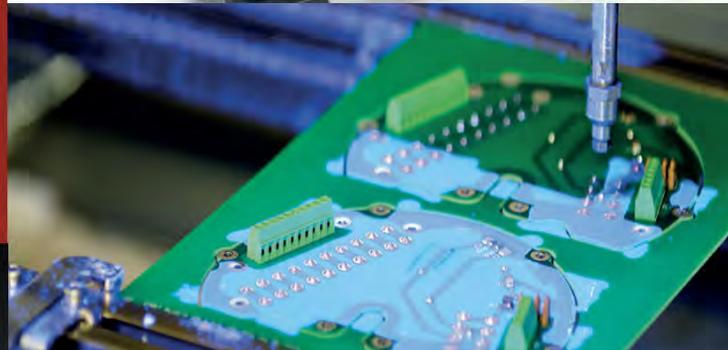
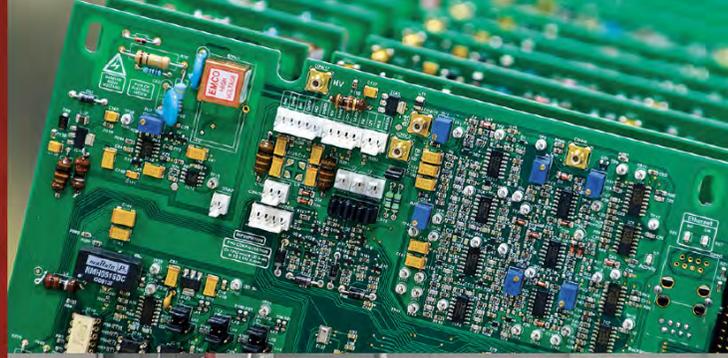
With modern facilities, comprehensive equipment and skilled workforce, we have an unbeatable combination of expertise, capacity and quality that has secured us great contracts, loyal customers and enviable certifications, including ISO14001:2004, ISO9001:2015 and AS9100-Rev D.

Knowledge

ETL customers can call on an impressive bank of knowledge and expertise. We offer complimentary advice at all levels on procurement channels, design for manufacture, design for test, production processes, quality procedures, logistics and more besides. This ensures cost effective production, optimum product reliability and shorter development cycles.

Capability

Our comprehensive full service covers a broad range of quality-certified capabilities. IPC standards are at the heart of all our production and test disciplines, and our staff training. We offer cable and harness production, mixed technology pcb assembly, test and inspection, automated selective conformal coating and full product or box-built - up to IPC Class 3 levels. We even include electro-mechanical expertise and metalwork in our turnkey services, while our dedicated project management solutions give customers a convenient single point of contact



ELECTRONIC TECHNICIANS LIMITED

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Dorset
BH21 7QZ
United Kingdom

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Email: sales@etluk.co.uk

www.etluk.co.uk



Investing in UK PCB distribution

With its acquisition of Photronix UK, STARTEAM GLOBAL now offers UK PCB purchasers just-in-time warehousing, on-site board inspection, sales and customer service

PCB manufacturer and solutions provider, STARTEAM GLOBAL, has expanded its global footprint by acquiring Photronix UK. STG operates in 19 countries with the UK becoming the 20th market. The company has a factory in China and plans for a second factory outside China soon. Photronix UK will become STARTEAM UK, complementing STG's European PCB sales, technical, quality labs and warehouse operations in Germany and Italy. Specifically, STARTEAM UK will offer just-in-time warehousing, on-site quality inspections of boards, plus sales and customer service for UK-based customers.

STARTEAM UK's MD, Alan Millard, said: "As STARTEAM UK management, the operations of this location will continue to provide local customers with PCB sales, engineering, quality control, technical support, plus our continued warehousing

services, for prototypes, small batch and medium order requirements. STARTEAM UK in Worthing is now also STARTEAM GLOBAL's UK sales office for mass volume PCB requirements supplied directly from Asia to customers' PCBA manufacturing locations."

STARTEAM GLOBAL's CCO, Franco Raffa, added: "We are delighted to have expanded our operations into the UK market and are looking forward to approaching UK based customers. We are confident that the market will be receptive of our products and services which have made us so successful around the world. With the addition of Custom Products to our portfolio of products we are excited to meet the market's technical needs."

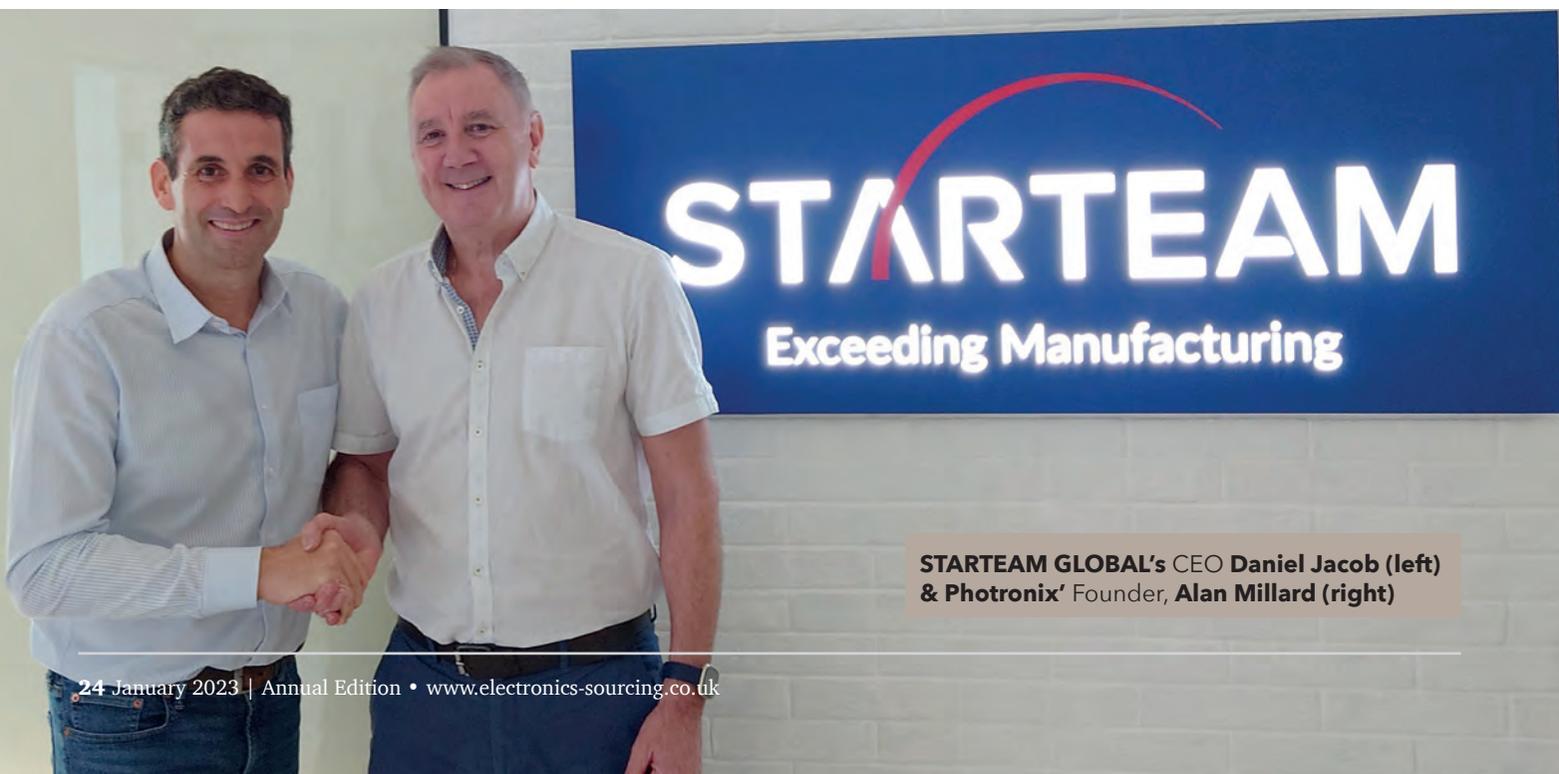
Originally from Germany, STARTEAM GLOBAL operates its own factory in China. Complemented by several JV manufacturing plants, STG

can meet all PCB technology needs. In the last year, STG has been expanding across the globe with nine sales offices being opened in unique locations. With over 20-years of success in the automotive industry, STARTEAM GLOBAL possesses a huge amount of technical knowledge and experience. Currently, STG has ongoing projects in the automotive, industrial, telecommunication, medical, consumer, energy and lighting sectors.

STARTEAM GLOBAL is currently working on a 'China + 1' concept which aims to reduce the market's dependence on China. Essentially, this would be a second fully owned STARTEAM GLOBAL factory based in Southeast Asia. An official announcement for this new STG manufacturing facility can be expected in coming months.

www.starteam.global

"We are delighted to have expanded our operations into the UK market and are looking forward to approaching UK based customers"



STARTEAM GLOBAL's CEO Daniel Jacob (left) & Photronix' Founder, Alan Millard (right)

STARTEAM

Exceeding Manufacturing

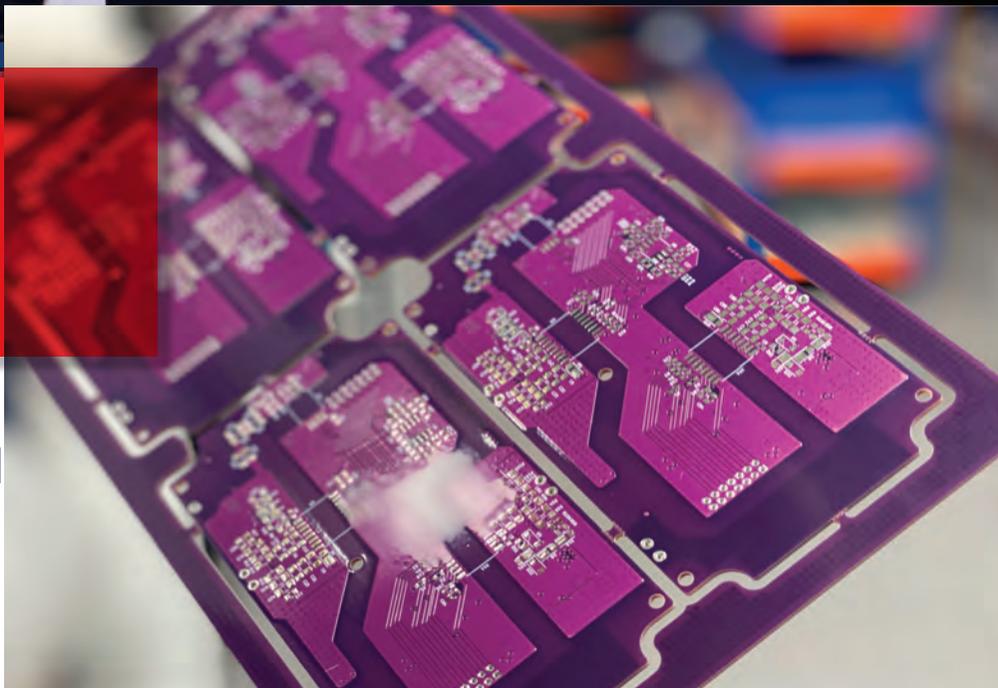
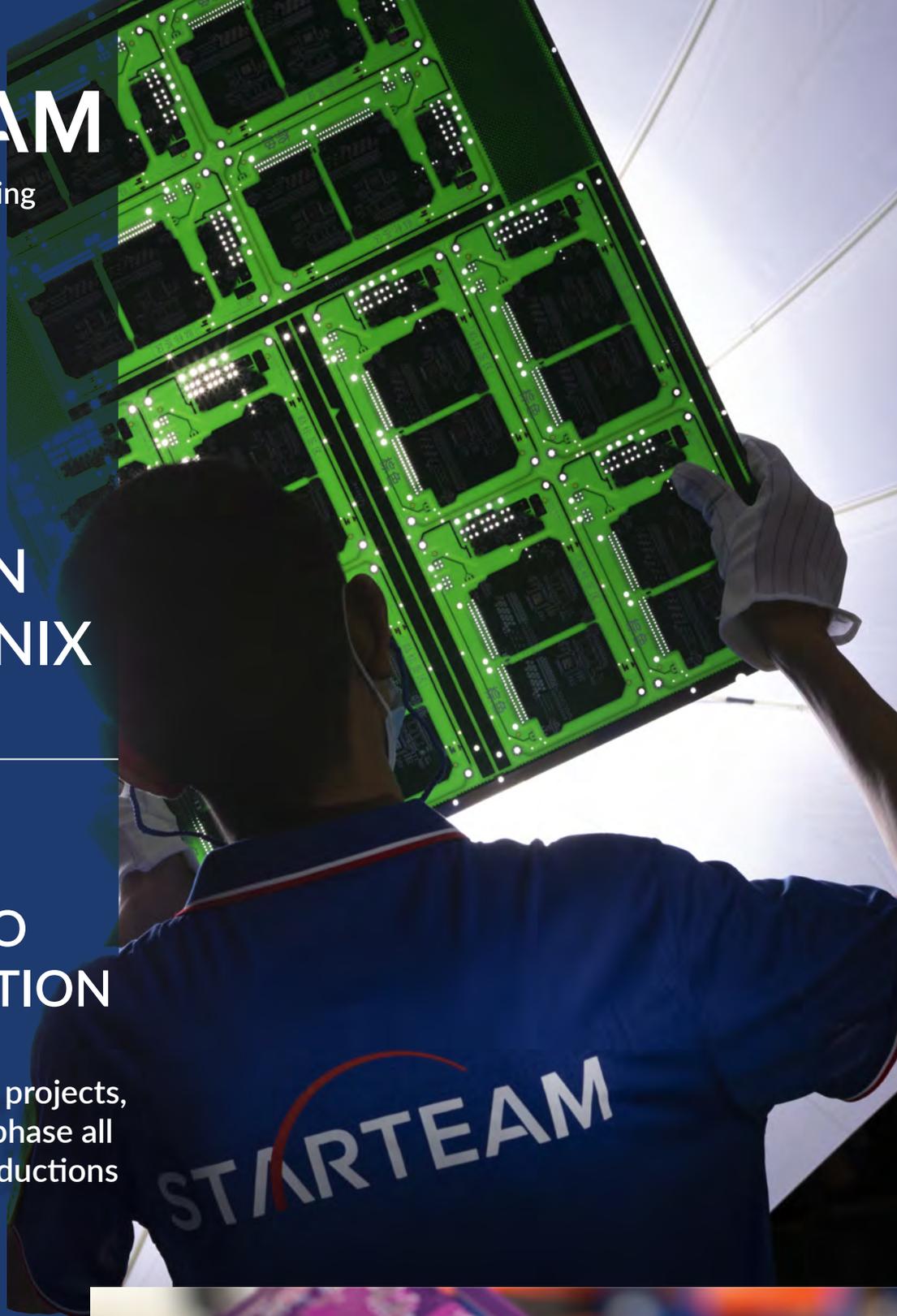
STARTEAM GLOBAL COMPLETES ACQUISITION OF PHOTRONIX

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Almost half a century of trusted supply

Winslow Adaptics' CEO, Teri-Ann Winslow, highlights how the company's 47-years' experience is helping manufacturers keep their production lines buzzing

Winslow Adaptics' CEO, Teri-Ann Winslow

Navigating the supply chain through 2022 has been a roller coaster, a particular challenge when you are famed for providing speedy solutions. But we threw down the gauntlet and made magic happen! The company also successfully completed the SC21 Competitiveness and Growth Program with ADS and became accredited to AS9100 RevD, quite a year!

2023 will see the Winslow brand move into its 47th year with the Adaptics range of products heading into 34 years. With almost half a century under our belt the company has become a critical part of the supply chain.

Many challenges have been presented to the electronics industry over that time but none quite like the last three years. We've risen to it and successfully helped our customers, old and new, keep their production lines going.

Looking forward, will 2023 see a huge improvement? I think the jury's out on that, there are too many conflicting views. If it does improve does that mean, we all go back to what we were doing before, breathe a sigh of relief and settle back down? I'm not sure that's the best idea. Isn't there a saying "learn from experience"?

Why choose Winslow as a partner for the long term?

Our team is highly experienced and instils confidence with fast responses. They understand the need for form, fit and function when specifying a solution and consider cost without sacrificing quality at all times. Using a Winslow product helps towards the right to repair movement, the circular economy, and the futureproofing of your design.

Put us to the test! Head over to our website and see how we can support your next design or supply chain challenge with...

- Interposers/Adapters to solve semiconductor shortages & obsolescence

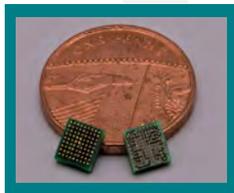
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Using our vast design & manufacturing experience, we are here to help quickly and affordably resolve your supply chain problems



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Talking openly about menopause

Nano Electronic Services' Steve Drew is proud of the organisations' support for colleagues experiencing the symptoms of menopause

Employees are the heartbeat of any company, with the industry already facing a skills crisis with not enough people entering the sector. However, what about people leaving it—skilled and knowledgeable people.

Did you know one in four women consider leaving their employment due to the menopause. Something that needs to be discussed, it's a condition likely to affect all women and impact the workplace.

Supporting menopause at work is right for colleagues and organisations. It underpins an inclusive, supportive work environment, while helping attract and retain talented people.

Menopause is an individual experience and for those experiencing symptoms it can be a relief to know their employer and colleagues will support them.

Employers seeking to attract and retain a diverse, inclusive workforce can start by creating an environment where colleagues can talk openly about menopause and mental health. Nano Electronic Services is proud to fly-the-flag for this important subject and hopes other companies will consider raising awareness.

www.bmrhealthandwellbeing.co.uk/menopause-training-courses

Use **NANO10** for 10% off courses

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Principles of manufacturing an electrical connector

PEI-Genesis introduces readers to a connector's individual components and the company's quick turnaround, value-added connector assembly capabilities

The chosen method of producing an electrical connector depends on the series and testing requirements. Inspections occur throughout each assembly stage to verify components are free of defects and ensure the connector meets its own specification requirements.

To break down the process of manufacturing connectors to its most basic form, it is best to separate them into their individual components: housing, inserts, contacts and assembly.

Housing: Depending on its material, the connector will either be formed from metal or plastic.

If the connector is plastic, typically it is created via injection moulding where plastic pellets are melted at high temperature and morphed into a particular shape before cooling and solidifying. If the connector is metal, it will either be die-cast or machined out of a base metal such as aluminium.

The connector is then sent to be plated. Plating involves covering the connector shell with a metal coating primarily to enhance electrical conductivity, protect from corrosion and guard against abrasion—all working together to ensure the final product is durable.

Insert: The centre of a connector comprises a non-conductive insert that separates the pins from the connector housing. For metal connectors, the insert is traditionally made from a rubber/silicone material that evenly separates the conductive contacts from electrical issues like creepage and clearance.

This isn't such a concern when a connector is made from a non-conductive material like plastic, where the connector housing can be designed to be its own insert.

Contacts: Manufacturing contacts is similar to the connector housing; however, this time, they can only be produced from a conductive material. There are two main

ways to produce contacts, CNC machining or stamping.

Assembly: The final stage of creating an electrical connector is assembly which is where PEI-Genesis excels.

By stocking all the connector housings, inserts and contacts required to produce a wide range of part number permutations, PEI offers quick turnaround, value-added connectors at a fraction of the lead-time compared

with purchasing directly from the connector manufacturer.

With over 75-years of connector experience and in-depth connector knowledge, the company's quality assurance inspectors use a variety of tools and techniques to ensure connectors are manufactured to the correct specification.

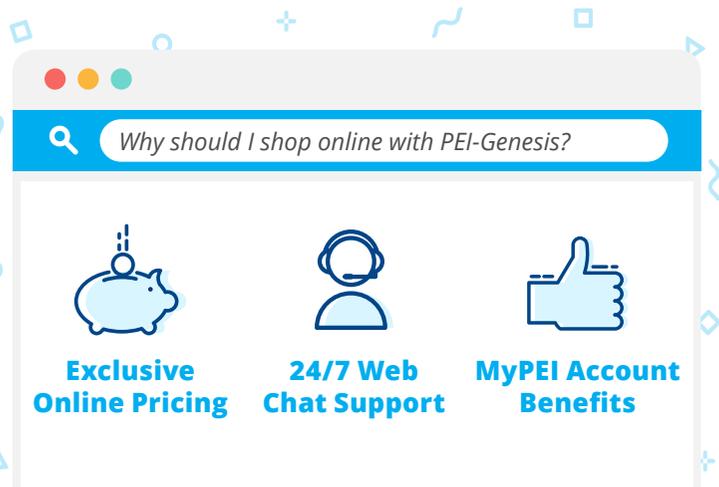
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Solving recruitment challenges in PCB sector

With the PCB sector facing recruitment challenges, Finline explains how training, opportunity and more helps retain employees, benefiting customers and the business

Whilst recruitment has been a decade-long concern for PCB companies, the pandemic and generational expectations have intensified the challenge. Lockdowns and 'work from home' caused people to question whether their job and employer remained the right fit. Expectations of flexibility, creativity and purpose mean more people are seeking diverse careers.

PCBs remain a growth industry, offering opportunities for people starting their careers or wanting a change. It's no secret many employees are maturing, with 25 per cent retiring over the next decade. This offers great career progression.

Millennials and Generation Z possess valuable technology skills and knowledge but seldom consider employment in the PCB sector. PCB companies must recognise this and adapt their recruitment strategies.

Finline has maintained strong employee retention through flexibility, competitive salaries, remote working, referral and company performance related bonuses, a great working environment, plus environmental responsibility and local community support.

Finline looks beyond qualifications and experience to soft skills including passion for learning, adaptability and initiative. Finline's training programs mean people with the right attributes can be coached to the required technical, service and commercial skill levels.

Recognising this, Finline has invested in a head of global training and learning to support this process. The company is recruiting for the long term and understands that investment in people is crucial for its future success.

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Partnering for design and manufacture

In this article, Review Display Systems explains how 40-years' experience underpins its product portfolios and technical support in embedded computing and display technology



Engaging Review Display Systems as a design and manufacturing partner lets OEMs access state-of-the-art technology, product portfolios and technical support in embedded computing, display technology and design services.

Review Display Systems is a specialist embedded computing and display solutions provider, and system design partner. Long-term, established alliances with leading global supply partners and manufacturers

ensures RDS has access to a comprehensive range of the latest embedded computing, display technology and system support peripherals.

Established in 1982, Review Display Systems engages and develops partnerships with electronics engineers, system architects and purchasing professionals in a range of industry sectors including process control, industrial instrumentation, medical device technology, factory automation, facilities management, in-vehicle systems, point-of-information and more.

Review Display Systems' engineering design and production team offers design and development support including hardware design, firmware development, mechanical fixtures/fittings, project management, approval prototypes, sub-assemblies through to full system production and sub-contract manufacture.

The company is committed to environmental responsibility, sustainability and quality with accreditation to internationally recognised

quality standards including ISO14001, ISO9001-2015 and ISO13485:2016 for the design and manufacture of medical technology devices.

During 2022 Review Display Systems celebrated its 40th year anniversary. Throughout this time, the company has successfully navigated challenging and dynamic business conditions supporting UK-based businesses with products, systems and services in many diverse industry sectors.

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Offering a broad spectrum of electronic assembly, the heart of Tioga's manufacturing facility is based in Derby right in the centre of the UK in a beautiful listed railway building. The site has been custom converted and fully refurbished into a modern, extensive and sophisticated plant housing state of the art equipment.

Our core competencies far exceed just manufacturing; this encompasses design, engineering support, global procurement and supply chain, manufacturing, test, configuration, warehousing and distribution. In short, we are able to take on board the management of customers' products in their entirety.

Happy New Year!

As we move into 2023, everybody at Tioga would like to wish you a Healthy and Prosperous New Year.

As COVID-19 eased more challenges were on the horizon for 2022. We encountered frustrating issues with supply chain, freight, energy and rising costs. Moving forward we see another tough year ahead, we are adapting and working together as a partnership to keep continuity of production, with flexibility and communication being Tioga's main key drivers.

A massive **'Thank You'** to all our customers and suppliers who have helped and supported Tioga through these unprecedented times and a special **'Thank You'** to our people for their hard work, understanding and patience.

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Access expert thermal knowledge

ATC Semitec's MD, Rob Savin, explains how customers can tap into the company's 25-years' experience solving thermal management challenges

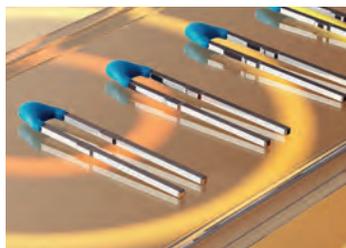
With over 25-years knowledge of the temperature sensing and thermal protection market, ATC Semitec claims the position of the UK's leading temperature sensor distributor.

The company works with its customers to understand their thermal requirements. Likewise, its expert knowledge lets it quickly identify product solutions, sometimes with the added benefit of cost reductions. ATC Semitec holds substantial levels of stock lines for immediate despatch and also for new customers or new projects.

MD, Rob Savin, said: "With over 25-years' experience in

this market, we have built an unbeatable reputation for offering good technical advice and excellent customer service. We offer solutions, high quality products and support when engineers and buyers are under pressure. As markets such as e-mobility evolve with increasing demands made on the BMS, we are able to use our expertise to help engineers resolve their thermal management issues."

atcsemitec.co.uk



Together we can make it happen!

At ATC Semitec we have been supporting design engineers with thermal management applications across a huge range of industries for 25 years.

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Ready to speed up your assembly time?



CamdenBoss introduces its Easy Assembly Electronics Enclosure, a product designed to help manufacturers shorten lead times and deliver cost savings

To help manufacturers shorten assembly times, CamdenBoss has launched its Easy Assembly Electronics Enclosure.

The enclosure comprises a Dual-action lid, featuring a push-button clip mechanism attaching the lid to the base. Thus, the lid can be attached quickly and easily without screws. This allows quicker assembly and subsequent cost savings. Alternatively, the lid

can be reversed where a brass insert aligns with the buttonhole, accommodating a countersunk screw.

The lid functionality provides effortless assembly which, on the production line, saves time. With a shorter assembly time more units can be processed faster, boosting efficiency, shortening lead times and providing cost savings and increased sales.

The Easy Assembly Electronics Enclosure

has another productivity boosting trick up its sleeve comprising a set of supports located at the top of the base section. These supports have been designed to require no screws when mounting a PCB. As a further security measure, the lid incorporates a set of moulded plastic springs that hold the PCB in place from the top so the board experiences no movement once the enclosure has been assembled.

These smart features provide benefits to both

OEM manufacturers for assembly speed and end users should the internal space need to be accessed at any time. So, if manufacturers are looking for an enclosure that combines quality, high design standards and the added benefit of a fool proof quick assembly method, the Easy Assembly Electronics Enclosure offers a solution.

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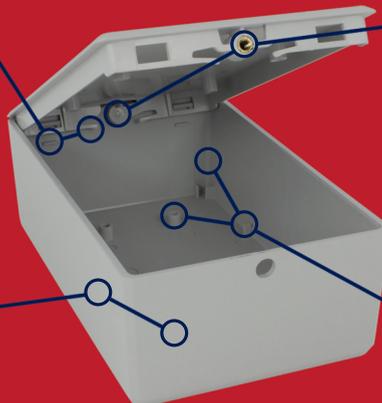
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Navigating changing semiconductor supply landscapes

Rochester Electronics' technical sales manager, Ken Greenwood, explains how OEMs are reclaiming control of their supply chains by tapping into data and expertise

Though semiconductor supply and demand may have begun normalising, it's important for OEMs, OCMs and their trusted end-of-life partners to agree new sourcing practices to reduce the risks arising from the lasting consequences of the recent turmoil. Sharing data is the key.

The semiconductor manufacturing flow is complex and thousands of miles long. Processing of raw materials, fabrication and assembly has concentrated in Asia to minimise costs. The pandemic and resulting effects on production timetables and shipping links, exposed the supply chain's vulnerability.

Political and trade tensions, plus a reassessment of existing supply chain risks, have resulted in large-scale restructuring of the semiconductor investment landscape in favour of North America and Europe. These fab investments must eventually be matched by investments in labour force skills, packaging and semiconductor materials to secure the supply chains.

Customers must reassess their purchasing practices. 'Minimising prices' has been replaced by 'guaranteed supply' as a purchasing

mantra. Safety stocks and multi-sourcing are back in vogue. Customers should also plan for supply disruptions and secure relationships with authorised partners who can provide: risk-free access in times of shortage; a trusted source for long-term needs after obsolescence; and critical intelligence on market trends surrounding fab technologies, packages and production capacities.

The continuous evolution of semiconductor technology has been a constant throughout the last 50-years. OCM investments and resources are focused on the most profitable newer technologies, whilst resources and costs are cut and reallocated by discontinuing older products.

The rising dominance of the networking and communications industries' market share is radically changing the nature of the business. A limited number of dominant users and high-volume applications dictate the rise and fall of technology nodes, especially at third-party fabs. As product geometries shrink, the demand necessary to keep lines running is enormous. Most industrial, transport, medical and energy applications have insufficient demand to influence supply. In a historic first, even automotive struggled to influence supply lines.

There have been numerous examples where a third-party fab has chosen to

close a line, with little or no warning to OCM users. Similarly, external packaging houses are choosing to concentrate on higher-margin products, by ending production of older packages, such as PLCC and small-SOIC.

Component lifecycle predictions, normally derived from OCM data suddenly become invalid when segments of an OCM's own component supply chain begin to dictate the exit timetable.

While OCMs have committed to a massive programme of new investments, component discontinuations (PDNs) on existing products will be arriving faster and more unexpectedly than ever before.

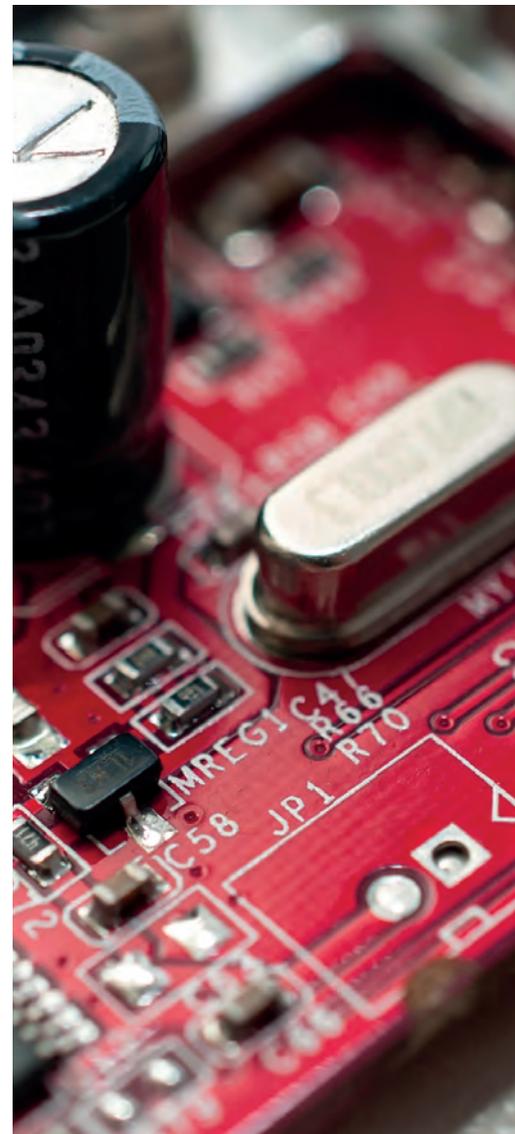
OEMs should regularly monitor components' lifecycle status. This means tracking the declared lifecycles through component database tools like z2Data and IHS, but also by tapping into the additional data available through semiconductor lifecycle experts, such as Rochester Electronics.

OEMs previously passed component selection and sourcing responsibility to their tier one and two suppliers. Unfortunately, the severity of the recent supply crisis meant supply problems ultimately ended up at OEMs' tables.

The crisis has triggered a fundamental reconsideration of how OEMs manage components



Rochester Electronics'
technical sales manager, **Ken Greenwood**





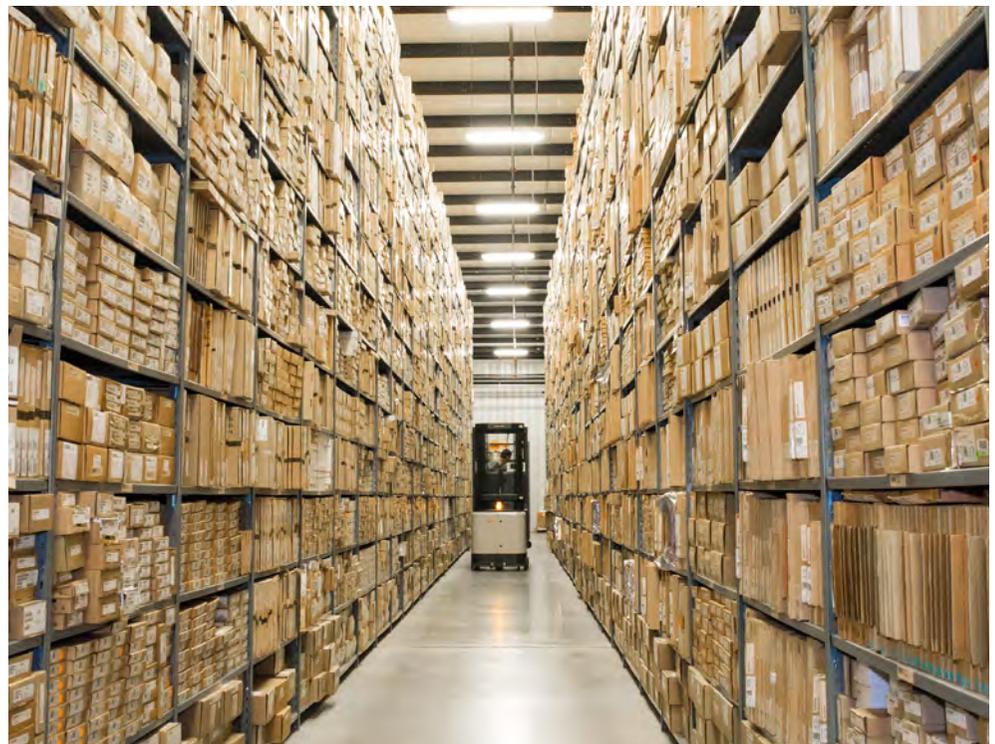
in their end equipment. Supply resources and component expertise—previously not a key focus—are now being strengthened. OEMs are reclaiming control.

OCMs are also attempting to regain control of the ways their products enter the market. Every supply crisis results in desperate sourcing practices. Unauthorised sources and counterfeiters are ready to take advantage of those desperate businesses. Overall component quality then deteriorates and the OCM's reputation can be tarnished.

OCMs have redoubled their efforts to limit the flow of components into unauthorised and broker channels. Both surpluses of active and obsolete components are now tightly controlled and released only to a trusted circle of authorised partners. These partners are tasked with ensuring components only flow to OEM and CEM customers. This also limits the chances of components finding their way around trade sanctions.

"The continuous evolution of semiconductor technology has been a constant throughout the last 50-years"

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Reducing purchasing and supply costs

Antistat's founder and CEO, John Hensley, explains how the company's success is based on carefully listening to customers' needs and responding with innovative solutions



Antistat's founder and CEO, John Hensley

Antistat was formed 35-years ago to meet the challenge of electrostatic discharge and the adverse environmental conditions experienced during handling and transportation of ESD sensitive devices and materials. Today, Antistat supplies ESD safe consumables and technology-led packaging solutions including personnel grounding, ESD monitoring and shipping materials.

The company has evolved in the industries and

geographies it serves; launched 1,000s of products; developed innovative, cost saving solutions for customers; and won awards including environmental best practice and the Queen's Award for Enterprise: International Trade.

Antistat's founder and CEO, John Hensley, said: "Core to our success is that our focus has and always will be our customer. Antistat has always supplied the solution for satisfying just-in-time supply chains for advanced manufacturing

businesses. We spend a lot of time listening to what the customer needs and evolving our processes and supply chain to deliver quality products with full traceability worldwide; right product, right place, right time."

Antistat also specialises in finding innovative technical solutions and ways to reduce purchasing and supply costs. The company works with customers to provide solutions on reductions in component purchase spend, inventory management, carriage

and supply chain cost management, rationalised supplier bases, dedicated supplier contacts, streamlined documentation processing with full batch traceability and ongoing cost saving alerts.

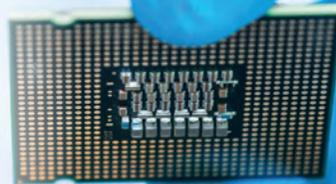
The company operates globally, serving over 1,000 customers across 48 countries.

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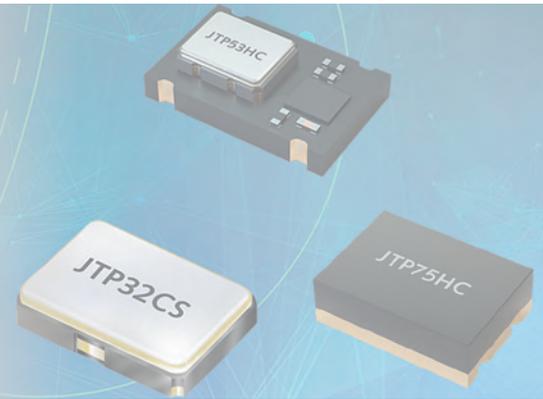


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Ready for small cell rollout

Jauch Quartz' new oscillator range is designed to match the performance specifications of 5G applications which are about to see a burst of activity



Jauch Quartz has launched a new range of precision temperature compensated crystal oscillators (TCXOs) and a voltage controlled option (VCTCXO) offering frequency stability of ± 50 parts per billion and operating temperature range of -40 to 105°C .

Frequencies include: 10.00, 19.20, 20.00, 25.00, 38.88, 40.00 and 50.00MHz. Three standard surface mount packages are 7.0 by 5.0, 5.0 by 3.2 and 3.2 by 2.5mm. The JTP75HC(V) and

JTP53HC(V) have an HCMOS output with a 3.3V current supply and a maximum current consumption of 10mA. The JTP32CS(V) has a clipped sinewave output and is available in a range of voltages from 1.8 to 3.3V and a maximum current consumption of 3mA.

Growth of 5G applications over coming years is creating demand for tighter stability frequency products operating over wider operating temperature ranges. This range is Jauch's first step in supporting customers in these markets.

5G runs on lower power than 4G meaning it requires a Massive In Massive Out (MIMO) system. In turn, this requires millions of small cells throughout cities, urban areas and in homes, offices and factories. Pico and Femto small cells will be key to critical IoT and industrial automation where a $< 1\text{ms}$ latency and 99.9 per cent reliability is required. It is estimated by 2025 there will be five billion IoT connections. There will also be a growth in the positive optical network (PON) market as more offices and homes are

connected by fibre to the home/office (FTTH/O).

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Experience and technical capability matter in CEM sector

Gemini Tec's MD, Adam Harsant, explains how the company's strategic growth over the last three years put customers at the heart of its operations

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Approaching its 50th anniversary, Gemini Tec has strong core values, a focused approach to sustainability and continual investment in its operations.

Adam said: "As a business, we have been resolute in ensuring customers benefit from our market leading capabilities and process expertise by continuing to manufacture complex electronic products whilst balancing the challenges of the wider market.

"It was our investment in solder jet printing in 2007 that created the foundation for the unique process capability we offer today. Since then, we have invested in 3D AOI, vapour phase reflow and nitrogen reflow, bringing technically advanced processes to customers in the automotive and aerospace sectors, successfully partnering with them to build complex PCB electronics. Our clients require superior quality, high reliability products for demanding applications and it has been a privilege for our company to have been an integral part of their success."

To ensure the business continues to exceed customer expectations in 2023 and beyond, a further 10,000ft² of production space has been created to increase capacity for final product assembly and system level testing, as more customers seek closer integration with their supply chain.

Adam concluded: "We work closely with customers, setting objectives for each project, collectively propelling production quality and capability forward. We look forward to working with customers requiring a technically capable CEM."

geminitec.co.uk

Outsourcing takes the investment strain

By continually upgrading its capital equipment, Jaltek shields its contract electronics manufacturing customers from the cost and complexity of investing in new technology

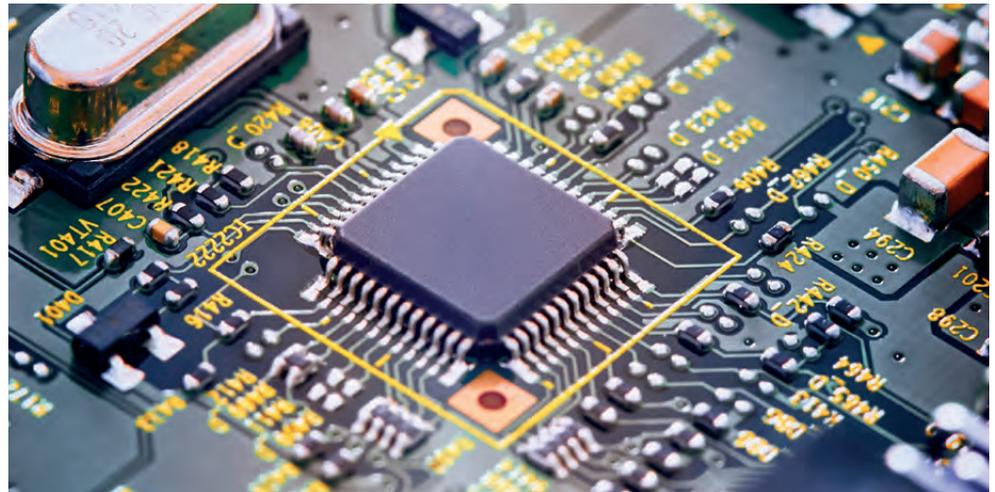
To provide customers with up-to-date, efficient and cost effective solutions, Jaltek constantly reviews its technology including its volume and NPI lines, all supplied by Blakell Europlacer. The multifunction SMT pick and place platform maximises flexibility, while the prototyping and main production lines are compatible, allowing seamless transfer of prototypes.

Jaltek's recent investments include production, test and inspection kit, including an environmental simulation test chamber allowing greater in-house temperature and humidity testing. The company's largest 2022 investment was increasing its manufacturing space by 50 per cent and recruiting across production, engineering and account management.

MD, Steve Pittom, said: "Despite the component challenges that 2021 and 2022 presented, due to the longevity of our strategy we have been able to continue to enhance our offering. We invest in our people as well as our equipment, we have expanded our team to support growing activity in design, engineering, project management and NPI. Our in-house training ensures all employees work to the industry's highest standards as per the Institute of Printed Circuits."

Business manager, Steve Blythe, added: "The new factory is now operational for box build and test, supporting our increasing workload. Essentially this investment enables us to continue delivering our vision towards world class competitiveness and productivity for our customers. As we grow, we are also able to offer more opportunities for people to have rewarding and enjoyable jobs in manufacturing and engineering. We deliver solutions through technology and partnership to make tomorrow better than today."

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Delivering solutions through Technology and Partnership

Jaltek is a leading AS 9100 and ISO 13485 accredited UK contract electronics manufacturer with over 30 years' experience. We provide a complete contract design and manufacturing solution adapted to meet our customer's varied requirements, serving a range of industries.

Focusing on low to medium volume, high mix product profiles, our services include conceptual design, PCBA layout, fast turnaround NPI, manufacture and test of PCBA's and final product assembly. Using advanced systems Jaltek supports products throughout their lifecycle, right from concept, through value engineering - where PCBA design and layout is optimised by our engineers - to volume production. We offer a single service or complete solution.

We supply a diverse range of customers, from well know multinational companies to start-up ventures. We have worked with many of our clients for over 15 years – providing transparent costs and collaborative support in an ever changing marketplace as we continually invest in equipment, systems and people to support our clients requirements.

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Digi-Key's myLists tool improves efficiencies



Digi-Key's VP of global business development, Mike Slater

Our customers have spent the past few years pivoting and embracing agile decision-making processes. While it's been an incredibly challenging time, we believe that those who have embraced and accepted these challenges will come out stronger because it is through the challenges that we grow the most.

Here at Digi-Key, we're listening to our customers and acting accordingly to improve efficiencies. Our goal is to provide customers with a frictionless digital interface, saving them time so they can focus on designing and building.

myLists Updates

We've updated our myLists online tool with faster, locked-in pricing. This consolidated list management system allows users to determine stock availability and lead times, perform attrition calculations to plan for lost or damaged components during manufacturing, create quotes that lock in pricing for 30 days and upload and download lists.

With the upgrades to the myLists tool, customers can access instant, locked-in pricing with the Quote Manager feature, along with real-time and on-demand price and availability. Getting a quote through myLists is fast and easy, allowing customers to make the most of the functionality to keep everything in one convenient location, create multiple quotes from one list of parts and easily convert quotes to online orders.

myLists also provides a better user experience with easier collaboration between purchasing and engineering, as lists can be shared with others in your organisation.

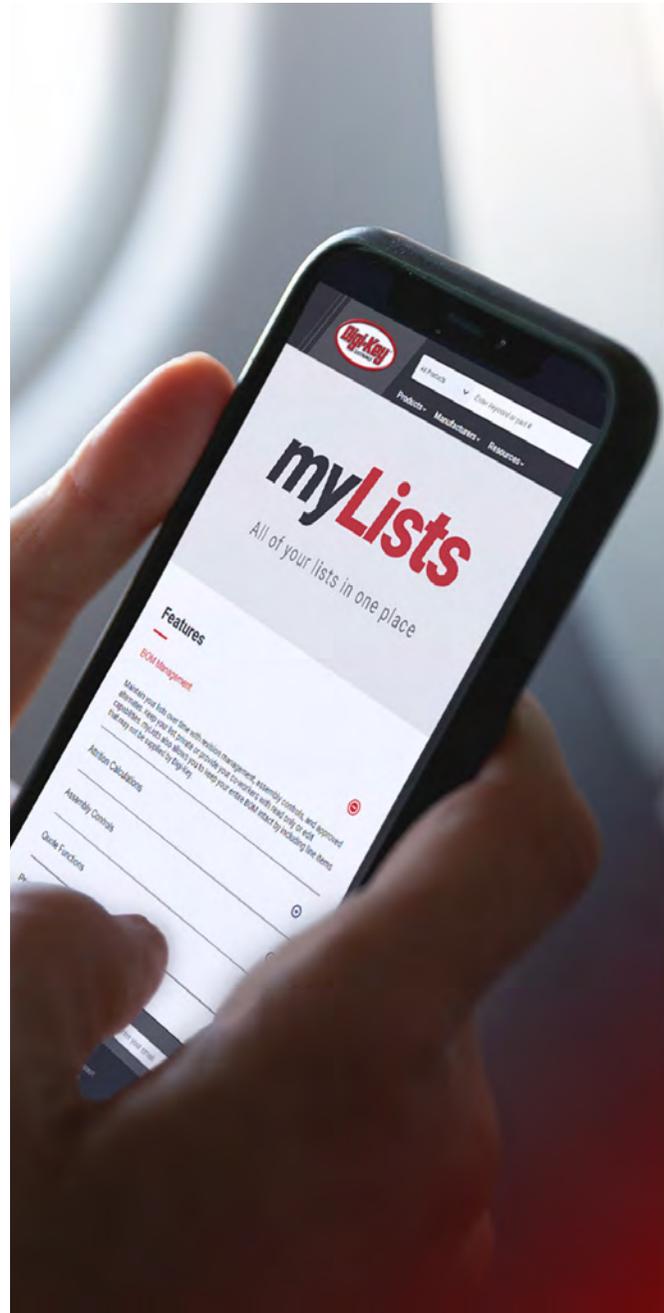
Alternative Parts

In addition, myLists makes it as easy as possible for customers to find alternative solutions that may fit their needs. We're still dealing with golden screw shortages and there's some concern that we don't have specific dates or timelines for some of those hardest to get products yet. When a customer tries to order a part number from our website and it is out of stock, Digi-Key automatically presents potential alternatives from our database of nearly 60 million part number cross-references.

For example, if a bill of materials is available for the design, it can be entered into myLists and it will indicate if any of the chosen parts are obsolete or not recommended for new designs. Even just entering a part name, keyword or number brings up a wealth of information about the status of that part, including if it's obsolete or headed that direction and alternatives to evaluate.

We know how important it is for customers to source products that are in stock and to access all the information they need to ensure they're getting the correct product the first time. We value and listen to customer feedback, and have made significant investments in the Digi-Key website to help our customers improve efficiencies as they continue to innovate during challenging times.

For more information, visit the myLists landing page at www.digikey.co.uk/mylists



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Solid State Disks'
sales director,
James Hilken



Solid State Disks offers form, fit and function replacements for all types of legacy hard disks, with the added benefits of remote access via local networks and higher reliability through use of solid state technology. Established in 1989, the company offers experience in sectors including aerospace, automotive, defence, embedded computing, industrial manufacturing, nuclear, rail, data servers and telecoms.

Certified to ISO 9001:2015 and NATO NCage, Solid State Disks designs and manufactures CF2SCSI SCSIFlash and FLOPPYFlash CF

based solid-state drives, both featuring proprietary FPGA-based technology designed to deliver greater performance and future-proof applications.

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Selwyn's other connector offerings include RF, PCB, crimp, high speed I/O, SATA/SAS, network, terminal blocks, custom adapters and BGA sockets.

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Supplier & Distributor Focus

Meet the supplier

Purchasing professionals seeking commercial and technical advice will be pleased to hear Würth Electronics UK is planning to attend numerous exhibitions throughout 2023

Würth Electronics UK is exhibiting at numerous events across 2023 including: Southern Manufacturing & Electronics, Engineering Design Show, Design Engineering Expo and more.

At these exhibitions, regional business managers and field application engineers will be on hand to provide commercial and technical expertise for visitors requiring it. Of course, Würth will also be handing out its famous gummy bears.

A full list of UK and global exhibitions can be

found on Würth's recently relaunched website.

For updates about upcoming free seminars which Würth Electronics is running in conjunction with EMC labs across the country, follow Würth Electronics UK on LinkedIn and keep your eyes peeled for posts advertising these events. Field application engineers from Würth Electronics and respective engineers from EMC Labs will combine their experience to provide a free day of technical presentations and training.

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How do you solve obsolescence issues and locate hard to find parts?

The International Institute of Obsolescence Management (IIOM) has been helping companies to address the problem of obsolescence in long life cycle industries since 1997, chapters are now operating in Germany, France, India, UK and USA. Its corporate members include asset owners & operators, manufacturers and obsolescence solution providers.

The short life-cycle of electronic components, driven by consumer markets, makes sustaining of long life cycle systems increasingly difficult, but it is not just about electronic components – globalisation and consolidation of the supply chain, supplier bankruptcy, and new regulations such as REACH affect electrical and mechanical components and equipment as well.

By joining IIOM, you will be able to talk to experts from industry and academia about how to implement obsolescence management best practice, to find obsolescence solution providers, and to recognise and develop the competence of your obsolescence experts.



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Top tips for finding the right manufacturing partner

Organisations should focus on the whole package when considering outsourcing. David O’Keeffe suggests looking at existing relationships: “Did the company do what it said it would within the agreed timeframe? Is it a trusted relationship?”

“This can often be determined by the length of customer relationships. Relationships stretching back several years and evidenced through testimonials are a good indicator the company values relationships and customer retention.”

Flexible approach: Although planning is essential, it is important to look for a flexible CEM that can meet changing requirements.

O’Keeffe said: “For example, when changing a product can the CEM accommodate design changes, shorter product runs or prototype manufacturing?”

Capabilities: O’Keeffe explained: “Any organisation choosing to outsource its manufacturing, assembly or end-of-life management, wants to be certain the CEM does what they would have done themselves, perhaps a little more efficiently.”

Capacity: Any organisation looking to scale production, run different product lines or move from assembly to box-build for example, needs a CEM with the capacity to accommodate this. O’Keeffe suggests a site visit, so the company can see what capacity and facilities the CEM has to accommodate their growth.

Culture and fit: O’Keeffe recommends organisations ask: does the CEM have a culture of collaboration, participation and innovation? Are both companies committed to working together with customers throughout every stage of the product and supply chain cycle?

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Trojan Electronics’ operations manager, David O’Keeffe, looks at why selecting the right manufacturing partner has become more important than ever

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Double down on component quality

In this article, Schurter outlines its component and service expertise across industries including industrial, automotive, space, aviation, communications and energy



SCHURTER manufactures and distributes circuit protection components, connectors, switches and EMC products. The company also develops and manufactures input systems and offers printed circuit board assembly services. The company's Solutions Unit coordinates projects from planning to end product manufacture.

SCHURTER Electronics is part of the worldwide Schurter Group, a Swiss-based global family

company certified to international standards. In the industrial sector, SCHURTER offers over 20,000 internationally approved products, available worldwide at customers' preferred points of purchase. Products for the medical market are certified and engineered for safety. Applications include power supplies and user interfaces.

Regarding automotive applications, electronic controls and power supplies require reliable components offering long-term stability. As an example, chip fuses are

precise, reliable, temperature and vibration resistant. These characteristics make them ideal for automotive use.

Specifications in the space and avionics sectors are significantly higher than regular international standards. SCHURTER provides zero defect solutions to meet the highly specific requirements of electronic systems used on aircraft, satellites and spacecraft.

In the data and communication industries, consistent, high-quality components are required

for manufacturing systems used in data centers. Likewise, in the energy sector, uninterrupted electricity supply is crucial.

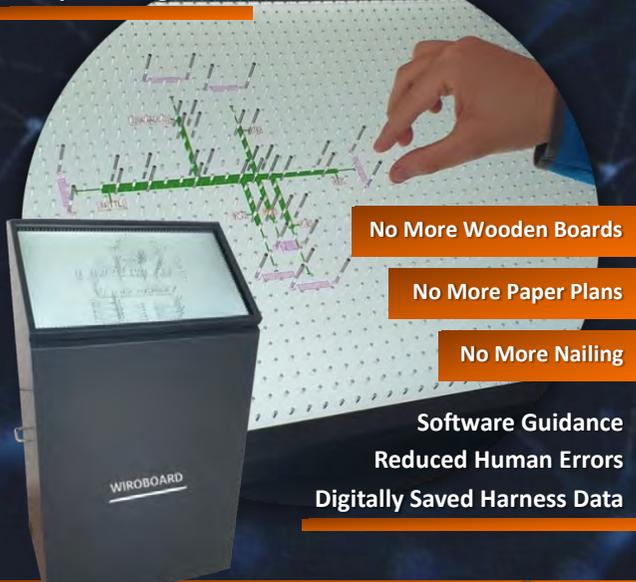
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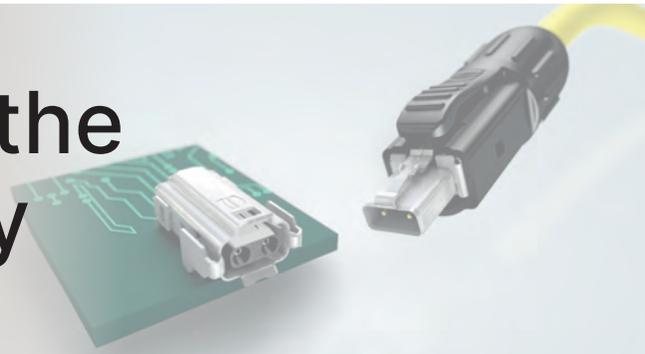
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Single Pair Ethernet, the future of connectivity

Harting's Ethernet communications expert, Matthias Fritsche, and global product manager, Marian Duemke, introduce readers to the benefits of Single Pair Ethernet



Previously, industrial Ethernet could only reach the control level before it needed to switch to bus systems via gateways. Single Pair Ethernet (SPE), delivered via Harting's T1 industrial interface, lets field devices connect directly to the Ethernet network.

SPE technology is fast, space-saving, cost-efficient and ready to implement in integrated industrial and IIoT applications. To discover more about the T1 industrial interfaces and SPE, *Electronics Sourcing* quizzed, Harting's Ethernet communications expert Matthias Fritsche and global product manager Marian Duemke.

What is the idea behind Single Pair Ethernet?

Matthias Fritsche: "SPE is about conveying the Ethernet protocol with another physical layer using only a single pair of wires. So just as one is currently using four-pair copper cables, fibre-optic cables or radio today, SPE is another form of physical layer, designed for communication down to the field level."

What are the benefits of SPE?

Marian Duemke: "SPE means Ethernet interfaces can now be integrated onto simple sensors, cameras, reading/ID devices or similar miniaturised equipment. As a result, there is immense potential in the T1, which can supply both data and power across a single pair of wires in an IEC 63171-6 industrial interface."

Which markets and industries could benefit from SPE?

Marian Duemke: "Within transportation, an Ethernet cable currently weighs approximately 4.6kg per 100m, whereas an SPE cable only 3kg. Over an average train carriage lifetime, each kilogramme of saved weight delivers fiscal savings of around £12,300. If you consider how many carriages the average train has and how many miles of cable are found in the train, it soon becomes apparent how great the savings potentials are."

How was the Harting T1 Industrial connector developed?

Matthias Fritsche: "For the concept, we examined the trends of recent decades and what the ideal plug connector should look like. To do this, we looked at the pain points of the RJ45. We decided on a pin and socket system as these are already established for many industrial connectors. We also enabled a safe interlock so that shocks and vibrations don't interrupt the data transmission."

What is the SPE Industrial Partner Network?

Marian Duemke: "The SPE Industrial Partner Network is an association of companies working together to promote Single Pair Ethernet technology as the basis for the IIoT. The aim is to offer an SPE ecosystem by not only pooling the knowledge of infrastructure providers, but also by

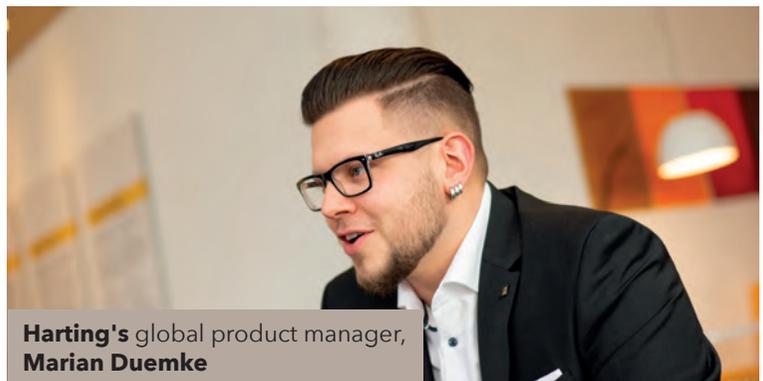
bringing people together on the device side."

What does SPE's future look like?

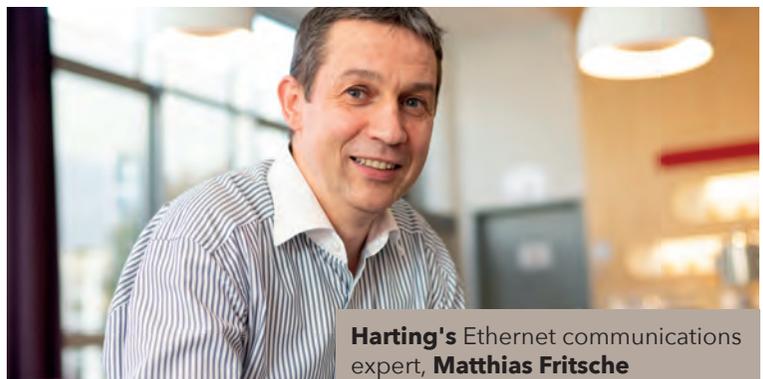
Matthias Fritsche: "Companies are starting to understand its benefits and are working on projects already. This has shown us that we are on the right track and that people understand that this is not just some kind of new Ethernet interface. It's a completely new world that harbours an incredibly great potential."

www.harting.com/UK/en-gb/single-pair-ethernet

"This is not just some kind of new Ethernet interface - it's a completely new world that harbours an incredibly great potential"



Harting's global product manager, **Marian Duemke**



Harting's Ethernet communications expert, **Matthias Fritsche**

Connectors and cables: nervous system of electric society

Phoenix Contact explains how connectors and cables are a key enabling technology in the power and data networking required for tomorrow's all-electric society

Climate change demands a global energy revolution only possible through the digitalisation and networking of all aspects of life. In an all-electric society, energy demands will be covered by renewable energies and electrical power will be the central energy source.

To achieve this, a comprehensive coupling of the energy, mobility, infrastructure, building, and industry sectors is required. Until now, individual sectors have been distinguished by different technical standards, making it difficult to couple them. However, base technologies are available that allow the establishment of a seamless communications infrastructure between countless installed devices.

To achieve this, infrastructure must be networked worldwide—physically and via data links. Electromechanical components, including a multitude of data, signal and power connectors, are the foundation for the electrification of machines and systems. Phoenix Contact is actively involved in many user organisations, committees and associations aimed at ensuring that further development of these standards is driven forward according to the requirements of the all-electric society.

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EVs are supercharging power semiconductor market

Electric vehicles are now at the center of efforts to reduce the impact of fossil fuel on the earth. Chipmakers have been charged with ensuring the achievement of this objective. Will they deliver?

Power hogs are out. Electronic devices that sip—rather than guzzle—energy are in vogue.

And it is the job of semiconductor manufacturers to facilitate what is now universally accepted as an obligation by businesses and individuals to transition to energy-efficient and environmentally friendly devices.

The fate of the universe may be at stake. That, at least, is the way proponents of clean energy see it and many electronics industry executives agree with them. But even those who may have doubts or disagree can cite some good reasons why the development and sale of less power-hungry electronic equipment could be in everyone's interest.

The clean-energy movement has been building for a while but 2023 will be a pivotal year. Governments, communities, enterprises, and individuals worry that geopolitical challenges are throttling efforts to reduce the impact of global warming on the earth and are even more determined to accelerate the development and adoption of cleaner energies.

By forcing countries in Europe to confront their vulnerabilities to externally procured crude oil and natural gas, the Russia-Ukraine war reinforced the need to search for better and more efficient energy streams, especially those generated using natural resources. But problems related to the generation, storage, distribution, and consumption of energy persist, according to policy makers who see the electronics industry as key to resolving some of these challenges.

“To end the EU's dependence on Russian fossil fuels and tackle the climate crisis, our energy system requires a deep transformation, in which digitalisation plays a central role,” said the European Union, in a policy paper. “In a context of high energy prices, accelerating the digitalisation of the energy sector is key to help consumers save on their bills. Smart buildings, smart meters and electric vehicles, Internet of Things devices, provide key information that allow us to monitor energy consumption, increase renewable integration, and reduce costs.”

Semiconductor suppliers and systems manufacturers are demonstrating both the willingness and the capabilities required to sort out the power supply challenges industries and families are facing. But they are handicapped by the growing number of equipment that need to be redesigned or modified for better energy consumption.

Guzzlers not wanted

Still, demand for more power efficient devices is roaring and disrupting the once staid energy market. Systems developers are asking for smaller, more resilient, and less power-hungry components. In response, chip manufacturers have been highlighting new and innovative components and collaborating with others to develop subsystems that meet OEM customers' constantly changing needs.

The high-tech and electronics markets are expected to keep growing over the next decade despite geopolitical disturbances, inflationary pressures, and concerns about the general

direction of the global economy. Most semiconductor sectors should remain vibrant through the 2030s, according to observers, but the power electronics segment is gaining greater attention because of growing community demand for better management of natural resources.

In October, the EU announced the re-establishment of its Smart Grids Task Force—renamed the Smart Energy Expert Group—to coordinate power management activities at member states. Digitalisation of data and services will be at the center of actions meant to improve power generation and usage within the EU, the regional body said.

This is where the high-tech sector comes in. Throughout the industry, component suppliers—both passive parts and semiconductors—are exploring growth opportunities and racing to deliver compelling products and designs to systems developers and their tier-1 suppliers. New alliances and partnerships have been formed by suppliers, in addition to the establishment of more fabs and other assembly plants aimed at boosting the supply of energy efficient systems.

Nowhere is this structural adjustment more evident than in the automotive industry. Electronic vehicles are rolling out by the hundreds of thousands across the world as manufacturers respond to energy management initiatives and consumer demand. In 2020, EVs accounted for less than 5 per cent of global auto sales but still grew 43 per cent, year-over-year, according to a



Jochen Hanebeck,
Infineon Technologies CEO





report by Virta, a provider of EV charging platforms in Europe.

The explosive growth rate recorded in 2020—despite the negative impact of Covid-19 related restrictions on production and auto IC supply—foretells what lies ahead for the industry. Sales of EV in 2021 climbed to 6.6 million, doubling from the prior year. 2022 was expected to be another exceptional year for EVs, according to the International Energy Agency (IEA).

“The success of EVs is being driven by multiple factors,” the IEA said, in a report. “Sustained policy support is the main pillar. Public spending on subsidies and incentives for EVs nearly doubled in 2021 to nearly USD 30 billion. A growing number of countries have pledged to phase out internal combustion engines or have ambitious vehicle electrification targets for the coming decades.”

China is leading the adoption of EVs, and by extension the growth of the supporting supply chain. In 2021, Chinese buyers accounted for half of the growth in demand for EVs although European consumers in countries like Germany and Sweden were also ardent adopters. Emerging economies lag the Western sector in demand for EVs, the IEA said.

Still, “in the longer term, government and corporate efforts to electrify transport are providing a solid basis for further growth in EV sales,” notes the IEA. “Electrifying transport has multiple benefits. Russia’s invasion of Ukraine has brought the role of EVs in reducing oil demand to the fore. It is one of the 10 measures proposed by the IEA to cut oil use in the near term.”

Researchers say the transition from fossil fuels to cleaner or green energy has taken on a life of its own and has become irreversible. Climate change is forcing all companies, including those in the services industries, to play closer attention to their energy footprint. The desire for and shift to cleaner energy will prove beneficial overall to society, helping to tamp down on and mitigate the effects of global warming, they said.

The transition “will come at a cost,” though, said Laurens Swinkels and Peter van der Welle, of asset management firm and consultancy Robeco in a research report.

“Transitions are complex processes,” the Robeco analyst said. “Their outcome is the result of various powerful forces, including chaos and stabilisation, coming together in often unpredictable ways. In the context of the energy transition, we highlight that implementation of carbon taxes or

a strong regulatory push towards renewables in a perhaps too tight a time frame is very likely leading to all sorts of adaptive behavior.”

Semiconductor manufacturers supplying chips to EV manufacturers are enjoying robust demand for their products. Simultaneously, though, many are caught in problematic supply chain situations, unable in many cases to meet surging demand from auto OEMs and tier-1 suppliers. While many segments of the chip market have recovered strongly from the recent shortages, for example, auto makers are still complaining of long lead-times for semiconductors, especially MCUs.

It is not that semiconductor vendors serving the sector are purposely sitting on inventory or tamping down on production. Many are running their fabs at or close to full production capacity but are still unable to meet demand. They are swiftly adding new fabs and signing procurement deals with raw material vendors to assure continuity of supply.

Infineon is one of those companies that is racing to meet current and future customer needs, according to executives at the Munich-based semiconductor company. The company sees opportunities ahead in the supply of wide band gap semiconductors such as silicon carbide and has added to facilities in Europe.

In November, Infineon announced it would invest in a new 300mm analog and mixed-signal power semiconductor fab at an existing location in Dresden. Although the \$5 billion plan is “subject to adequate public funding,” as Infineon said, in a statement, it is only one in a growing number of power semiconductor projects chipmakers have recently announced.

Many of these are geared towards supporting the EV market as well as the need to reduce global warming.

“Semiconductor solutions from Infineon are addressing two of mankind’s most pressing challenges: the need to fight climate change and the desire to

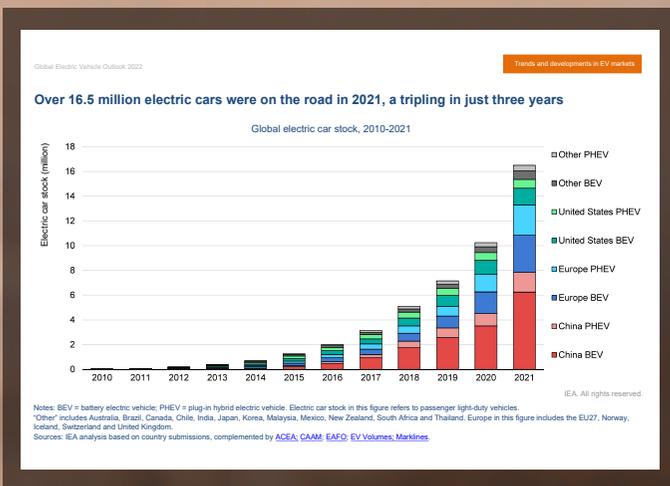


Hassane El-Khoury, Onsemi CEO

reap the benefits of digitalisation,” said Jochen Hanebeck, Infineon’s CEO, during a presentation to financial analysts. “Infineon is at the core of major growth drivers such as e-mobility, renewable energy, autonomous driving, data center and power supply, the IoT and many others.”

Like their German competitor, American chipmakers Onsemi and WolfSpeed are also adding fresh capacities to beef up their power semiconductor offerings. They both have their eyes, naturally, also on the surge in demand for electronic vehicles and the development of autonomous vehicles. The systems used in EVs, and AVs will improve driving and security and simultaneously support clean energy goals, according to Onsemi CEO Hassane El-Khoury.

“One of the primary drivers of increasing numbers of cameras for cars has been the efforts by traditional OEMs to match to ADAS and related safety features offered by the disruptors and the new EV models,” El-Khoury said, while presenting second quarter results. “We are seeing an increasing use of our image sensors to enable safety through the replacement of traditional mirrors by camera enabled digital mirrors. We secured a design win for a digital mirror that incorporates four cameras for the rear and outside use.”

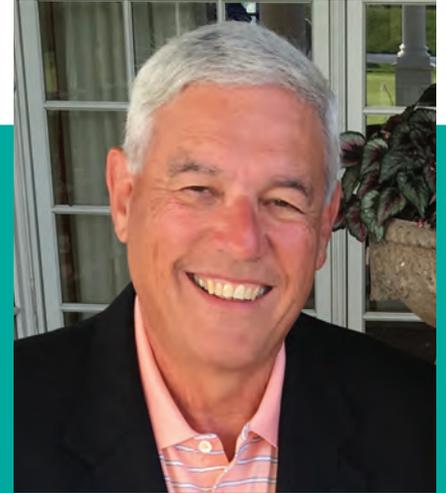


Electric vehicles on the road



Forecast • By John Denslinger

Recession or recovery?



John Denslinger is a former executive VP Murata, president SyChip Wireless, and president/CEO ECIA, the industry's trade association. His career spans 40 years in electronics

In this article, John Denslinger reminds readers that even in a recessionary environment, next-gen electronics technologies and applications will still see growth

Forecasting 2023 is a challenge given so much economic uncertainty. Will it be recession or recovery that dominates the calendar? It's anyone's guess as there seems to be no common path forward.

A prolonged contraction suggests a year of sluggish economic growth. But, if the Fed can tame inflation, minimise employment losses, stabilise consumer and financial confidence, and do it quickly, a second half recovery is possible.

On the macro level, the economy is either transitioning or in trouble. While consensus US GDP hovers around 2.5 per cent for 2023, recent comments by Goldman Sachs actually pin GDP for 2022 at a flat zero per cent with slight improvement to 1.1 per cent in 2023. Their outlook has the Fed tightening at a higher rate in an attempt to drive down inflation sooner, in effect, reducing 2023's potential rate of growth.

Former Boston Fed president, Eric Rosengren, offers this assessment: a mild recession is coming in 2023. He goes on to say, measures stemming inflation will also weaken the labor market and slow nominal wage growth. Either tends to stifle overall demand. With further fiscal stimulus and key regulatory relief unlikely, easing the recessionary impact will rely solely on monetary policy. In other words, the decisions made by the Fed will set much of 2023's economic landscape.

As for the electronics industry forecast, even the optimist must weigh the realities of inflation and the possibility of recession suppressing demand in the near term. At the same time, our industry benefits from new markets made possible by several next-gen technologies. It is our electronic components, modules and services that enable technologies like 5G, smart devices, IoT, AI, EV, edge computing, secure data storage, smart environs, robotics and more. Even in a recessionary environment, these applications will see growth. It's also worth noting the component count/device is always greater

on next-gen. Definitely, this is a nice counterweight to what could be an otherwise gloomy 2023 outlook. Semiconductor is the bellwether component of our industry. Market forecasts are plentiful. This year, it's obvious some analysts clearly anticipate a deep recession and understandably quite bearish about 2023. That being said, given the avalanche of next-gen technology on the horizon, two respected forecasters seem a bit more plausible for the American market.

Gartner's recent 2023 semiconductor forecast shows a decline of 3.6 per cent, while WSTS' autumn forecast projects a year-on-year growth of 0.8 per cent. Let's face it, neither outlook is great. The difference between the two is just a few degrees of perception: perception of recession length and severity; inflation mitigation and timing; supply and demand rebalance; geo-political volatility; labor availability and productivity; capital spending for next-gen technology; and finally, confidence in the Fed's soft-landing approach.

Some final stats to consider: From a June high of 9.1 per cent, we enter 2023 with inflation at 7.8 per cent (October report) and nowhere near the Fed's North Star target of two per cent. The Fed Fund Rate after seven consecutive increases is in the 4.5 per cent range and destined to go higher through Q1 2023. Unemployment now hovers at 3.7 per cent climbing to five per cent by end of 2023. Wages are still rising inconsistent with past inflationary periods adding yet another question mark. Altogether they serve to diminish consumer demand and enterprise confidence. Until that sentiment is broadly reversed, the recovery may not manifest itself until 2024.

Given all the low hanging clouds, the safe baseline might be a no-growth forecast for 2023. To be more aggressive, plan on taking market share from competitors and absolutely be prepared to win next-gen business.

£23.6b unfinished goods trapped

Barclays Corporate Banking's head of manufacturing, transport and logistics, Lee Collinson, explains how industry is working hard to release trapped work-in-progress

A new Barclays Corporate Banking report reveals goods valuing £23.6b are awaiting completion in UK manufacturers' warehouses because of supply chain delays. The Chain Reaction study focuses on manufacturing businesses with over ten employees and looks at the impact of supply chain issues. Barclays' research shows over 72 per cent of businesses are holding items in their warehouses awaiting completion because raw materials, ingredients or component parts have not been delivered. On average, this 'unfinished business' is worth over £1m to each company impacted.

Products in the steel/metals sector are most severely affected, with £9b worth of goods incomplete—equivalent to almost 19 per cent of the sub-sector's annual turnover. A high value of plastic products (£2.6b) and electronics (£2b) are also awaiting completion.

The trends are reflective of supply chain disruption that has challenged the manufacturing sector since the pandemic and 59 per cent of firms say they are still facing supply issues. This has been exacerbated by the invasion of Ukraine and the aftermath of the UK's exit from the EU. Customer relationships are now being impacted: 65 per cent of manufacturers say their customers are having to wait longer for products, with 15 per cent describing the hold-ups as 'significant'. To offset rising costs such as energy and transportation, 55 per cent of manufacturers are planning price increases for their own products.

Industry is innovating to solve these challenges. Most commonly: 39 per cent of businesses are increasing their storage capacity; 33 per cent are near-shoring; and 32 per cent have friend-shored to work with suppliers in countries with a strong UK trading relationship. To spread their bets, 37 per cent of manufacturers have increased the number of suppliers they work with.

Such measures are leaving industry confident in the medium-term. Two

thirds think supply chain challenges will improve over the next six months and 86 per cent are confident about growth next year.

The report also lays bare the threat that rising costs and supply chain disruption could pose long-term if circumstances do not improve. On average, UK manufacturers only expect to be able to sustain their operations for 15 months if current conditions continue.

Barclays Corporate Banking's head of manufacturing, transport and logistics, Lee Collinson, said: "The British manufacturing sector has faced a perfect storm of challenges this year, with rising costs, the war in Ukraine, labour shortages and ongoing Covid lockdowns in China hitting supply chains hard. As a result, billions of pounds worth of goods are trapped in warehouses unfinished, and this may hit industry turnover in the early part of next year.

"However, manufacturing firms have done what they do best and engineered new solutions to limit the impact of the issues they face. As a result, many businesses

will enter the new year with a degree of cautious optimism and confidence."

Other findings include: some 64 per cent of manufacturers have faced rising costs because of the weak pound; trade barriers are a concern, particularly for electronics and automotive; and government interventions manufacturers would like to see are energy transformation and a more aggressive energy price cap.

www.barclayscorporate.com



65 per cent of manufacturers say their customers are having to wait longer for products, with 15 per cent describing the hold-ups as 'significant'



Grabbing users' attention

Anders is offering a selection of circular TFT LCD colour displays with integrated rotary switch. Available sizes are 1.3, 2.1 and 2.47in, ideal for applications such as heating systems, industrial controls, IoT devices, boilers, white goods, fitness equipment and audio equipment.

The rotary switch permits convenient and intuitive adjustments such as temperature, volume, motor speed, timer settings, lighting, dimming and ambience control settings. The switch is operated by turning a perimeter ring, which provides a tactile response to confirm the selection and hold the switch position.

Circular displays grab customers' attention with an almost limitless range of imaginative effects. Examples include: making a timer count up or down by illuminating or turning off graduations around the edge; darkening or brightening the display as the user adjusts a lighting dimmer; or changing the backlight colour of a heating or air-conditioning controller depending on the user's setting.

www.andersdx.com



Fit PCBs inside metal cabinets

Hylec-APL has launched a push-together range of PCB housing modules called DIME. The open front system provides DIN rail support for PCBs between 20 and 177.5mm in length, with longer lengths possible by adding additional base mounting elements. The system suits all DIN rails and is useful for fitting PCBs inside metal cabinets.

There are several modules in the DIME range including BE base sections, SEF end sections with feet (DIN Clips) and FS foot elements, to be clipped to SE and BE Sections.

The number of parts required to mount a PCB depends on the PCB's length, with a table on Hylec's website detailing this. The push fit extrusion offers a convenient solution for interlocking modules to create custom sizes versus buying long lengths of extrusion and cutting to length, saving shipping difficulties and additional cutting processes.

The DIME modules offer a robust design manufactured from flame-retardant polyamide 6.6 UL94-V0.

www.hylec-apl.com



Accommodate 48 cables in any direction

Foremost Electronics has announced Icotek's new Cable Entry 360° which can accommodate up to 48 cables, with or without connectors, from all entry directions. This splittable distribution box safely routes cables and provides strain relief.

The product allows centrally located cables to be distributed over a 360° range and offers nearly unlimited uses. Cables with diameters from one to 15mm can be routed, sealed and provided with strain relief according to DIN

EN 6244. The box suits metric cut-outs and can be fixed with a locknut, included with the device. Retrofits, maintenance and repairs are simple and fast thanks to a screw fixed cover and split grommets.

The box is constructed from UL94-V0 self-extinguishing polyamide, rated to IP54 and halogen and silicone free. It has a mounting height of 39.4mm and operating temperature range of -40 to 140°C.

www.4most.co.uk

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Opt for optimum system efficiency

Flex Power Modules has launched the BMR320, a non-isolated, unregulated, DC-DC intermediate bus converter with a fixed 8:1 input/output voltage ratio in a compact form-factor.

Flex Power Modules' strategic product manager, Anders Sellin, said: "The BMR320 intermediate bus converter is designed for optimum system efficiency when used alongside point of load converters and integrated power stages such as our BMR510 and upcoming BMR515. It is a great solution for datacom, cloud computing and AI applications, where power density,

efficiency and low cost are critical factors." The product operates over a 40 to 60VDC input range, producing a five to 7.5VDC output, ideal for powering point of load converters at lower intermediate bus voltages to optimize system efficiency.

The BMR320 is rated at 400W/60A at 54V input, achieving a power density of 128W/cm³ in a 27 by 18 by 6.4mm envelope. With efficiency peaking at 97.7 per cent, up to three units can be paralleled for a total load of 1080W.

flexpowermodules.com



Feedback up to 200,000rpm

Portescap is introducing the M-Sense22, a magnetic encoder option suited to its brushless DC motor platform. The encoder pairs well with Portescap's brushless slotless motors ranging from 22 to 40mm diameter. It features an integrated RS422 line driver, delivers an accuracy up to 1.5deg and offers a wide resolution range up to 1024 lines. The M-Sense22 can provide both incremental and absolute feedback, even at high input speeds up to 200,000rpm, due to the latest chip technology.

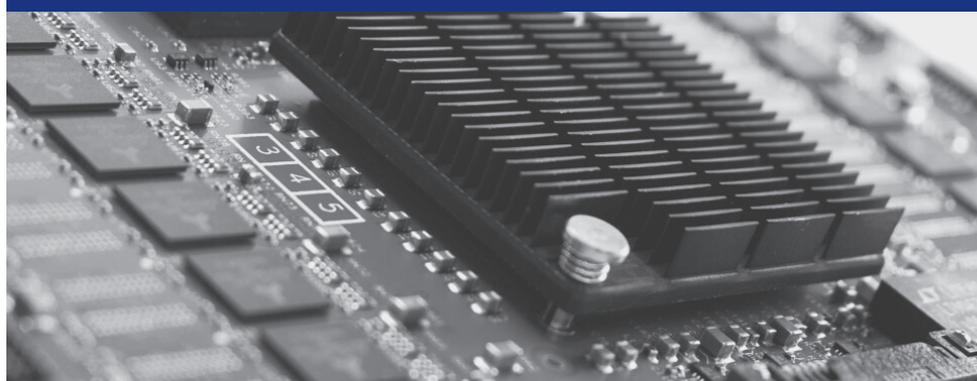
This encoder suits environments requiring high-precision positioning feedback and a wide range of resolution capabilities, especially within the aerospace, defense, industrial power tools, robotics and life sciences markets.

Specific applications that can realize the benefits of the M-Sense22 encoder include missile fin actuation, drones, portable ultrasound probes, grippers and nut runners/ electric screwdrivers.

www.portescap.com

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Continuous condition monitoring bolts into place

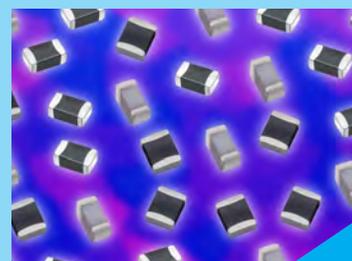
Sick has launched the MPB10 Multi-Physics Box condition monitoring sensor, a bolt-on device designed to deliver real-time, continuous service data from industrial machines, including electric motors, pumps, fans and conveyor systems, even in the harshest environments.

This all-in-one device is designed to make it easy to monitor and interpret vibration, shock and temperature measurement data delivered right from the heart of machines. The MPB10 provides service data to enable more cost-efficient predictive maintenance practices that can improve plant

availability, maximise operating life and protect product/process quality.

Sick's market manager for presence detection, David Hannaby, said: "The MPB10 is a rugged little instrument with the potential to add huge value to industrial machines and processes. By bolting on an MPB10 to their machine, plant operators and managers can upgrade simply to predictive maintenance practices and identify problems early before any significant decrease in performance or failure."

www.sick.co.uk



Tackling power inductor shortages

Material shortages are impacting availability of SMT power inductors. BEC Distribution can now offer alternatives from five to seven weeks lead time. The miniature power inductors are part of BEC's Select range of passive alternatives, all available on short lead times.

BEC states the inductors provide a high current carrying capacity within a compact standard 1008 (2520 metric) footprint of 2.7 by 2.2mm. Other surface mount footprints are offered. The inductors have a rugged construction and are magnetically shielded with low EMI. They meet AEC-Q200 Grade 1 (-55 to 125°C) and are available to meet automotive specifications AEC-200 Grade 1 qualified (-55 to 125°C ambient).

Other passive products affected by shortages include high current power chokes and chip inductors, common mode chokes, LAN magnetics and LAN transformers. BEC states it can offer alternatives covering up to 95 per cent of passive components.

www.bec.co.uk

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Innovative composite enhances touch display safety

Review Display Systems has introduced a new material technology for use with PCap touchscreens. AMT Polym Touch uses a new polymer composite material as the top cover lens to enhance the protection of the PCap touch substrate and improve impact resistance.

RDS' display business manager, Justin Coleman, said: "AMT's composite polymer PCap solution provides excellent impact resistance and is suitable for small and medium-sized products that need to be lightweight, rugged and able to meet industry standard drop test specifications."

The implementation of a polymer composite cover lens enables the complete PCap touch solution to be thin, lightweight and exceptionally durable with significantly improved impact resistance while still meeting the requirements of the IK10 drop ball test rating (equivalent to a 5kg mass dropped from 400mm above the impact surface).

AMT Polym Touch is available for PCap touch panels up to 15in display diagonal with 362 by 216mm mechanical outline dimensions. Cover lens thicknesses of 1.0, 1.5 and 2.0mm are supported.

www.review-displays.com



Go-anywhere electronic devices



OKW has extended its range of sensor enclosures with its Mini-Data-Box. Its different versions, sizes, colours and optional flanges offer 32 permutations, all available as standard.

The enclosure suits applications including IoT/IoT, automation, security and surveillance technology, environmental monitoring, measurement/control, smart logistics, peripherals, interfaces and ICT. Its small size also suits wearable electronics.

Mini-Data-Box can be specified in two shapes: square and edge (rectangular), either with or without flanges for screws and cable ties, enabling fast mounting to walls, ceilings, rails and masts. Each enclosure offers plenty of flat surfaces for interfaces. The lids have bevelled corners—a 'diamond cut' design which reduces weight and enhances the housings' stylish, modern aesthetics.

The lid and base feature a tongue-and-groove joint for added strength. They are assembled with tamperproof Torx screws, a requirement for medical electronics. IP65 ingress protection is optional. Inside, there are fixing supports for PCBs and components in both the top and bottom sections.

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Explore the world of electronics products and services



Southern Manufacturing & Electronics returns to Farnborough 7 to 9 February 2023, offering purchasing professionals a golden opportunity to meet many suppliers

Visitors to *Southern Manufacturing & Electronics* have the opportunity to explore the products, technologies and services offered by regular exhibitors and new faces. For example, Taiwanese PCB manufacturer EISO Enterprise is making a first appearance, as is Bournemouth-based INDUS Engineering Services which plans to showcase custom control panels and more.

Those needing to source components will be spoiled for choice. Take electrical connectors, for example. Advanced Chemical Etching, Aerco, Broadband Technology 2000, Cembre, CIE Electronics, Coax Connectors, Gem Cable Solutions, Hitaltech UK, ODU UK, Schurter, Selwyn Electronics, Shoal Group and TFC will all be exhibiting.

Another example is cables, including: EV charging, assemblies, looms, harnesses, jointing products, design services and identification. Exhibitors specialising in cabling include Brady, Cableplus Europe, Convert, Corintech, Delta Impact, Easby Electronics, Electronic Manufacturing Solutions, Electronic Technicians, Emolice Contract Manufacturing Solutions, European Circuits, Gem Cable Solutions, Grinsty Rail, Hitaltech UK,

InCap Electronics UK, Kabelschlepp Metool, K Lacey Cables, Micronel, Nemco, Phoenix Contact, Process Parameters, Shenzhen X-Mulong Circuit Co and Trojan Electronics 2018.

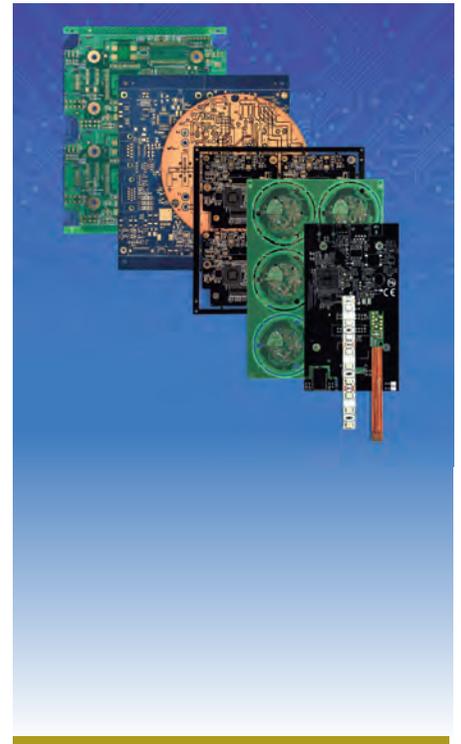
PCB design, manufacture, assembly, inspection and accessories are also well represented, with offerings from over three dozen companies providing machines, automation, products and services.

Numerous launches have been announced by exhibitors. Accelonix will showcase its new Neotel Neostation, a smart, light guided assembly station integrating assembly, soldering and even visual inspection for low volume, high mix manual PCB assembly. E-MAX Systems will show a new cloud product combining the cost savings, improved security and greater flexibility of that technology with automatic software updates and a reduction in the need for IT resource. Europac3D will demonstrate LEO, the world's first wireless, AI-driven 3D scanner that simplifies reverse engineering and inspection.

AutoAero is a specialist show feature focusing on manufacturing in the automotive and aerospace sectors, both vital to the UK economy.

As well as the exhibition and demonstration areas, there will be the usual seminar programme comprising technical and business topics covering a wide range of issues facing manufacturing businesses today.

www.industrysouth.co.uk



Those needing to source components will be spoiled for choice

Seminar schedule on page 60 >

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(3.30pm close Thurs)

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Electronics Seminars - Seminar Room 1

Tuesday 7 February

Session 1

10.00am

Making it Happen: The art of effective strategy deployment

Ailsa Carson, Onsite Insights

We will look at examples from several high performing companies and provide some insight on what works and why.

Session 3

11.00am

Next level operations excellence—Lean meets digital

Nigel Whittingham, principal director, BBN Nexus

In this presentation we consider what to digitalize and why? We look at the landscape of possible solutions and tools but, connect back to our lean principles.

Session 5

12.00pm

Additive manufacturing landscape prototype to end use parts

Kevin Askew, Additive-X

How to implement cost effective additive manufacturing, determining the right solution for your application and reducing the barriers to entry.

Session 7

1.00pm

Testing your product: The good, the bad and the ugly

Stephen Keebler, head of engineering, Ignys

Stephen will share his extensive knowledge on design for test with tips on the use of test jigs, environmental simulation testing and test and verification.

Session 9

2.00pm

Optimised SMT production that increases your bottom line

Anthony Bradbury, Mark Flaskett, Rebecca Mace-Hewett & Steven Skelding, Mycronic UK & Ireland

Do you know how effective your production processes are? How to understand and measure what is really going on in your SMT assembly line.

Session 11

3.00pm

Five changes to your work that science shows will improve your health

Rebecca Canham, Msc human factors principal scientist, Institute of Medicine

Now more than ever there is a greater responsibility to change working practices to benefit the health, wellbeing and productivity of staff.

Electronics Seminars - Seminar Room 1

Wednesday 8 February

Session 25

10.00am

How to build a content marketing strategy for 2023

Chris Haydon, head of content, Finally Agency

Content marketing is the key to unlocking engagement with your audience. Take the opportunity to audit your current content strategy and follow our best practice.

Session 27

11.00am

Emerging technologies and how NCAB implement it

Jan Pedersen, director of technology, NCAB Group

The world is changing faster every day and even though Moore's law comes to its limits, the technologies coming up are still fascinating and promising.

Session 29

12.00pm

What does good look like and how do you measure it?

Tim Scurlock, director, ALC

With case studies and examples from the last 11-years of lean consulting, Tim will discuss specific strategies and plans to help you become more efficient.

Session 31

1.00pm

Additive Manufacturing landscape prototype to end use parts

Kevin Askew, Additive-X

How to implement cost effective additive manufacturing, determining

the right solution for your application and reducing the barriers to entry.

Session 33

2.00pm

Six common failures in B2B marketing and how to avoid them?

Justin Willett, The Business Marketing

Often marketing falls short. With over 35-years experience working within industrial sales and marketing, Justin Willett will talk through the issues and how to get the best results.

Session 35

3.00pm

Making it happen: The art of effective strategy deployment

Ailsa Carson, Onsite Insights

We will look at examples from several high performing companies and provide some insight on what works and why.

Electronics Seminars - Seminar Room 1

Thursday 9 February

Session 49

10.00am

How to successfully adopt additive manufacturing in-house

Simon Chandler, managing director, CREAT3D

Learn from other UK engineering and manufacturing companies how having 3D printers in-house solves engineering problems and generates large cost savings.

Session 51

11.00am

Concept to commercialisation: How to make your product idea a reality

Nigel Clarke, CEO, Morgan Innovation & Technology

Innovation to Income is the complete ecosystem for innovators. Developed and taught across 30-years, it brings together R&D, agile manufacturing, commercialisation and funding

Session 53

12.00pm

Optimised SMT production that increases your bottom line

Anthony Bradbury, Mark Flaskett, Rebecca Mace-Hewett & Steven Skelding, Mycronic UK & Ireland

Do you know how effective your production processes are? How to understand and measure what is really going on in your SMT assembly line.

Session 55

1.00pm

CE and UKCA marking, 2023 and beyond

Tim Harrison, CE Marking Association

We will explore how our new relationship with the EU will affect manufacturers' product compliance obligations.

Session 57

2.00pm

Planning for succession as well as growth: understanding your business exit options

Azets

Properly preparing your business for the future will allow you to maximise the value that you have built up, reduce unexpected tax liabilities and realise a fair return.



Single digit growth in 2023

In this article, ECSN chairman, Adam Fletcher and market analyst, Aubrey Dunford, summarise the results of the association's annual Forecast

The Forecast predicts the UK and Ireland electronic components market will see modest growth in H1 2023, returning billings (sales revenues) growth of between zero to 6.3 per cent, with a mid-point of around 3.5 per cent. In H2 the association predicts billings will slow modestly in the range 4.0 to 3.0 per cent for a full year range of 2.0 to 4.9 per cent and mid-point of 2.8 per cent growth over the previous year.

ECSN's market analyst, Aubrey Dunford, confirmed that market conditions in 2019, 2020, 2021 and 2022 had been far from normal due to the pandemic but that some 'normality' can be expected to return in 2023: "The problem is trying to determine the 'new normal' in a global economy recovering from the pandemic's aftershocks including double digit inflation and increased energy/borrowing costs, while dealing with a war in Europe.

"The 'distributor total available market' will have grown in 2022 by about 18 per cent. That said, product shortages, extended lead-times, exchange rate fluctuation, rising raw material costs and labour rates, have led to price rises higher than our members anticipated. Global demand has remained higher than we forecast and is still strong despite the slowdown in China as the handset and PC market cools."

From early 2021 ECSN members saw book-to-bill ratios rise to levels rarely, if ever seen. Unprecedented bookings were driven by extending lead-times and price increases.

Dunford continued: "The high book-to-bill ratios carried on throughout H1 2022. From

the middle of the year, ratios for passives and electro-mechanical products started to decline and headed towards unity in the summer months. However, semiconductors continued to see a high B2B ratio throughout Q3. Members are confident of growth for at least the first half of 2023.

"However, looking into H2 2023 is more difficult. Uncertainties remain, especially in light of the predicted recession, so we are forecasting growth will slow at the year's end."

Although component industry analysts are forecasting global growth will decline and turn negative in 2023, Dunford sees that decline limited to consumer electronics applications: "In the UK the component market is driven by automotive, industrial and professional applications. We expect 5G and data communications will remain strong, although investment may slow. Also, the military and aerospace sector will remain strong for more obvious reasons."

Adam Fletcher said: "The consensus opinion held by ECSN members is that by mid-2023 lead-times will be stabilised at around an average of 12 to 16-weeks for most semiconductor and passive components, with interconnect and e-mech components remaining in the eight to 10-week lead-time. There will remain outliers on longer lead-times across all component categories. I suspect all electronic components will remain on lead-times in the six to 16-week timescale for at least the next few years."

The electronic components market's trajectory continues to be up and to the right. Despite 2022's difficult market conditions, which Fletcher believes will continue throughout 2023, he remains confident that stronger underlying growth will return because so many competing applications are driving it. 5G, cloud/high performance computing and automotive are key 'push' applications, with automation, medical, aviation and military running a close second in 2023.



ECSN's chairman, Adam Fletcher



Market analyst, Aubrey Dunford



Buyers' Guide

Manufacturer	Distributor	Telephone	Website	Franchised Distributor	No. of Lines for Principal	Stock Value for Principal	Minimum Order Value	% Lead Free for Principal Range	No. of technical Support Staff	Total No. of Staff	Buffer Stock Facility
CABLE ASSEMBLY & HARNESSING											
Amphenol	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	3,000	N/A	0 €	N/A	50	2,500+	Y
FTDI	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	50	N/A	0 €	N/A	50	2,500+	Y
Harwin	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	600	N/A	0 €	N/A	50	2,500+	Y
Molex	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,550	N/A	0 €	N/A	50	2,500+	Y
Phoenix Contact	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,200	N/A	0 €	N/A	50	2,500+	Y
CIRCUIT PROTECTION											
Bourns	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,800	N/A	0 €	N/A	50	2,500+	Y
EPCOS/TDK	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,950	N/A	0 €	N/A	50	2,500+	Y
Littelfuse	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	11,450	N/A	0 €	N/A	50	2,500+	Y
Vishay	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	3,150	N/A	0 €	N/A	50	2,500+	Y
DISPLAYS											
Midas Displays		01493 602602	www.midasdisplays.com	N	3,300	N/A	£0	100%	10	17+	Y
ENCLOSURES											
Bud Industries	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,600	N/A	0 €	N/A	50	2,500+	Y
Hammond	Switch Electronics	01482 862255	switchelectronics.co.uk	Y	500	N/A	£0	70%	2	6	Y
Hammond	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	3,350	N/A	0 €	N/A	50	2,500+	Y
Metcase Enclosures	OKW Enclosures	01489 583858	www.metcase.co.uk	N	288	£40,000	£0	N/A	5	22	Y
New Age Enclosures	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	150	N/A	0 €	N/A	50	2,500+	Y
OKW Enclosures Ltd	OKW Enclosures	01489 583858	www.okw.co.uk	N	1,955	£40,000	£0	N/A	5	22	Y
Rolec Enclosures	OKW Enclosures	01489 583858	www.rolec-enclosures.co.uk	Y	935	£40,000	£0	N/A	5	22	Y
Teko Enclosures	OKW Enclosures	01489 583858	www.teko.co.uk	Y	1,860	£40,000	£0	N/A	5	22	Y
FREQUENCY MANAGEMENT											
ABRACON	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,750	N/A	0 €	N/A	50	2,500+	Y
Analog Devices Inc.	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	150	N/A	0 €	N/A	50	2,500+	Y
ECS	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,050	N/A	0 €	N/A	50	2,500+	Y
Epson	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	900	N/A	0 €	N/A	50	2,500+	Y

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Buyers' Guide

Manufacturer	Distributor	Telephone	Website	Franchised Distributor	No. of Lines for Principal	Stock Value for Principal	Minimum Order Value	% Lead Free for Principal Range	No. of Technical Support Staff	Total No. of Staff	Buffer Stock Facility
Golledge Electronics Ltd	Golledge Electronics Ltd	01460 256 100	www.golledge.com	N	N/A	£800,000	£0	100%	12	24	Y
IQD Frequency Products	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,500	N/A	0 €	N/A	50	2,500+	Y
Jauch Quartz	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	500	£250,000	0	100%	15	130	Y
Kyocera	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	950	N/A	0 €	N/A	50	2,500+	Y
Microchip	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,450	N/A	0 €	N/A	50	2,500+	Y
Murata	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	550	N/A	0 €	N/A	50	2,500+	Y
Silicon Laboratories	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	500	N/A	0 €	N/A	50	2,500+	Y
TXC Corporation	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	500	N/A	0 €	N/A	50	2,500+	Y

HEATSINKS

Aavid	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	200	N/A	0 €	N/A	50	2,500+	Y
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ICs & SEMICONDUCTORS

Alliance Memory	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	500	N/A	0 €	N/A	50	2,500+	Y
Analog Devices Inc.	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	18,700	N/A	0 €	N/A	50	2,500+	Y
	Avant Electronics LTD	01449 774247	www.avantelectronics.co.uk	N	5000	N/A	£100	N/A	2	10	Y
Broadcom Limited	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	200	N/A	0 €	N/A	50	2,500+	Y
Central Semiconductor	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,250	N/A	0 €	N/A	50	2,500+	Y
Cirrus Logic	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	200	N/A	0 €	N/A	50	2,500+	Y
Cree, Inc.	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	200	N/A	0 €	N/A	50	2,500+	Y
Diodes Incorporated	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	8,200	N/A	0 €	N/A	50	2,500+	Y
FTDI	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	100	N/A	0 €	N/A	50	2,500+	Y
Infineon	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	8,300	N/A	0 €	N/A	50	2,500+	Y
Intel	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,750	N/A	0 €	N/A	50	2,500+	Y
Maxim Integrated	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	14,050	N/A	0 €	N/A	50	2,500+	Y
Microchip	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	24,200	N/A	0 €	N/A	50	2,500+	Y
Micron Technology	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	600	N/A	0 €	N/A	50	2,500+	Y
Monolithic Power Systems (MPS)	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	850	N/A	0 €	N/A	50	2,500+	Y
Nexperia	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	7,600	N/A	0 €	N/A	50	2,500+	Y
Nordic Semiconductor	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	60	N/A	0 €	N/A	50	2,500+	Y
NXP	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	4,700	N/A	0 €	N/A	50	2,500+	Y
ON Semiconductor	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	18,700	N/A	0 €	N/A	50	2,500+	Y
Power Integrations	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	750	N/A	0 €	N/A	50	2,500+	Y
Qorvo	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	700	N/A	0 €	N/A	50	2,500+	Y
Renesas Electronics	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	5,550	N/A	0 €	N/A	50	2,500+	Y
ROHM Semiconductor	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	6,900	N/A	0 €	N/A	50	2,500+	Y
Semtech	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	350	N/A	0 €	N/A	50	2,500+	Y
Silicon Laboratories	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,200	N/A	0 €	N/A	50	2,500+	Y
Skyworks	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	550	N/A	0 €	N/A	50	2,500+	Y
STMicroelectronics	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	10,050	N/A	0 €	N/A	50	2,500+	Y
Texas Instruments	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	39,050	N/A	0 €	N/A	50	2,500+	Y
Toshiba	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,050	N/A	0 €	N/A	50	2,500+	Y
Vishay	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	10,850	N/A	0 €	N/A	50	2,500+	Y
Xilinx	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,900	N/A	0 €	N/A	50	2,500+	Y

INTERCONNECTION

3M	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,750	N/A	0 €	N/A	50	2,500+	Y
Amphenol	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	33,200	N/A	0 €	N/A	50	2,500+	Y
Cinch Connectivity Solutions	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	4,250	N/A	0 €	N/A	50	2,500+	Y
FCI / Amphenol	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	7,850	N/A	0 €	N/A	50	2,500+	Y
HARTING	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	6,800	N/A	0 €	N/A	50	2,500+	Y
Harwin	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,950	N/A	0 €	N/A	50	2,500+	Y
Hirose Electric	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	7,850	N/A	0 €	N/A	50	2,500+	Y
Intellconnect (Europe) Ltd		01245 347145	www.intellconnect.co.uk	N/A	N/A	N/A	N/A	100%	5	30	
JAE Electronics	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,450	N/A	0 €	N/A	50	2,500+	Y
Molex	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	23,600	N/A	0 €	N/A	50	2,500+	Y
Phoenix Contact	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	17,150	N/A	0 €	N/A	50	2,500+	Y
Radiall	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,350	N/A	0 €	N/A	50	2,500+	Y
Samtec	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	16,300	N/A	0 €	N/A	50	2,500+	Y
Souriau	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	3,300	N/A	0 €	N/A	50	2,500+	Y
TE Connectivity	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	41,850	N/A	0 €	N/A	50	2,500+	Y
Wurth Elektronik	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,650	N/A	0 €	N/A	50	2,500+	Y

Buyers' Guide

Manufacturer	Distributor	Telephone	Website	Franchised Distributor	No. of Lines for Principal	Stock Value for Principal	Minimum Order Value	% Lead Free for Principal Range	No. of Technical Support Staff	Total No. of Staff	Buffer Stock Facility
OBSOLESCENCE / HARD TO FIND											
	Cyclops Electronics	01904 415 415	www.cyclops-electronics.com	N/A	177,232	£12m	£100	75%	3	78	Y
Rochester Electronics	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	299	N/A	\$250	N/A	10	400+	Y
OPTO ELECTRONICS											
Broadcom Limited	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,300	N/A	0 €	N/A	50	2,500+	Y
Cree, Inc.	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	3,800	N/A	0 €	N/A	50	2,500+	Y
Intel	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	20	N/A	0 €	N/A	50	2,500+	Y
Osram Opto Semiconductor	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,300	N/A	0 €	N/A	50	2,500+	Y
Toshiba	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	450	N/A	0 €	N/A	50	2,500+	Y
Vishay	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,350	N/A	0 €	N/A	50	2,500+	Y
PASSIVES											
AVX	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	17850	N/A	0 €	N/A	50	2,500+	Y
Bourns	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	15,100	N/A	0 €	N/A	50	2,500+	Y
Coilcraft	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	5,750	N/A	0 €	N/A	50	2,500+	Y
EPCOS / TDK	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	5,450	N/A	0 €	N/A	50	2,500+	Y
KEMET	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	23,650	N/A	0 €	N/A	50	2,500+	Y
Murata	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	18700	N/A	0 €	N/A	50	2,500+	Y
Ohmite	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	6,550	N/A	0 €	N/A	50	2,500+	Y
Panasonic	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	25,450	N/A	0 €	N/A	50	2,500+	Y
Taiyo Yuden	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	5,100	N/A	0 €	N/A	50	2,500+	Y
TDK	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	13,050	N/A	0 €	N/A	50	2,500+	Y
TE Connectivity	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	11,500	N/A	0 €	N/A	50	2,500+	Y
TT Electronics	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	5,050	N/A	0 €	N/A	50	2,500+	Y
Vishay	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	43850	N/A	0 €	N/A	50	2,500+	Y
Würth Elektronik	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	6,750	N/A	0 €	N/A	50	2,500+	Y
Yageo	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	21,450	N/A	0 €	N/A	50	2,500+	Y
PASSIVES ALTERNATIVES											
BEC Distribution Ltd		01844 275824	www.bec.co.uk		5,000	N/A	£0	100%	3	5	Y
POWER & BATTERIES											
FRIWO Gerätebau GmbH	Haredata Electronics	01423 796240	www.haredata.co.uk	Y	250 - 500	€1M	£250	100%	7	14	Y
Jauch Quartz		01276 605900	www.jauch.com			£500,000	0	95	15	130	Y
Mean Well	Ecopac (UK) Power Ltd	01844 204420	www.ecopacpower.co.uk	Y	6,000	£2M	£0	100%	8	30	Y
Bel Power Solutions	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	600	N/A	0 €	N/A	50	2,500+	Y
CUI Inc.	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,200	N/A	0 €	N/A	50	2,500+	Y
MEAN WELL	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	4,400	N/A	0 €	N/A	50	2,500+	Y
Murata	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1500	N/A	0 €	N/A	50	2,500+	Y
RECOM	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	3,150	N/A	0 €	N/A	50	2,500+	Y
TDK-Lambda	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,900	N/A	0 €	N/A	50	2,500+	Y
TRACO Power	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	4,000	N/A	0 €	N/A	50	2,500+	Y
Vicor	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,300	N/A	0 €	N/A	50	2,500+	Y
XP Power	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,200	N/A	0 €	N/A	50	2,500+	Y
SENSORS											
ams	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	150	N/A	0 €	N/A	50	2,500+	Y
Analog Devices Inc.	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	300	N/A	0 €	N/A	50	2,500+	Y
Bosch	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	25	N/A	0 €	N/A	50	2,500+	Y
Honeywell	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,200	N/A	0 €	N/A	50	2,500+	Y
Maxim Integrated	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	350	N/A	0 €	N/A	50	2,500+	Y
NXP	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	300	N/A	0 €	N/A	50	2,500+	Y
Sensirion	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	80	N/A	0 €	N/A	50	2,500+	Y
STMicroelectronics	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	75	N/A	0 €	N/A	50	2,500+	Y
TE Connectivity	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	650	N/A	0 €	N/A	50	2,500+	Y
Texas Instruments	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	850	N/A	0 €	N/A	50	2,500+	Y
SWITCHES & KEYBOARDS											
Apem	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,850	N/A	0 €	N/A	50	2,500+	Y
C&K Switches	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	5,550	N/A	0 €	N/A	50	2,500+	Y
E-Switch	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,350	N/A	0 €	N/A	50	2,500+	Y

Buyers' Guide

Manufacturer	Distributor	Telephone	Website	Franchised Distributor	No. of Lines for Principal	Stock Value for Principal	Minimum Order Value	% Lead Free for Principal Range	No. of Technical Support Staff	Total No. of Staff	Buffer Stock Facility
EAO	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,800	N/A	0 €	N/A	50	2,500+	Y
Honeywell	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	4,700	N/A	0 €	N/A	50	2,500+	Y
NKK Switches	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	4,000	N/A	0 €	N/A	50	2,500+	Y
Omron	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	4,700	N/A	0 €	N/A	50	2,500+	Y
Panasonic	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	550	N/A	0 €	N/A	50	2,500+	Y
TE Connectivity	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,350	N/A	0 €	N/A	50	2,500+	Y

TERMINAL BLOCKS

Marathon Special Products	Global Supply Services	01904 436 488	www.global-supply-services.com	Y	8,000	£800,000	£100	100%	3	11	Y
Molex	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,850	N/A	0 €	N/A	50	2,500+	Y
Phoenix Contact	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	13,550	N/A	0 €	N/A	50	2,500+	Y
TE Connectivity	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,750	N/A	0 €	N/A	50	2,500+	Y

THERMAL MANAGEMENT

Bergquist Company	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	250	N/A	0 €	N/A	50	2,500+	Y
Delta Electronics	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	700	N/A	0 €	N/A	50	2,500+	Y
ebm-papst	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,450	N/A	0 €	N/A	50	2,500+	Y
EMI Thermal	EMI Thermal	01992 510000	www.emithermal.com	N	800	N/A	£20	100%	12	200	Y
Materials Direct	Materials Direct	+44 (0)1908 222 211	www.materials-direct.com	N/A	N/A	£1,000,000	£0	N/A	5	55	Y
Sanyo Denki	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,450	N/A	0 €	N/A	50	2,500+	Y
Sunon	G.English Electronics Ltd	0208 855 0991	www.gelec.co.uk	Y	3,500	£1,000,000+	£0	100%	10	28	Y
Sunon	Thermaco Ltd	01684 566163	www.thermaco.co.uk	Y	3,500	£450,000	£100	100%	7	15	Y
Universal Science	Universal Science	+44 (0)1908 222 211	www.universal-science.com	N/A	N/A	£1,000,000	£0	N/A	5	55	Y

TRANSFORMERS & INDUCTORS

Best Windings	Best Windings	0044 (0)1394 448424	www.bestwindings.co.uk	N	300	N/A	£100	N/A	2	24	Y
Bourns	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	4,900	N/A	0 €	N/A	50	2,500+	Y
Coilcraft	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	5,500	N/A	0 €	N/A	50	2,500+	Y
EPCOS / TDK	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,300	N/A	0 €	N/A	50	2,500+	Y
Murata	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	6,900	N/A	0 €	N/A	50	2,500+	Y
TDK	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	4,050	N/A	0 €	N/A	50	2,500+	Y
Vishay	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,200	N/A	0 €	N/A	50	2,500+	Y
Würth Elektronik	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	3,400	N/A	0 €	N/A	50	2,500+	Y

WIRELESS SOLUTIONS

DIGI	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	200	N/A	0 €	N/A	50	2,500+	Y
Espressif	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	30	N/A	0 €	N/A	50	2,500+	Y
Laird Connectivity	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	100	N/A	0 €	N/A	50	2,500+	Y
Lantronix	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	25	N/A	0 €	N/A	50	2,500+	Y
Microchip	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	150	N/A	0 €	N/A	50	2,500+	Y
Murata	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	30	N/A	0 €	N/A	50	2,500+	Y
Silicon Laboratories	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	150	N/A	0 €	N/A	50	2,500+	Y
Texas Instruments	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	20	N/A	0 €	N/A	50	2,500+	Y
u-blox	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	10	N/A	0 €	N/A	50	2,500+	Y

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Contract Manufacturers Buyers' Guide

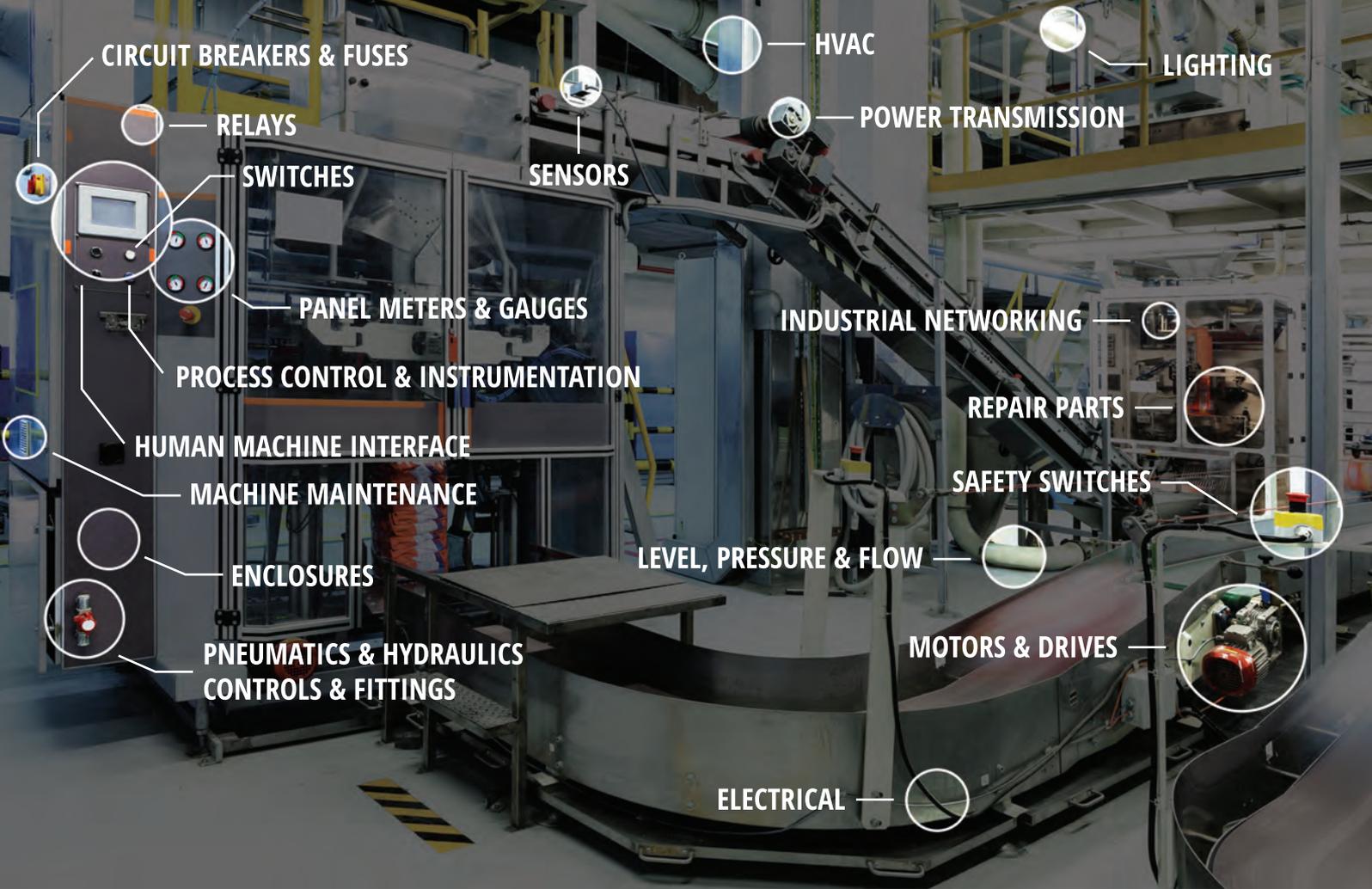
Manufacturer	Telephone	Website	Turnover	Location	Employees	Number of Surface Mount Lines	Approvals	BGA Capacity	Lead Free Manufacturer	Prototyping	Design Capability	Full Turnkey Cables and Harnessing
Challenger Solutions Ltd	01245 325252	www.challengersolutions.com	£10m	Essex/SE	70	9	AS9100 Rev D, ISO9001:2015, ISO 14001:2015, UL, CCC, IPC-610-G Class 3, TUV	Y	Y	Y	Y	Y
CML Innovative Technologies (uk) Ltd	01284 714700	www.cml-it.com	£12M	UK/EU/China	65		ISO9001, TS16949, UL, ISO9001 2015, IATF 16949 2016	N	Y	Y	Y	Y
Corintech Ltd	+44 (0)1425 656555	www.corintech.com	£16.9m	UK & Far East	80	6	AS9100, ISO9001, IPC-A-610 Class 3, J-STD-001	Y	Y	Y	Y	Y
Custom Interconnect Ltd	01264 321321	www.cil-uk.co.uk	£18.6m	Andover (Hampshire)	130	6	AS9100 ISO13485 ISO9001 IPC-A-610 Class 3	Y	Y	Y	Y	Y
Electronic Technicians Ltd	01202 897722	www.etluk.co.uk	£3.7m	SE	50	2	AS9100, ISO9001, ISO14001, IPC610/620 Class 3	Y	Y	Y	Y	Y
FermionX Ltd	+44(0)1903 524600	www.fermionx.com	£6.5m	Worthing, W. Sussex	56	3	ISO9001:2015, ISO4001:2015, IPC-A-610 Class 2 & 3, IPC-J-STD-001	Y	Y	Y	Y	Y
G&B Electronic Designs Ltd	01420 474188	www.gandbelectronics.co.uk	£4.6m	Hampshire	60	2	ISO9001, ISO13485, IPC-A-610, IPC-J-STD-001, IPC 7711/7721	Y	Y	Y	N	Y
Hallmark Electronics Ltd	01782 562255	www.hallmarkelectronics.com	£2.4m	Staffordshire	26	2	ISO9001:2015, IPC-A-610 to Class 3, UL	Y	Y	Y	Y	Y
Icon Electronics Limited	01423 449080	www.iconelectronics.co.uk	£8.5m	Hampshire & Yorkshire	75	6	AS9100, ISO9001, BS EN ISO/IEC 80079-34:2018 ATEX, IPC-A-610 Class 3	Y	Y	Y	Y	Y
Incap Electronics UK Limited	01782 753200	www.incapcorp.com	£169.8m	UK, Slovakia, Estonia & India	2,500	22	ISO9100, ISO14001, ISO13485, AS9100D, ISO45001 & IATF16949	Y	Y	Y	Y	Y
Industrial Electronic Wiring Ltd.	+44(0)1793 694033	www.iwco.co.uk	£5.5m	Swindon, UK	60	N/A	ISO9001:2015, IPC610, IPC620	N	Y	Y	N	Y
Jaltek	01582578170	jaltek.com	£15m	UK	105	3	AS9100, ISO9001, ISO13485, IPC-A-610 Class 3, Certified IPC Trainer (IPC-A-610, J-STD-001 & J-STD-001 Space Addendum)	Y	Y	Y	Y	Y
KEY-TECH ELECTRONIC SYSTEMS	01592 597711	www.key-tech.co.uk	£7m	Scotland	65	2	ISO9001:2015, J-STD-001, IPC-610/620 CLASS 3, IPC-7711, BS EN ISO13485:2016, ISO 13485	Y	Y	Y	N	Y
Nemco Limited	01438 346600	www.nemco.co.uk	£15.9m	SE	120	6	AS9100, ISO9001:2008, IPC610/620 to Class 3, ISO14001-2004, SC21	Y	Y	Y	Y	Y
NOTE Group	01753 746700	www.note-uk.co.uk	£207m	UK/EU/China	1,200	20	IPC610 to Class 3, ISO9001:2015, 13485, 14001, 18001	Y	Y	Y	Y	Y
M-TEK (Assembly) Ltd	01189 455377	www.mtek.co.uk	£2.4m	SE	30	4	ISO9001, ISO14001, IPC-A-610 Class 3, IPC-7711/7721, WHMA-3620, Certified IPC Trainer	Y	Y	Y	Y	Y
Pektron	01332 832424	www.pektron.com	£50m	E-Midlands	350	8	ISO9001, ISO14001, TS16949, BEAB, VCA, TUV, UL	Y	Y	Y	Y	Y
Simtek EMS Ltd	01843 233120	www.simtekems.co.uk	£8.2m	SE	77	3	ISO9001:2008, ISO13485, IPC-A-610 Class 3 & IPC-7711	Y	Y	Y	Y	Y
TEXCEL TECHNOLOGY PLC	+44(0)1322621700	www.texceltechnology.com	£15.5m	SE	131	7	ISO9001, ISO14001, IPC610 Class 3,	Y	Y	Y	Y	Y
Tioga Limited	01332 360884	www.tioga.co.uk	£16m	Derby	130	6	ISO 9001, ISO 13485, ISO14001, IPC 610, 620, 7711/7721	Y	Y	Y	Y	Y
Wilson Process Systems	01424 722222	www.wps.co.uk	£12m	SE	100	5	ISO9001:2015, IPC-A-610 Class 3	Y	Y	Y	Y	Y

PCB Buyers' Guide

Manufacturer	Telephone	Website	Service Provided (ie Broker, Manufacture &/or Repair)	Location	Approvals	Volume - Small, Medium, Large	Double-sided	Multi-Layer 4-10/16-20-30	Metal PCBs	Ceramic PCBs	Heavy Copper PCBs	Flex / Flex-Rigid	Obsolescence Solutions	Modifications	Prototyping
Cambridge Circuit Company Ltd	01223 423100	www.cambridge-circuit.co.uk	M	SE	ISO9001:2015, UL, ISO 14001:2015	SML	Y	4-16	Y	N/A	N/A	Y	Y	Y	Y
DK-Daleba Printed Circuit Boards	01992 510000	www.dk-daleba.co.uk	M	UK, Europe, Asia	ISO 9001:2015, UL, TS16949, IOSCAR	SML	Y	4-58	Y	Y	Y	Y	Y	Y	Y
GSPK Circuits Ltd	+44 (0)1423 798 740	www.gspkcircuits.ltd.uk	M/R	UK, Europe, Asia	ISO9001:2015, IATF 16949:2016, EN (AS) 9100, Ioscar	SML	Y	4-34	Y	Y	Y	Y	Y	Y	Y
Stevenage Circuits Ltd	01438 761811	www.stevenagecircuits.co.uk	M/B	UK/China	ISO 9001:2015, EN 9100:2018, EN 9104:2013, UL796, ISO 14001:2015	SML	Y	4-44+	Y	N/A	N/A	F, F/R	Y	Y	Y
Tate Circuit Industries Ltd	01543 622 435	www.tatecircuits.com	M/B	UK/China	ISO 9001:2015, UL	SML	Y	4-20	Y	N/A	N/A	Y	Y	Y	Y

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