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FOUR STEPS TO ENCLOSURE SOURCING

PAGE 12

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Supporting The Authorized Channel



On the cover – November 2023

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Editor's Word



Preparing for 2024 forecasts

At the time of writing, I'm already waiting for the executive forecast copy to start arriving ahead of the December issues of *Electronics Sourcing UK and North America*. At this stage of the process, I like to play a mind game by trying to second guess the authors' thoughts and then compare my ideas with the final articles.

If I was to write my own executive forecast it would start with reshoring, nearshoring and friend shoring. At present, I'm awash with news about investments in new manufacturing and distribution facilities in the UK, Europe and North America. Likewise, I'm intercepting news about production capacity relocating from China to surrounding regions. It looks like the next rewrite of globalisation is underway.

Secondly, I would discuss demographics. A strong manufacturing sector requires people to make things and people to buy things. Slowly but surely, we are running out of both. Populations across the planet are aging while, at the same time, the birthrate continues to decline. I foresee a significant shift in the types of products consumers will demand, how they will be manufactured, where they will be produced and how much they will cost.

Finally, there is digitisation. As products and their supply chains become more complex, while the number of people available to manage them diminishes, digitisation is currently the only obvious solution. Being a digitisation pathfinder can be a risky business. However, coming to the game late could also be a disaster. Thus, I expect 2024 to be a year where the middle ground of distribution learns from the early adopters and starts deployment.

Jon Bakhett

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agreement announced

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Rugged power supply stocking agreement announced

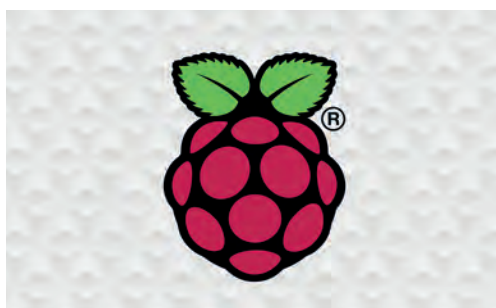
Princeps has signed a partnership agreement with on-systems, a UK designer and manufacturer of power systems for harsh environments. Princeps will become the UK authorised stocking distributor, providing sales, marketing and logistical support and holding stock of all standard units of on-systems' power supply products, initially starting with its boa family of Mil-COTS low profile, baseplate-cooled DC-DC power supplies.

Princeps sales director, David Nash, said: "We're delighted to partner with a British design and manufacturing success story that is recognised as a leader in its field. Especially one that is focused on the same demanding industry sectors and hi-rel application spaces as Princeps."

On-systems' CEO, Mike Harvey, added: "With its focus on hi-rel sectors and established strong base of military and aerospace customers, Princeps will help extend the reach of our standard product offering."

Princeps' MD, Dan Hughes, concluded: "We're excited to work closely with the on-systems team to combine our market knowledge and reach with their power systems expertise to deliver real added value for our customers."

www.princeps.co.uk



More Pi supply options

Mouser Electronics is now offering customers the latest Raspberry Pi products. Sourced directly from Raspberry Pi, the entire catalogue of single-board computers, embedded devices and peripherals is available, with full manufacturer traceability/authenticity.

Mouser Electronics' VP of supplier marketing, Andy Kerr, said: "Mouser is excited about this expanded partnership with Raspberry Pi. With their line of industrial-ready products, customers across the globe now have access to an expanded offering of innovative, scalable products that are certified, low-cost, powerful and production ready."

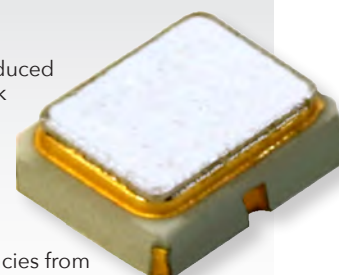
Raspberry Pi's chief commercial officer, Mike Buffham, added: "Mouser's global reach enables us to extend our customer base to offer powerful and easy-to-use products to people of all skill levels. Known for their best-in-class distribution, outstanding service and exceptional customer reach, Mouser is a valued strategic partner for us. We look forward to this expansion opportunity."

Raspberry Pi products now offered by Mouser include: Compute Module 4; RP2040 microcontroller; Pico, Pico H and Pico W; and Camera Module 3.

www.mouser.com

New source of stable reference crystal oscillators

Euroquartz has introduced a new range of Statek crystal oscillators offering tight frequency stability for high-reliability applications. The oscillators offer fundamental frequencies from 10 to 50MHz with a total frequency tolerance as low as ± 5 ppm (including first year ageing) over the military temperature range from -55 to 125°C. Versions offering shock resistance up to 75,000g are also available.



Applications include RF telemetry, master clock, telecommunications, navigation and handheld devices and instrumentation.

Housed in a compact 3.2 by 2.5mm hermetically sealed ceramic package, MTXO crystal oscillators also offer ultra-low period jitter of 1.7ps (RMS) with ultra-low Allan deviation and phase jitter. Suitable for reflow soldering at maximum process temperature of 260°C for 20s, the new MTXOs offer CMOS output into 10pF load with clipped sinewave option available. Additional specifications include low acceleration sensitivity, start-up time of 5ms maximum, rise/fall time of 5ns maximum with duty cycle of 45 per cent minimum, 55 per cent maximum.

www.euroquartz.co.uk

KNOWN GOOD COMPARISON

In this article, a Princeps counterfeit investigation demonstrates the value of comparison to a known good device

This month's counterfeit investigation began when initial visual inspection of a DC-DC converter device under test (DUT) purchased from a global broker highlighted some red flags—exposed base metal on leads, apparent plating finish variability and scoring marks along the leads (Fig 1)

Factory-new components can exhibit marginal red flags, so when possible, Princeps compares suspect parts to a traceable known good device. The known good device's leads (Fig 1 R) exhibit some plating finish variability but none of the exposed base metal or scoring (Fig L).

Comparison of component markings exposed key

differences. In Fig 2 there is an offset in DUT marking absent on the known good. Also, the CM+ logo is clearly different. The part marking alignment and logo layout of a traceable part also matched the known good.

X-rays showed construction differences between the DUT and known good, with variation in internal layout, case material density and messy coil winding.

Finally, decapsulation shows markedly different construction quality with the known good having several additional components, cleaner soldering and a tidier finish.

The parts were reported to the ERAI and removed from the supply chain.

www.princeps.co.uk

Fig 1 (L) DUT (scoring and exposed base metal on leads); **(R)** known good



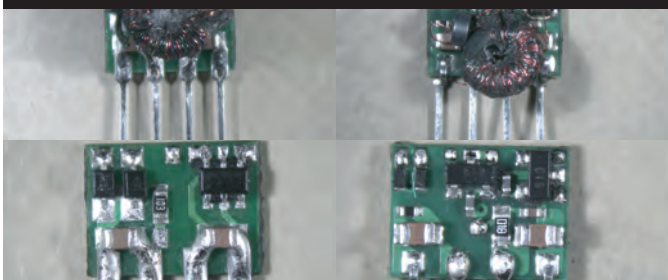
Fig 2 (L) DUT; **(middle)** known good; **(R)** traceable device image



Fig 3 X-rays (L) DUT; **(R)** known good



Fig 4 Decapsulation (L) DUT; **(R)** known good



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In Brief

Portfolio gains own brand

Distrelec is adding RS PRO own brand products to its portfolio. The initial launch features over 1,000 products across multiple categories, particularly automation, electrical engineering, electromechanical and tools, including almost 80 test/measurement lines. Customers are guaranteed products and components that undergo rigorous testing, inspection and auditing to demanding standards. www.distrelec.com

Battery facility opens

GS Yuasa Corporation's president, Osamu Murao, has officially opened the company's new Swindon facility. The site is the headquarters for GS Yuasa Battery Europe and sales/distribution centre for GS Yuasa Battery Sales UK. The 178,500ft² site incorporates automated shuttle racking, AGV reach trucks and pick tunnels. www.yuasa.com

Unleash Pi potential

Inelco Hunter has announced availability of an extended range of capacitive touch screen kit options for the Raspberry Pi offering three display sizes: 5, 7 and 10.1in. Options include: assembled, kit form and rugged industrial case. The kits help realise the Raspberry Pi's potential, turning it into an industrial-rated system. www.inelcohunter.co.uk

New LED sourcing option

TTI is now an authorised distributor of Cree LED for markets including lighting, transportation, e-mobility and industrial. Flagship product families in Cree LED's portfolio include the XLamp and J Series LEDs for general and specialty lighting applications and high brightness LED products for video screens, signage and specialty lighting applications. www.ttieurope.com

More than solid state, more than supply

Solid State Supplies has rebranded as Solsta. Managing director, John Macmichael, explained: "Our company now offers much more than just 'solid state' components and with our wealth of value-added services, we do much more than just 'supply'. We felt that the time was right for us to create a modern, distinctive and easily recognisable brand that encompasses all that is good about our business and better represents who we are today."

Director of sales and marketing, Jon Baxter, added: "As Solid State Supplies has grown and expanded over the years, we have made a number of acquisitions, each of which has brought us huge benefits in terms of people

and capability. Our core values and strengths have remained the same, but the resulting amalgamation of companies and brands has increased the complexity of how we articulate who we are, what we do and why we are unique and different from our competitors.

"Our customers can rest assured that our core values and strengths, people, locations, suppliers and the products and services we provide to them have not changed. We continue to offer the same combination of leading-edge products, technical expertise and outstanding added value that we've offered for many years."

www.solsta.co.uk



Reliable, economical interconnects in stock

For high reliability in harsh environments, Rutronik is offering buyers Amphenol's SurLok Plus series, an alternative to conventional compression lugs. With protection class IP67, the product is an environmentally sealed version of the original SurLok series. This suits harsh, demanding environments including: energy storage, e-mobility, process control and heavy equipment.

SurLok Plus is available in smaller sizes (3.6, 5.7 and 8.0mm) than its predecessor and features a quick-lock and press-to-release design. Since Amphenol uses industry standards for the crimp, screw and busbar connection options, no additional investment in special torque tools is required.

Three different colours (red, black, orange) and different mechanical coding options allow use of multiple connectors side-by-side without the risk of reverse polarity. Specifications include: 50 to 70 A rated current and male, female/rectangular genders.

www.rutronik24.com

Europe to Europe direct shipping begins

DigiKey has announced direct shipments from European suppliers to European customers through its Marketplace program.

DigiKey's VP, new market development, Missy Hall, said: "DigiKey's Marketplace gives our suppliers and customers in Europe access to more product lines than ever before and we are thrilled to offer this direct shipping option in the region. By allowing for additional cost savings, efficiency and more sustainability, as well as a wider variety of products that are able to be sold in Europe, we can accelerate progress for engineers and designers."

Environmental and cost savings are realised when products do not have to be shipped to US facilities to be shipped back to Europe, eliminating costly shipping prices, additional time and environmental impact due to shipping. Shipments sent within Europe typically arrive next-day.

By reducing shipping, more types of products can be sold including lithium batteries, heavy automation equipment, chemicals and adhesives, solar products and more. Currently about 30,000 SKUs are eligible for the program

www.digikey.com

Transformative transaction in components distribution

WT Microelectronics has entered into an agreement to acquire 100 per cent of Future Electronics' shares.

WT Microelectronics' chairman and CEO, Eric Cheng, said: "Future Electronics has an experienced and deep management team and a very talented employee base and is highly complementary to WT Microelectronics in terms of product offerings, customer coverage, and global footprint. Future's management team, all their employees worldwide and all locations and distribution centres will continue to operate and add value to the organisation."

Future Electronics' president, chairman and CEO, Omar Baig, added: "Our two companies share a common culture, driven by a rich entrepreneurial spirit that will empower our talented employees globally. This combination is a great opportunity for WT Microelectronics and Future Electronics to jointly form a world-class industry leader, and allows us to continue our long-term strategic plan to offer the highest level of services to our customers, which we have been doing for the past 55-years."

www.futureelectronics.com



EV growth drives facility investment

Schneider Electric's Leeds site is expanding operations with a £7.2m facility upgrade and 110 new jobs over the next five-years. This investment underscores Schneider Electric's growth due to rising demand from the energy transition and electric vehicle markets.

Employing one tenth of the company's UK workforce, the site specialises in designing and manufacturing medium and low-voltage switchgear solutions, which protect and distribute electricity in public, commercial and industrial installations. The investment aims to radically enhance the facility's efficiency to support growing demand.

The upgrade will feature a 3,380m² extension and a centralised Factory Acceptance Testing (FAT) area. Work is projected to begin early 2024.

Schneider Electric's zone president UK&I, Kelly Becker, said: "This multi-million pound investment in Leeds reflects our commitment to investing in the UK's burgeoning green economy. I'm proud that through this project, we plan to create local jobs in Yorkshire, which has been part of our operational presence in the UK for years."

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Ocean transit by John Denslinger

Navigating the trade **tide shift** in ocean transit

John Denslinger dives deep into the ocean of trade transit, revealing that growth on the Gulf and East Coast is likely to exceed that of the West Coast in the coming decade

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

Eighty per cent of global trade is moved by ocean shipping. That's an incredible figure made possible by a sprawling network of ports, massive container ships and two vital canals. Ocean routes and transit times have remained predictable for years. America's ports once shared the same consistency, but the 'trade tide' is changing that.

To be competitive requires investment and America's gateways have invested heavily in port automation, harbor dredging for larger ships and improved intermodal connections for managing more cargo with greater efficiency. On the surface, it all looks incredibly smooth and seamless, but there's plenty of importer, exporter and shipper anxiety. The yearlong labor slowdown and strike at US West Coast ports took its toll, but as of July, it's finally over. Workers there voted to accept a six-year contract restoring stability. Also, after a two-week strike, Canadian workers ratified their four-year contract in August. The West Coast ports now seem open for normal business once more.

But ocean transit is far from normal. It appears a new normal has surfaced. The consequence of prolonged labor unrest, changing manufacturing strategies and geopolitical tensions shifted millions of container shipments from the West Coast to Gulf and East Coast ports. Manufacturers seeking supply chain resilience are likely to retain these new gateways. Likewise, as Southeast Asia and India replace China manufacturing, routing through the Suez Canal to East Coast ports becomes increasingly convenient and cost effective. These facts imply much of traffic gains at Gulf and East Coast ports may be permanent.

According to S&P Global's Journal of Commerce, the West Coast's share of Asia imports dropped from 71 per cent in 2013 to 56 per cent in the first half of 2023, while East Coast and Gulf share

grew from 29 to 44 per cent. As for new growth, technology will definitely add substantial new market share at Savannah and Charleston ports as the southeastern states become production epicenters for EV and batteries. Both ports are well-equipped to oversee increased Asian trade with modern terminals, rapid processing systems, and integrated intermodal hubs offering unrivaled train and trucking options to the continent's interior.

The US remains the largest importer of goods and second largest exporter in the world. That position is unlikely to change, so route and port optimisation is a must. Asia traffic to West Coast ports is open waters. Asia traffic destined for Gulf and East Coast ports must pass through the Suez or Panama canals. Neither is risk-free anymore. Both can bottleneck, but the reasons differ. The Suez has been plagued by intermittent blockages, ships running aground and collisions. Most are resolved quickly but the Ever Given's six-day blockage brought global trade to its knees queuing hundreds of vessels. Piracy along the Somalia coast was another concern, but abated quickly after US, EU and UK naval presence. As for Panama, it's drought...lack of fresh water. Mainly fed by rainfall, Lake Gatún serves as the lock's reservoir. With precipitation 30 to 50 per cent below normal, canal operators imposed transit restrictions limiting both ship weight and number of daily ship crossings. Expect these restrictions to continue for at least 10 more months.

Indeed, West Coast port stability has returned, but its long tenure as the dominant gateway to US appears less certain. US population and technology centers are shifting southward. Supply chains are leaving China for southeastern Asia and India. Supply resilience and risk avoidance supersede cost. All signs suggest trade growth on the Gulf and East Coast will exceed that of the West Coast in the coming decade. It's the new trade tide normal.

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Maintaining a Competitive Edge in the Global Electronics Market

Although supply chains were predicted by many to stabilise in 2023, they still remain unstable. The electronic components industry must tackle new challenges head-on to prosper in the future. Whether it is the higher interest rates tightening budgets and impact sales, shifting markets with erratic growth trends, or keeping pace with rapidly evolving technologies like artificial intelligence (AI), companies across the globe are feeling the impact of these new challenges.

Increasing Collaboration and Delivering New Services

At Mouser, over the past few years, we have been working to strengthen the systems that enable us to provide our services and build new and closer relationships with our customers and manufacturer partners. This has provided us with better inventory visibility and the insight needed to anticipate supply chain delays, as well as leading to the development of some additional services designed to improve our customer's purchasing journey.

One of these new features is product lifecycle tracking, with components that are unsuitable for new designs being highlighted and alternatives suggested to our customers. Furthermore, the additional FORTE BOM tool calculates design risk for components, which not only saves engineers' time but also enhances the intelligence of the purchasing process.

Expanding Product Lines and Shifting Global Supply Chains

Despite recent challenges, the product supply chain has improved and is healthier than a year ago, with the Global Supply Chain Pressure Index (GSCPI) returning to pre-pandemic values in January 2023. But raw material shortages are hindering the growth of markets like PCB manufacturing, which are expected to grow only up to 5% this year.

Our ongoing effort to broaden our line card and maintain diverse inventory enables us to offer customers with multiple options if a product is unavailable. Since January 2020, we've added over 280 new manufacturers and currently have more than \$2 billion of inventory at hand. New products are constantly being launched, with 44,000 new parts added so far this year, including 20,000 in June.

Investing in Technology and a New Distribution Centre

We are always analysing our operations to improve efficiency and accuracy and finding ways to make it easier for our employees to do their jobs effectively. Our investment in vertical lift modules (VLM) has been substantial, and we are currently operating the world's largest installation with 138 VLMs. VLMs replace traditional shelving and use lift systems for quick access to storage trays. The trays are retrieved and delivered to a pick window for selection. VLMs are safer, maximise space, and reduce

picking time compared to traditional shelving.

We're currently expanding our Mansfield, Texas distribution centre with a multi-million dollar project. The 413,000 sq-ft building has three mezzanine levels and includes state-of-the-art automations such as VLMs, a EuroSorter, IPack machines, pallet AS/RS (auto storage and retrieval system), 6 miles of conveyor belts, and 49 bay doors. A skybridge will connect it to our Distribution Centre, with conveyors to move inventory. The new facility, scheduled for completion in 2024, will improve our capabilities, accuracy, and despatch speed, helping customers reduce their time-to-market.

www.mouser.co.uk



Mark Burr-Lonnon
Senior Vice President of Global Service & EMEA and APAC Business

Mark Burr-Lonnon, Senior Vice President of Global Service & EMEA and APAC Business, helps guide Mouser Electronics' global service strategy, as well as day-to-day international efforts in Europe and Asia-Pacific. Under his and CEO & President Glenn Smith's shared global vision and direction, Mouser has quickly grown from a small U.S. electronics distributor into a Top 10 global distributor with more than \$4 billion in annual revenue, focused on serving the unique needs of design engineers and buyers worldwide.

In addition to planning and directing Mouser's global growth and expansion activities, Burr-Lonnon provides a leadership role for his multicultural global management team. He is active in cultivating relationships with customers, current and potential electronic component manufacturers, top industry organizations and media partners.

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Four steps to enclosure sourcing

Hitaltech's Andy Fitzner introduces purchasing professionals to the four stages of sourcing enclosures from off-the-shelf to fully finished

A well-designed enclosure is more than a box of parts. Depending on the product being developed, it's a protective shell and product enabler. It's a design feature that can distinguish the product from competitors. With a QR code on its surface, it could be an instruction manual or even a sales tool. It pays to get the enclosure right and the following is how to achieve that.

Start with off-the-shelf:

Always the lowest cost option, the first step in enclosure sourcing should always be to explore stock choices. This doesn't have to mean compromise.

Hitaltech's range of industrial and building automation enclosures runs to 1,000s of products, ranging from IP-rated and handheld enclosures to embedded platforms and DIN-rail mounted enclosures. It is entirely possible to find the right off-the-shelf enclosure for an application without needing to tailor, tweak or customise.

Adapt off the shelf: Suppose an off-the-shelf enclosure would be ideal but there isn't an opening precisely where required. With machining or mould tool modifications it's possible to adapt off-the-shelf enclosures to include the openings and apertures

for inputs, outputs and LEDs exactly where required. It's a fast, cost effective option compared with full bespoke development when producing higher volumes.

Custom design: Where no available choice—even a modified option—would suit the application, the product developer's next step is working with an enclosures manufacturer to design a product from scratch. Working in collaboration, this could be an opportunity to create the right box for the product and actively improve the product's functionality, aesthetics and value.

Apply the finish: Whether off-the-shelf or custom, the final stage of enclosure sourcing is to apply design, branding or informational printed elements. From wiring diagrams to QR codes, print can help turn a passive enclosure into an active benefit.

www.hitaltech.com

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Non-rectangular shield takes the heat

The Chomerics Division of Parker Hannifin Corporation is launching Soft-Shield 3800, an electrically conductive fabric-over-silicone foam EMI shielding and electrical grounding gasket for low closure force and high temperature electronics applications. Claimed to be the first product of its type to reach market, profiles come in complex and unique non-rectangular shapes.

The product offers 100dB shielding effectiveness in the range 20MHz to 10GHz. Applications include computer server faceplates and inserts, consumer electronics, electronics enclosures, door seals and

EMI window/vent gaskets. With an operating temperature range up to 125°C, the products suit applications exposed to high heat, supported by UL 94 V-0 flammability rating.

Chomerics Division's global market manager, Ben Nudelman, said: "This product typically requires less than 80g/mm of closure force for effective electrical contact. It also takes less than 10 per cent compression set, delivering reliable and repeatable shielding performance over the service life of the device."

www.ph.parker.com



Growing measurement enclosures range

OKW has added tough new Solid-Box to its range of plastic enclosures for test and measurement electronics. Offering IP66, IP67 and IK08 impact protection, the enclosures suit devices used in challenging industrial and outdoor environments. Applications include: plant/machinery, HVAC, IoT/IIoT, gateways, data loggers, ICT, electrical, agriculture and safety engineering.

These polished enclosures can be installed lid-closed, ensuring any finely calibrated electronics inside remains accurate. The lid is recessed for a membrane keypad, while the bottom has deep recesses to protect connectors.

Three models are available: 115 (135 by 115 by 50mm), 145 (180 by 145 by 60mm) and 175 (225 by 175 by 70mm). Mounting points on the rear of the 145 and 175 match the hole patterns of VESA MIS-D 75/100. They are moulded from PC+ABS (UL94V-0) in anthracite grey (RAL7016) or light grey (RAL7035) as standard.

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Specifying the right IIoT enclosures

OKW Enclosures' marketing director, Robert Cox, walks buyers through the requirements of IIoT enclosure applications and products meeting these needs

Data is the lifeblood of the industrial internet of things (IIoT), playing a critical role in real-time monitoring, process optimisation, predictive maintenance, quality control, energy efficiency, supply chain management, safety and compliance. Vast amounts of precious data must be managed on robust networks, so demand for IIoT network hardware is surging as companies vie to seize the opportunities offered by Industry 4.0.

Last year the global IIoT market was valued at £81 billion—with a compound annual growth rate (CAGR) of 20.5 per cent from 2022 to 2030, report analysts at Coherent Market Insights. Little wonder electronics designers are swiftly developing new solutions for manufacturers keen to capitalise on IIoT.

This has driven demand for specialist enclosures for IIoT electronics. Smart factory technology has opened new possibilities for manufacturers of plastic enclosures—advanced thermoplastics are making inroads into industrial

markets traditionally dominated by diecast aluminium housings.

In the past, ABS was the 'go to' plastic for many enclosures, being resistant to impact and chemicals. However, ABS does not cope well with UV rays. So, more enclosures are now being moulded from UV-stable ASA or blends such as ASA+PC-FR. However, there is still a place for ABS in industrial electronics, especially when blended with stronger plastics such as polycarbonate.

OKW Enclosures' marketing director, Robert Cox, said: "There's no doubt that Industry 4.0 has accelerated the pace of innovation in enclosure design. Creating specialised standard enclosures for IIoT reduces the amount of customisation required. This means the enclosures can be manufactured and shipped faster to meet rising demand for Industry 4.0 electronics.

"And although many new enclosure models have been designed with IIoT in mind, they're versatile



enough for lots of other applications too."

Plastic enclosures for IIoT applications must be strong and well protected from dust or water ingress. A rating of IP65, IP66 or IP67 is recommended. However, durability and good ingress protection are just the start.

The sheer number of sensors involved in IIoT makes fast installation a priority. Models such as OKW's Mini-Data-Box can be specified with (or without) flanges allowing housings to be cable tied or screwed in place quickly and easily. Easytec enclosures are also flanged, while a curved recess at the rear adds stability when mounting on poles or rails.

Small handheld or wearable enclosures can

Continues on page 16 >

Although many new enclosure models have been designed with IIoT in mind, they're versatile enough for lots of other applications too

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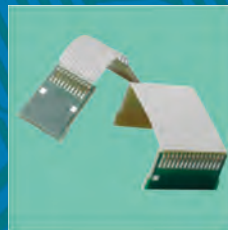
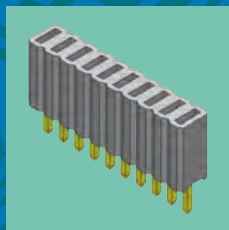
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also be excellent for IIoT sensor duties, particularly in smart logistics. Award-winning Minitec was originally designed for personal electronics, offering a range of standard choices based on size, shape and colour. At the heart of the design are different intermediate rings offering various carrying and mounting options, making it simple to attach Minitec to objects requiring tracking.

Many IIoT enclosures feature smart, modern contours that enhance their aesthetics, an important consideration in today's futuristic factories. As standard enclosures, they must be attractive but also discreet and understated.

That ethos is exemplified by housings such as wall-mounted Smart-Panel. These ASA+PC-FR flush-mount enclosures fit standard cavity wall boxes,

blending seamlessly into modern industrial settings. Screwless assembly ensures rapid installation.

However, many IIoT applications require larger plastic enclosures such as the new Solid-Box. These IP66/IP67 housings have an IK08 impact rating, plus design touches usually reserved for diecast housings. These include 'lid closed' installation to stop dust and water ingress when the enclosures are being fitted in challenging locations. Deep side recesses protect connectors and interfaces, while hinges secure the lid when open.

www.okw.co.uk



OKW's new Mini-Data-Box exemplifies specialised 'go-anywhere' enclosures for IIoT



OKW's tough new sealed Solid-Box for larger indoor/outdoor IIoT equipment



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Enhancing connector resilience in harsh environments

PEI Genesis' senior product manager, Dawn Rogers, discusses the benefits of Tin Zinc J plating for connectors used in harsh environments

In harsh environments, such as military vehicles, industrial equipment and outdoor applications, connectors must withstand extreme conditions, including exposure to moisture, salt, chemicals and extreme temperatures.

Tin Zinc J plating was introduced in countries that use VG spec connectors in extreme military conditions. It was designed and developed as a full

replacement for cadmium plated VG connectors, which were phased out of new designs since 2018 due to environmental concerns. As a full replacement, it has plating compatibility with cadmium-plated versions, thus suiting maintenance, repair projects and new designs.

The plating was developed as a Restriction of Hazardous Substances (RoHS) and Registration, Evaluation,

Authorization and Restriction of Chemicals (REACH) standards compliant alternative to cadmium-plated versions currently used in extreme harsh environments. These regulations control the use of hazardous substances in manufactured equipment, making connectors more environmentally friendly.

Tin Zinc J plating offers advantages for connectors exposed to harsh



PEI Genesis' senior product manager,
Dawn Rogers

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Connectors

environments. Its corrosion resistance ensures longevity, even in extreme conditions, such as off-road vehicles or industrial settings. It has been shown to withstand over 500-hours of static salt spray testing and over five-days of cyclic salt spray testing.

With high conductivity and shielding capabilities, plated connectors maintain reliable electrical performance, crucial in applications like military vehicles and railway projects. The plating also boasts a wide operating temperature range. Tin Zinc J plated connectors are found in applications ranging from heavy earth-moving equipment to military and aerospace contexts, including aircraft and ground support equipment.

In the harsh environmental industrial sector, including oil and gas, mining and manufacturing, Tin Zinc J plated connectors are employed to link sensors, actuators and various electronic devices in environments characterised

by extreme conditions, such as exposure to chemicals, dust and rugged terrain.

Furthermore, these connectors suit outdoor applications such as traffic control systems, where they connect electrical systems in challenging applications subjected to moisture exposure, salt and other environmental factors.

It is important to purchase Tin Zinc J plated connectors from a reputable manufacturer that uses high-quality materials and processes. PEI-Genesis has extensive expertise in delivering reliable solutions for harsh environments. In 2024, PEI-Genesis will extend its assembly line range with the full Tin Zinc J plating solution. This will include the following VG spec products from Amphenol-Air LB:VG95234, VG95328, VG96912, VG95319-1016A & VG95319-1011A and ITT Cannon VG95234.

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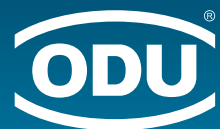
Characterized by robust metal housings with different surfaces. These metal circular connectors ensure secure and stable connections. With an interface diameter of just 6.4 mm, they can also be installed in the smallest spaces.

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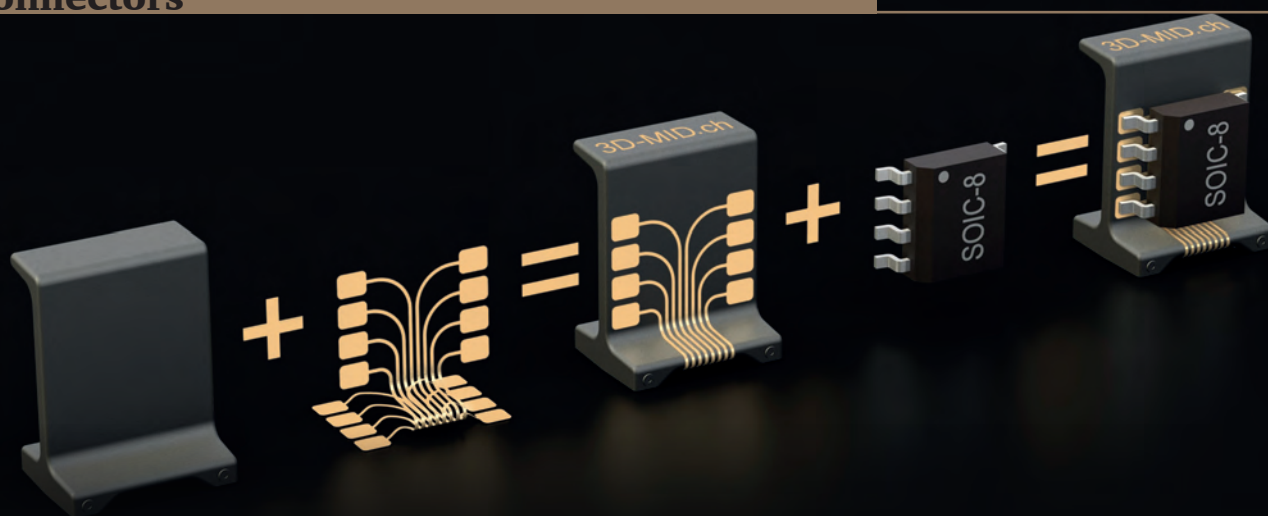
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Component carriers replace flexible circuit boards

Harting introduces a process designed to replace flexible printed circuits, letting original equipment manufacturers benefit from simplified installation and cost savings

Flexible printed circuits are established components in many products thanks to their adaptability. However, assembling and fixing these circuits can be a complex process. To simplify installation and deliver cost savings, Harting has developed a new component carrier solution based on 3D Mechatronic Integrated Devices (MID) technology.

This means electronic components can be fitted directly onto the carrier, replacing flexible circuit boards. The carrier provides

a connection between the printed circuit board and components such as LEDs, ICs, photodiodes and sensors.

Carriers are constructed using Laser Direct Structuring (LDS), which applies conductor paths directly onto plastic parts. The base body is injection moulded and material additives are activated by laser, letting the material accommodate electrical conductor paths. It can then be assembled using standard surface mount processes or soldered in a reflow oven.

Resulting assemblies can be flexible, complex geometric designs. Products such as smart phones, hearing aids and smart watches can become smaller and more powerful. LDS also allows production of 3D-MID assemblies, meaning components can be fitted directly onto a three-dimensional base body without circuit boards or connecting cables.

Component carrier technology suits various applications. As a stable, reliable process it has

become established in quality-critical sectors such as medical technology and production of safety-relevant automotive components.

Another recent application is security covers for payment terminals. The covers protect internal components from unauthorised mechanical and electronic access, increasing transaction security and preventing theft.

www.harting.com/3D-MID

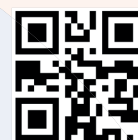


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Connectors enabling high tech agriculture

In this article, Samtec explains how connectors proven in harsh automotive applications are now supporting the development of vertical farming applications

Intelligent Growth Solutions is an innovator in vertical farming. Based in Scotland, IGS has developed the Growth Tower, a vertical farm that replaces soil with racks of trays stacked up to 12m high. The plants gain the nutrients they need from their roots which are flooded with a nutrient solution on a schedule set by software-controlled automated growth recipes.

LED technology provides an alternative to direct sunlight and IGS has developed a Total

Controlled Environment Agriculture (TCEA) platform that integrates all these elements to manage indoor farming. Yield is maximised while resources are used efficiently. Food can be grown any time of year, meters from the population that will consume it.

Compared to conventional farms, the Growth Tower can produce more food on a tiny percentage of the area. Unlike open fields, water not taken up by crops can be collected and reused. Vertical

farms can be located to reduce the carbon footprint, making supply and logistics simpler.

The vertical farm environment creates challenges for electronic components. Humidity and temperature require components designed to provide reliability in tough conditions. Regarding connectors, products designed for tough automotive or telecommunications conditions are delivering the performance IGS needs to support its technology.

Samtec manufactures high-performance connectors. The company supports innovators like IGS with rapid development and the latest interconnection products designed for harsh environments. Samtec is proud to partner with IGS to deliver superior service and innovative connector solutions to support the latest developments in vertical farming.

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Rugged power/signal interface features quick lock

Binder's new PBC15 power bayonet connector suits power supply and signal linking of devices via one cable. Features of this compact, quick locking connector are tailored for fast wiring and installation.

Its size corresponds to M15, bridging the gap between M12 and M23 designs. The connector suits power supplies, particularly to three-phase motors or frequency converters. The component features three power pins, two additional pins for signal transmission, plus a protective earth contact.

The PBC15 design is specified within the DIN EN IEC 61076-2-116 standard. The quick-lock ensures simple, fast and reliable locking via a quarter turn. Screw clamps provide termination. The PBC15 is initially available as wireable female or male cable connectors, unshielded or shieldable.

With rated values of 630V and 16A for the power interface, the connector suits small to medium-sized drives. With rated values of 63V and 10A, the signal pins can be used to control brakes or query operating parameters such as temperatures.

www.binder-connector.de



More spring contact height options

Harwin has added four new height options to its multi-directional spring contact range, which now spans 4.00 to 10.00mm. The S1921-46R and S1931-46R have free heights of 4.00 and 5.50mm respectively, while the S1981-46R and S1991-46R are 8.50 and 10.00mm respectively.

Although many spring contacts suit vertical compression applications, it is less common to find parts allowing horizontal operation. Support for multi-directional operation appeals because higher density electronic designs need more PCB connection flexibility.

Current ratings up to 14A allow use in low level power applications, plus signal transfer and enclosure grounding tasks. Typical applications include communications equipment, consumer electronics, industrial control/monitoring systems, instrumentation, retail tracking devices and kiosks.

Harwin's VP of product, Ryan Smart, said: "Since their initial introduction, we received many customer requests to develop more compact spring contacts, with smaller footprints and lower profiles, as well as taller options. This means our customers can meet a broader spectrum of application criteria."

www.harwin.com



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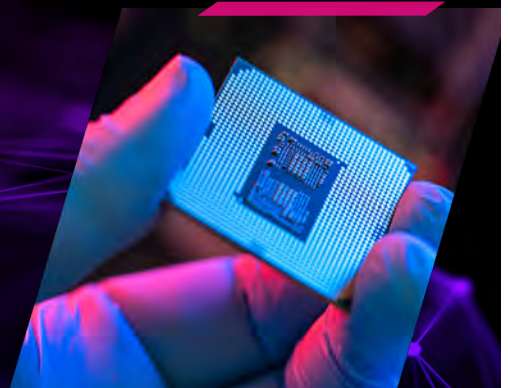
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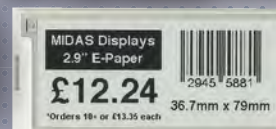
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Medical equipment benefits from cable innovations

Aerco explains how choosing the right cable technology for medical equipment is a win-win situation for both original equipment manufacturers and end users

In no other industry are cable and connectivity as critical as medical: their performance can save lives. Along with the devices and equipment they support, cables and connectors must perform despite pressures of 24/7 use, including constant handling and sterilization.

Alpha Wire's cable and connectivity solutions are designed to combine accurate diagnostics with cleanability, ease of use, space savings and reliability, helping original equipment manufacturers push the boundaries of medical device design.

Major capital investments that impact care—CT scanners, ultrasound equipment and x-ray devices, for example—perform as well as the cable and connectivity that link them to power and data. When these components fail, the result is extensive, costly service and repair work, plus unexpected equipment downtime.

Designed to provide better performance in a smaller package due to

reduced insulation and jacket thickness, Alpha Wire's EcoGen is a next-generation eco-friendly, high-performance wire and cable. Compared to conventional wires and cables, 65 per cent EcoGen wires and cables are up to 47 per cent smaller and lighter. As a result of the superior dielectric properties of mPPE, the wall thickness of the control cable can be reduced while maintaining the same electrical properties as a thicker PVC control cable.

EcoGen products are free of halogens, phthalates and heavy metals. With up to 91 per cent less outgassing, the mPPE thermoplastic insulation and jackets are compliant with RoHS and WEEE regulations.

Durable jackets let the cables withstand continual sterilization and exposure to harsh chemicals, giving them a long lifespan and decreased total cost of ownership for hospitals and clinics alike. As specialists in the design of biocompatible cables that allow flexible movement and

resist chemicals and extreme temperatures, Alpha Wire lets healthcare professionals in hospitals and clinics concentrate on providing the best patient care instead of concerning themselves with equipment failure when performing a life-saving or life-sustaining procedure.

When replacement is necessary, the cables are fast and easy to deploy. They are designed to ensure consistent performance, require fewer connections to maintain and reduce costs by combining multiple performance characteristics into one cable. The EcoGen series offers a wide temperature range, allowing use in all industrial verticals subject to harsh environmental conditions.

www.aerco.co.uk



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High voltage DC portfolio expands

Durakool has expanded its CHV series ceramic HVDC contactors and range of precharge resistors, designed for battery isolation in electric vehicles, high voltage battery storage systems and switching HVDC in solar panel installations. Focused on non-consumer markets, applications include: trucks, buses, construction, off-road, marine and aerospace.

Responding to requests for higher power switching, Durakool enriched its range of precharge/discharge contactors up to 60A and power resistors up to 2,800W.

Durakool's brand manager, Ricardo Esquinazi, said: "The CHV contactor's non polarised terminals make it possible for electric vehicles to provide stand-by power back to the charger. They also enable the contactor in an EV to break high DC currents whilst using regenerative braking, resulting in longer service life and higher 'in application' reliability.

"Our HVDC contactors protect vehicles, their occupants and emergency service personnel by providing isolation of the high voltage battery from the electronic drive system upon vehicle impact and when vehicles are not in use."

www.durakool.com

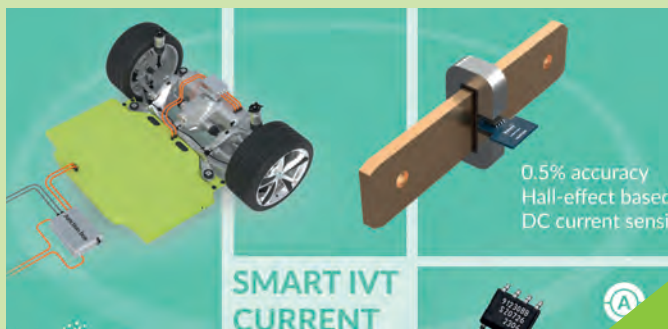
Safe, reliable renewable control

Mouser is now stocking TE Connectivity's ECPx50B high voltage contactors. Designed for control in high-voltage environments such as battery energy storage systems and solar inverters, the contactors are designed to combine high performance and endurance with low coil power consumption. Applications include alternative energy storage systems, photovoltaic inverters and EV charging solutions.



The contactors offer a switching voltage up to 1,500VDC and a continuous carry current up to 500 A. Supporting bi-directional loads, the contactors offer impressive electrical endurance and reliable hermetic sealing with ceramic sealing technology. The contactors can be integrated into space-constrained designs for PV and EV applications with a form factor of 104 by 75 by 108mm. The contactors comply with the DC-1 utilisation category and meet UL, TUV and CE certifications.

www.mouser.com



Novel sensor suits EV battery management

Melexis has launched the MLX91230, the first product of its third generation of current sensors. The company states this digital solution brings 0.5 per cent accuracy at an affordable price in a compact design. It integrates IVT measurement capability, embeds a microcontroller to offload processing from the ECU and benefits from pre-installed safety features. The device suits EV battery management and power distribution systems.

For battery installations, the device supports: state of charge; battery state of health; and state of function in both low voltage and high voltage systems. This is ideal for battery management systems, battery disconnect units and battery junction box deployments.

Melexis' product line manager current sensors, Bruno Boury, said: "Melexis' third generation of current sensors for the battery platform represents the very latest developments in our extensive automotive and sensor knowledge. With this portfolio we defined three key pillars, a dependable digital core, high accuracy and functional safety compliance."

www.melexis.com



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Smarter, safer wind turbines

Analog Devices has announced that Envision Energy is adopting ADI's MEMS sensor technology in the company's new generation of smart wind turbines. Initial goals for the collaboration include enabling new levels of wind turbine safety through enhanced real-time monitoring of vibration, tilt and other information used to inform safer windmill operation and design. New MEMS sensor capabilities add intelligence at the edge for real-time monitoring.

Envision Energy's director of Intelligent Control Division, Haipeng Chen, said: "We are pleased to work with ADI to add its predictive, precision, high-reliability MEMS sensors to our wind turbines. This increases the safety of the tower barrel as well as brings the blade diameter and tower barrel height to the next level, continuing to lead the progress of the industry."

ADI director of MEMS Technology Group Asia, Neil Zhao, added: "ADI has decades of experience in the field of MEMS sensors. We are committed to helping customers solve challenges in different scenarios through high-performance solutions and all-around support. This collaboration with Envision Energy supports the promotion of smart distributed wind turbines."

www.analog.com



Improving turbine safety

To ensure the floor hatches of Nordex wind turbines are securely mounted in their cut-outs, EMKA developed a new stainless steel compression latch designed to resist the forces and corrosive environment involved. This solution ensures the cam closes the hatch firmly and is vibration-proof due to its compression function.

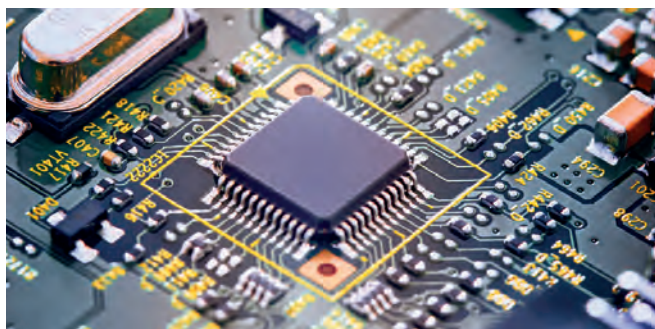
The lock can only be opened by turning it 180deg with a square 8mm key. When rotating 90deg, the cam moves 6mm axially, releasing the compression. When rotating another 90deg, the released cam also rotates and the hatch can be removed.

The actuation covers only half the housing's head so each position shows either OPEN (red) or CLOSED (green). This visual aid lets the technician see whether the locking system is closed or open at a glance. The red/green markings are also smudge-tested according to DIN EN 62208 chap. 9.3 and DIN EN 61439-1 chap. 10.2.7.

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Solar inverters benefit from fourth-generation MOSFETs

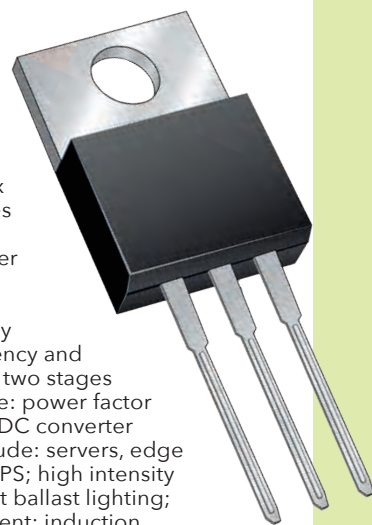
Vishay Intertechnology's new fourth-generation 650 VE Series power MOSFET is designed to deliver high efficiency and power density. Compared to previous-generation devices, the Siliconix n-channel SiHP054N65E reduces on-resistance by 48.2 per cent, while offering a 59 per cent lower resistance times gate charge.

With these devices, the company is addressing demand for efficiency and power density improvements in two stages of the power system architecture: power factor correction and subsequent DC/DC converter blocks. Typical applications include: servers, edge computing, and data storage; UPS; high intensity discharge lamps and fluorescent ballast lighting; solar inverters; welding equipment; induction heating; motor drives; and battery chargers.

Built on Vishay's latest energy-efficient E Series superjunction technology, the SiHP054N65E's low typical on-resistance of 0.051ohm at 10V results in a higher power rating for applications >2kW and lets the device address Open Compute Project's Open Rack V3 (ORV3) standards.

Samples and production quantities are available now.

www.vishay.com



Power solutions: why supplier choice matters

In this article, Sunpower explains key reasons why choosing the right power supply product should go hand-in-hand with selecting the best manufacturer and distribution partner

From the plethora of power supplies available today, finding the right product is only half the job. The other half is backing the right supplier. A solution is not just the physical product, but everything else the supplier brings to the table.

As the power solutions market evolves, it is crucial buyers consider more than just the product's specifications. The supplier's credentials, expertise and approach can significantly influence the overall quality, reliability and performance of the chosen power solution. This makes supplier choice integral to the purchasing decision.

When evaluating potential power supply providers, there are specific indicators buyers should prioritise. This includes: trading history; relationships with key suppliers; depth of internal expertise; and overall approach to client requirements. Sunpower's approach is client-centric: instead of focusing solely on power specifications or cost considerations, the strategy revolves around client consultation to understand and align with their objectives. This

includes offering custom or modified solutions, something not all businesses in the power supply sector have either the expertise or inclination to deliver.

Power supply quality will always remain a crucial factor and important considerations include voltage/current ratings, power capacity, compatibility, efficiency and reliability. It's also essential the supply incorporates high-grade components to ensure: optimal thermal behaviour; protection against potential voltage spikes; reduced ripple value for consistent performance; and comprehensive protective measures for safe installation. Additionally, EMC compliance, with the appropriate testing and certification, is a given.

While Sunpower's power supplies are built with premium components and deliver optimal performance, safety, longevity and sustainability, its commitment stretches far beyond the point of sale. The 'total life' service approach, for example, ensures clients receive ongoing support throughout the product's lifecycle—a customer service ethos that has played a significant role

in fostering a loyal customer base for over 20-years.

As power supply technology advances at pace, there's an increasing focus on sustainability. Manufacturers like Sunpower are exploring ways to incorporate more recycled materials during production and assessing how much of a power supply can be recycled. In an industry that's progressively embracing the principles of the circular economy, the capacity to deliver solutions that are both technologically superior and environmentally responsible is becoming vital.

What's more, with the global transition towards renewable energy, it's imperative for power supply solutions to be adaptable and versatile. Power supplies need to be equipped to manage power from diverse sources, including renewables potentially located in remote areas, as well as offering remote performance reporting. Sunpower recognises these needs, ensuring solutions are primed for both present challenges and future developments in the energy landscape.

www.sunpower-uk.com



Manufacturers like Sunpower are exploring ways to incorporate more recycled materials during production and assessing how much of a power supply can be recycled

Customer relationships key to navigating supply chain storm

Trojan Electronics 2018's David O'Keeffe explains how strong customer relationships pay dividends when finding solutions to unexpected component shortages

Sourcing the right components, first time, every time is vital for manufacturers. Instead of worrying about this, one South Wales-based manufacturer believes it's time to fully-embrace customer relationships.

David O'Keeffe, who runs the contract electronics manufacturing side of Trojan Electronics 2018, explained: "We have had several instances now where component shortages have resulted not

only in delays, but necessitating product redesign. The ability to weather storms like these when components literally balloon in price overnight or become practically unavailable, necessitates an open, honest relationship where trust and collaboration is essential."

cases, we have worked with customers to procure materials 12-months ahead of time to ensure availability. This would not have been necessary in the past. Fortunately, we have a solid financial base which we can leverage to help mitigate potential cash flow issues."

www.trojanelectronics.co.uk

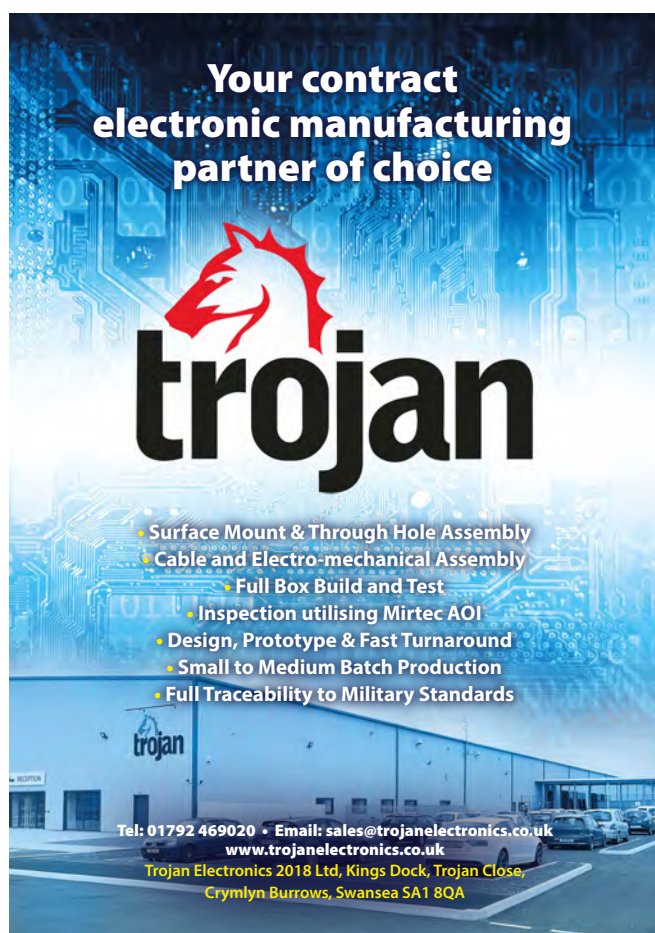
In addition to its established mainstream franchise supply network, Trojan has embraced the grey market, even recycling or retrofitting to provide customers with a sustainable solution.

O'Keeffe continued: "Ultimately price is important. Unfortunately, when a component becomes so expensive—increasing from a few pounds to 20 times that price overnight—we need to look at other options. This is when the relationship really matters so the customer believes you are looking out for them."

In addition to keeping an open dialogue, O'Keeffe values the company's ability to flex with changing demand.

O'Keeffe concluded: "We now often work in tandem with customers around product design or redesign. This provides peace of mind to the customer that they have options depending on available components. In some

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Fast track prototyping drives efficiency

Incap UK explains how Fast Track can help original equipment manufacturers meet tight deadlines for prototypes and pre-production builds

A core feature of the Fast Track strategy is rapid PCBA prototyping and small batch assembly, with projects typically taking three to seven working days to complete, depending on complexity. The service also includes quick-turn cable assembly, advanced testing (like flying probe and on-site x-ray) and streamlined quoting/procurement processes.

What sets the strategy apart is its commitment to quality and efficiency. Companies adopting this approach establish dedicated teams that oversee projects, start to finish. They employ state-of-the-art equipment,

provide detailed reports and replicate volume production processes in the line, ensuring a smooth transition to full-scale production.

Incap UK's Fast Track is an example of how this approach can transform manufacturing. Businesses across the industry can unlock new levels of efficiency and responsiveness, ultimately accelerating innovation and success.

www.incapcorp.com



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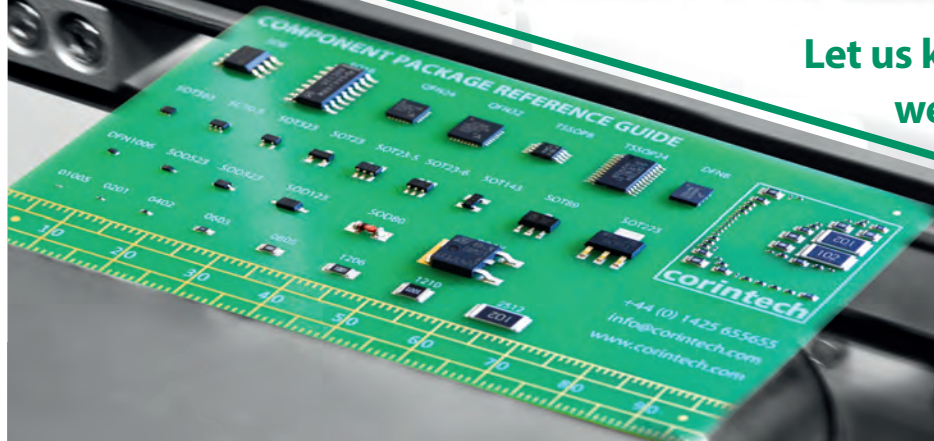
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No compromise on production requirements

In this article, Nano Electronic Services explains how manufacturing agencies can offer OEMs and CEMs a win-win solution to everchanging production requirements

No one likes change, especially when it comes to electronics manufacturing partners. Once an OEM has chosen one or two factories to use, they tend to stick with what they know and trust, often for the right reasons, they know how to build the boards and a relationship has been developed. However, what happens when their capabilities don't quite match? Maybe their equipment doesn't suit the OEM's latest design but finding someone new is an aggravation, so everyone compromises.

What if there was a solution? This is one benefit of working with a

manufacturing agency like Nano Electronic Services. Nano currently works with 13 UK factories and six design consultancies, offering a wide range of capabilities, so match the project, rather than the customer, to the factory. This way there are no compromises, the OEM keeps a single point of contact and relationship. Offering full transparency, customers can interact with the factories building the boards if required but without the need to add multiple vendors.

Does this approach cost more? No, suppliers offer Nano preferential terms, so they pay

for our work, not the customer. The cost is the same as going direct but with the benefits of an agency working with the OEM.

Is this arrangement the same as a broker? No, Nano works on behalf of the suppliers and customers. It isn't a kitting company either. Everything Nano does is transparent and the company does much more in the background.

The CEMs Nano works with also benefit. Instead of wasting time quoting for work they don't win, kitting up prototype jobs etc, Nano ES manages this customer

interaction. The CEMs focus on building boards, don't lose time on front-end processes and get new work without employing someone for business development.

The overall focus is saving customers time in dealing with their manufacturing supply chain: a valuable commodity these days.

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Derby based Tioga Limited, founded in 1996, has developed into one of the UK's leading Contract Electronic Manufacturers.

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.



Angela Williams, Sales Director at Tioga is retiring at the end of November after 20+ years.

We wish her well and express our greatest appreciation for all her hard work, motivation and loyalty

during the highs and lows over the years.

Angela explains 'having helped to reach our highest turnover of £20m and approved to AS9100 these past few months, it feels a good time to go out on a high. I hope that Tioga will continue to grow and I would like to thank all our people, our customers and suppliers who have supported us in our success. The journey has been amazing!'

Big hugs Angela from everybody at Tioga.



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Evolving CEM technology

Electronic Manufacturing Solutions' sales director, Rob Moore, explains how recent manufacturing innovations underpin the introduction of artificial intelligence

When Covid emerged, CEMs started investing in technologies to adapt to a new, more demanding landscape. Roll forward to 2023 and new challenges are emerging. Once again, CEMs are finding manufacturing solutions in innovative ways.

When considering how Covid-19 impacted the electronics manufacturing industry, chip shortages come to mind. However, it's a slightly different story for CEM technologies.

As global supply chains increased in volatility—with

international lockdowns causing disruption to trade routes and labour shortages—electronics manufacturers turned to cloud-based databases for improved visibility over component availability.

Though once deemed too unsafe to handle sensitive manufacturing information, cloud technology offered valuable real-time insights into supplier inventories and streamlining order processing when needed most.

The pandemic also prompted accelerated

Electronic Manufacturing Solutions'
sales director, **Rob Moore**

Continues on page 34 >

ETL



PCB
Assembly



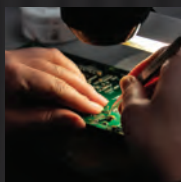
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uptake of automated healthcare technologies. Electronics manufacturers looked for fast, reliable ways to produce wearable medical devices to ensure high-quality patient care while resources were stretched. For example, CEMs used automated quality control procedures to check for product flaws, resulting in fewer recalls, quicker turnaround times and safer products.

Having overcome the pandemic's challenges, electronics manufacturers are turning their attention to technologies that promise to solve ongoing issues. Many CEMs are let down by outdated equipment—requiring excessive maintenance—and error prone manual processes. These can lead to downtime, product flaws and production stops which harm customer relationships and cost money.

Right now, many CEMs have their sights set on bolstering production lines with artificial intelligence (AI) technology, which promises to increase efficiency and accuracy. For instance, AI can support predictive maintenance procedures which anticipate when a machine is likely to fail before the event occurs, minimising downtime and making mistakes less likely. Companies achieve higher quality, more cost-effective processes and customers benefit from faster turnaround times.

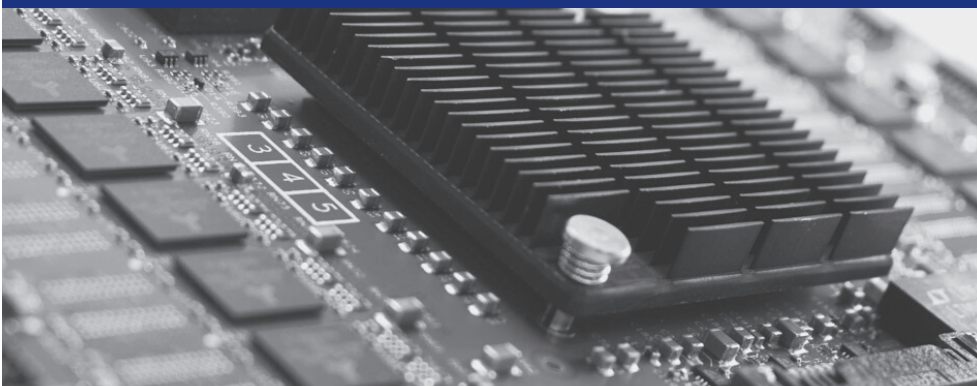
AI can also support manual processes such as quality control checks: one of the most time-consuming aspects of PCB assembly. By detecting flaws that could be missed by eye, AI can help improve how manufacturers spot and address product issues. Also, because AI provides insights in real-time, it can help manufacturers right wrongs at the earliest possible stage, leading to reduced delays and happier customers.

AI algorithms can be used in machine learning—analysing data from production lines to identify areas requiring improvement. If obstacles regularly arise at one particular stage, CEMs can identify what's causing the issue and rectify it to streamline processes and continuously improve operations.

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Laying the Groundwork for a Bright Future

by **Dave Doherty**, president, **DigiKey**



The past several years have presented challenges, as well as opportunities, for DigiKey and our customers. When I take a step back and look at our business, specifically the past two years, we've reached new heights, which is in no small part due to our incredible DigiKey suppliers, partners and customers. We've seen 80% growth and surpassed \$5 billion in global sales.

While we continue to focus on our core business, we've found new opportunities to partner with our suppliers to offer our customers even more benefits. We're a customer-focused business, so we're always looking ahead and reshaping what service for our customers looks like.

A Seamless Check Out for Customers

Making transactions as seamless as possible for customers is extremely important. Whether a customer is on the DigiKey

website or doing additional research directly on a supplier's website when they decide they want to make a purchase, we need to make the checkout process as smooth as possible. We're working with suppliers across our network to ensure no matter where a customer is making a purchase, they have the same user experience. There is a lot of potential here and we're excited to keep expanding in this area.

Premier Search Functionality

For the past couple of years getting parts for electronics was extremely difficult and a pain point for procurement professionals. DigiKey can provide a solution.

Longtime customer, Limor "Ladyada" Fried of Adafruit, recently shared what a difference this has made for her business. "Sometimes parts are completely discontinued, and I have to look at what is new and available on the market because if I'm going

to be doing the redesign, which takes so much effort, I might as well get the newest best thing that I know will last me 10 years," Fried shared. "DigiKey's parametric search lets me find the best fitting components. It's helped me do 300 redesigns in the last two years."

As Limor shared, our search function identifies product alternatives extremely well. Whether our customers are looking for an alternative because a product is unavailable, soon to be discontinued or has a lead time longer than they're willing to wait. We've heard from many customers that this has been an extremely useful tool.

What's Next? It's Always a Cycle

In the first half of 2023, DigiKey has added over 175,000 new stocking parts year-to-date, including nearly 40,000 newly introduced product SKUs across our core business. We can look

at order history and see signs that design activity is shifting from sourcing old designs to innovating new ones, which we're excited about and is a good sign for the overall industry.

While we've seen an increase in customer count and shipments, we've also seen order size and revenue go down. But at DigiKey that doesn't mean it's time to worry, it's all cyclical and this is the time to work toward what is going to fuel that next stage, the next cycle. We see it as just the beginning.

Learn more at [DigiKey.co.uk](https://www.digikey.co.uk)

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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
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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											
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Vishay	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	3,150	N/A	0 €	N/A	50	2,500+	Y
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ENCLOSURES											
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CamdenBoss	CamdenBoss	01638-716101	www.camdenboss.com	N	1,199	N/A	£0	N/A	10	106	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
Phoenix Mecano Ltd	BOPLA Enclosures & Accessories	01296 611660	www.bopla-enclosures.co.uk	Y	150	N/A	£0	N/A	3	2,000+	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
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Epson	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	900	N/A	0 €	N/A	50	2,500+	Y
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
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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
Intelliconnect (Europe) Ltd		01245 347145	www.intelliconnect.co.uk	N/A	N/A	N/A	N/A	100%	5	30	
JA 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

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
TE Connectivity	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	41,850	N/A	0 €	N/A	50	2,500+	Y
Würth Elektronik	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,650	N/A	0 €	N/A	50	2,500+	Y
OBsolescence / Hard to Find											
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

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
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

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
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

CamdenBoss	CamdenBoss	01638-716101	www.camdenboss.com	N	930	N/A	£0	N/A	10	106	Y
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
Multiple Manufacturers	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
Alan Anderson Manufacturing Ltd	+44 (0) 333 322 7222	www.aa-manufacturing.co.uk	£21m	Hertfordshire UK	40	2	ISO9001:2015, IPC-A-610	Y	Y	Y	Y	Y	Y
Challenger Solutions Ltd	01245 325252	www.challengersolutions.com	£14m	Essex/SE	85	12	AS9100 Rev D, ISO9001:2015, ISO 14001:2015, UL, CCC, IPC-610-G Class 3, TUV	Y	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	Y
Corintech Ltd	+44 (0) 1425 655655	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	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	Y
Electronic Technicians Ltd	01202 897722	www.etluc.co.uk	£3.7m	SE	50	2	AS9100, ISO9001, ISO14001, IPC610/620 Class 3	Y	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	Y
GSPK Design Ltd	01423 798254	www.gspkdesign.ltd.uk/	£1m	North Yorkshire, UK	12	2	ISO 13485:2016, ISO 9001:2015, GS ATX 7422	Y	Y	Y	Y	Y	Y
Hallmark Electronics Ltd	01782 562255	www.hallmarkelectronics.com	£4.1m	Staffordshire	27	2	ISO9001:2015, IPC-A-610 to Class 3, UL	Y	Y	Y	Y	Y	Y
Incap Electronics UK Ltd	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	Y
Industrial Electronic Wiring Ltd	+44(0)1793 694033	www.iew.co.uk	£5.5m	Swindon, UK	60	N/A	ISO9001:2015, IPC610, IPC620	N	Y	Y	N	Y	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	Y
Nano Electronic Services Ltd	01388 247152	www.nanoelectronicsservices.com	£1M	County Durham	2	15	ISO13485, ISO9001:2015 & IPC610 to Class 3	Y	Y	Y	Y	Y	Y
Nemco Ltd	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	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	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	Y
Pektron	01332 832424	www.pektron.com	£50m	E-Midlands	350	8	ISO9001, ISO14001, TS16949, BEAB, VCA, TUV, UL	Y	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	Y
Texcel Technology Plc	+44(0)1322621700	www.texceltechnology.com	£18m	SE	131	7	ISO90001, ISO14001, IPC610 Class 3,	Y	Y	Y	Y	Y	Y
Tioga Limited	01332 260884	www.tioga.co.uk	£20.50	Derby	150	4	ISO 9001/14001/27001- ISO 13485 -AS9100 -IPC 610/620/I-Std/7711/21	Y	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	Y

PCB Buyers' Guide

Manufacturer	Telephone	Website	Service Provided (ie Board Manufacture &/or Repair)	Location	Approvals	Volume - Small, Medium, Large	Double-sided	Multi-layer 4-10/10-20-30	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	IS 9001:2015, IATF 16949:2016, EN (AS) 9100, Joscarr	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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