

ELECTRONICS

NOVEMBER 2021

Sourcing

UK & IRELAND

AN MMG PUBLISHING TITLE

SUPPORT

COLLABORATIVE SUPPLY CHAIN - PAGE 16

EXCHANGE

Connect to real-time data with Digi-Key APIs



LOOK INSIDE ▶



API SOLUTIONS

- Ordering
- Quoting
- Product Information
- Supply Chain
- Barcode Information



Download the free ebook
at www.digikey.co.uk/API

Digi-Key is a franchised distributor for all supplier partners. New products added daily. Digi-Key and Digi-Key Electronics are registered trademarks of Digi-Key Electronics in the U.S. and other countries. © 2021 Digi-Key Electronics, 701 Brooks Ave. South, Thief River Falls, MN 56701, USA

 ECIA MEMBER
Supporting The Authorized Channel



On the cover – November 2021

Unite around a collaborative supply chain

Page 16

Editor's Word



The next 100-years

From time-to-time I like to step back and conduct some future gazing. The question is always the same, what will drive the electronics industry for the next 20, 50 and 100-years. Computing, mobile communications and the internet have had a good run but innovations now seem more incremental than revolutionary given the current high levels of adoption.

My best guess, unsurprisingly will be eco tech. Looking back over past decades it looks like the pulse rate of eco technology is generational: about 25-years trough to peak. As examples, it took about 30-years for both double glazing and LED lighting to be adopted on a national scale.

The path is always the same. A company develops a novel technology. Early adopters (often spending ludicrous amounts of money) embrace the technology because that's what they enjoy. Initial sales fund further innovation, cost reduction and commercialisation. Finally, government steps in with incentives and/or legislation and the tipping point is reached.

Looking at automotive, the first Nissan Leaf was introduced in 2010 and most automotive manufacturers will have a full EV offering by 2030. Following this, I estimate another 20 to 30-years for domestic heating to move to fully renewable electric or hydrogen boilers. And on it goes. Then comes electric and biofuel air transport. Maybe, ships will revert to innovative, computer controlled, sails.

One thing will remain unchanged. At the heart of all these innovations will lie an integrated circuit or two, surrounded by an array of passive and electromechanical components: and it will be our job to make sure they are delivered.

Jon Barrett

Contact



EDITORIAL

Managing Editor: Jon Barrett
jonb@electronics-sourcing.co.uk
Contributing Editor: Amy Barker
amyb@electronics-sourcing.co.uk
Editorial & Production: Thomas Smart
thomas.smart@electronics-sourcing.co.uk

ADVERTISING

Advertisement Manager: Emma Evernden
emma.evernden@electronics-sourcing.co.uk

DESIGN

Graphic Designer: Katie Williams
katie.williams@electronics-sourcing.co.uk

CIRCULATION

Circulation Manager: Vicky Leary
vicky.leary@electronics-sourcing.co.uk
Circulation Account Manager: Liz Poole
liz.poole@electronics-sourcing.co.uk

PUBLISHER

Mark Leary
mark.leary@electronics-sourcing.co.uk
Office Manager: Denise Pattenden
denise.pattenden@mmgpublishing.co.uk

Issue 186, Vol.17 No.11
Published 12 times per year
by MMG Publishing Limited
ANNUAL SUBSCRIPTION:
EU Countries €60 Rest of World £90

MMG PUBLISHING LTD
Suite 2, 1-3 Warren Court, Park Road,
Crowborough, East Sussex TN6 2QX
Tel: +44 (0)1892 613400
Fax: +44 (0)1892 613402
@Electrosourcing

Printed by: Pensord Press Ltd
Electronics Sourcing is printed on
sustainably sourced paper stock
ISSN 2043-9504
© 2021 MMG Publishing Ltd



ELECTRONICS
SOURCING
IS INDEPENDENTLY
ABC AUDITED
2005/2021



Articles appearing in this magazine do not necessarily express the views of the Editor or the publishers. Every effort is made to ensure the accuracy of information published. No legal responsibility will be accepted by the publishers for loss arising from articles / information contained and published. All rights reserved. No part of this publication may be reproduced or stored in a retrieval system or transmitted in any form without the written consent of the publishers. Cover image – ©www.shutterstock.com/g/etiamms

NEWS



Portfolio includes extended temperature TFTs

04

FEATURE



Force that binds innovation together

08

CEM SOURCING



How do OEMs choose the right CEM?

18

CONNECTOR PRODUCTS



Fast, secure connections

34

BUYERS' GUIDE



All the facts and figures to help you buy

46

View current editions online

www.electronics-sourcing.co.uk



Portfolio now includes extended temperature TFTs

GTK has added four new extended operating temperature TFT displays to its portfolio, including three IPS TFT panels, with sizes at 4.3, 5 and 7in, plus a standard TN panel at 7in. Several of the displays also feature high-powered backlights for sunlight readability. These popular sizes are used in a variety of applications and markets.

GTK's displays business manager, Clive Dickinson, said: "We already have some ultra-wide displays with extended temperature performance, but these new sizes are much more mainstream and lend themselves to so many different applications. A typical TFT display can operate between -20 to 70°C. However, these new products will operate between -30 to 85°C.

"Examples of vertical markets where this extra bandwidth is needed include, marine electronics, EV charging, access control, external kiosks, ticketing and transport. We can offer all the usual customisation options for these new additions including OCA bonding, touchscreens and extended backlights."

GTK's technicians can support OEMs with new product designs, including selection of the right display, customisation and connectivity.

www.gtk.co.uk



Rapid introduction of low power products

Digi-Key has secured a global partnership with QuickLogic through the Digi-Key Marketplace, offering its range of low power, multi-core MCU, FPGAs and embedded FPGAs, voice and sensor processing.

If a customer is adding always-on wake word detection; deploying AI inferencing models at the edge/endpoint; or wants a low power Arm Cortex-M4F MCU based on open source software, the QuickLogic EOS S3 family of SoCs offers a solution.

Digi-Key's senior product manager Marketplace, Anissa Lauer, said: "QuickLogic products are optimised for ultra-low power consumption, making them ideal for IoT and consumer mobile applications. In addition, the Basic Edition of the Analytics Toolkit from QuickLogic's subsidiary, SensiML, is already available at Digi-Key. As a result, our customers now have a complete software and hardware solution enabling a more rapid ideation and design process."

www.digikey.co.uk

New wire and cable services

Aerco has enhanced its AlphaWire product offering with an investment in cable and wire spooling equipment. The company can now offer customers the exact lengths they require from the bulk reel stocks of AlphaWire products, on short lead times.

Aerco has UL approval to re-spool bulk wire and cable, letting the company deliver full lot traceability and the reassurance that UL provides.

Standard reel sizes of 1,000, 500 and 100 feet lengths are available, with customers having the option of requesting custom lengths.

Aerco stocks AlphaWire hook up wire, equipment wire, communication/control cables and Xtra-Guard cables. The company also offers the AlphaWire EcoGen portfolio of eco-friendly re-cyclable wire and cables.

www.aerco.co.uk

Streamline supply chain administration

Mouser Electronics' Mark Patrick, explains how the company's order automation capabilities help buyers manage their supply chain process

Commerce today is increasingly conducted electronically. Connecting business-to-business buyer and supplier enterprise resource planning (ERP) applications can significantly streamline financial, procurement and supply chain processes. ERP systems represent the organisational hub of any modern purchasing company. Connecting trading partners electronically removes the burden of conducting business through paper-based transactions and the laborious tasks of manual document review and data entry.

The electronics industry is an excellent example of the need to remove costs from the administration of purchasing, accounting and logistics departments. Any company developing and manufacturing an electronics-based product needs to source potentially thousands of individual components. Many components cost less than a fraction of a Euro yet are essential to the overall bill-of-materials. By using printed documents to manage and process orders and associated financial records, businesses stand to incur expenses significantly more than the components themselves, representing a substantial overhead. By exchanging documents electronically, companies can reduce processing errors and document entry delays while also improving production planning.

Almost any business can save time, reduce cost and improve order accuracy by implementing an electronic order automation method such as electronic data interchange (EDI).

Most leading ERP systems feature an EDI capability that permits the smooth, reliable exchange of transactional documents using an internationally agreed format. Whether provided by the ERP vendor or vendor-approved third party, EDI functions automate the ERP document conversion process into the EDI format and communicate with the other trading partner.

Mouser offers a variety of order automation capabilities suitable for almost any customer, regardless of size, including: simple API integrations; punch-out catalogue provision; and comprehensive EDI solution.

API features provide customers with a flexible and straightforward approach to integrating Mouser product search, order and checkout capabilities into existing internal applications. Using this method removes the need for customer purchasing staff to switch from their procurement system to the Mouser website. Instead, product search and purchasing features become an integral function within the customer's system.

A punch-out catalogue feature enables suitably equipped ERP systems to link directly to the supplier's website and product catalogue without leaving the ERP application. Mouser's team is on hand to provide a solution for companies whose ERP supports this feature, including a checkout option depending on the platform. EDI provides the most sophisticated method of integrating workflow processes with Mouser. Supported transaction types include the EDI standard message types of

Purchase Orders (850), PO Acknowledgements (855), PO Changes (860), PO Change Acknowledgements (865), Advanced Ship Notices (856), and Invoices (810).

Mouser's team can provide advice and guidance on the appropriate order automation implementation for your business. Options include a simple API-based integration within your ordering system, a punch-out catalogue function from your ERP, or a full-featured EDI capability.

Whatever solution you choose, your organisation will benefit. Order automation will ease the burden of handling paper documents and unproductive time resulting from a lack of core procurement processes and systems integration. It will help streamline your operations, reduce transaction processing costs, eliminate order errors and improve overall production planning.

www.mouser.co.uk



Mouser Electronics' technical marketing manager for EMEA, **Mark Patrick**



The electronics industry is an excellent example of the need to remove costs from the administration of purchasing, accounting and logistics departments



In Brief

Cable and connector franchise

Powell Electronics has added WithWave to its European franchise portfolio after signing a full stocking distribution agreement. WithWave is a South-Korean designer and developer of a broad range of RF, microwave and millimetre wave test solutions. The product portfolio includes high speed, high density multicoax cable assemblies, connectors up to 67GHz and more. www.powell-electronics.eu

Investing in custom connector support

With a focus on delivering custom interconnect solutions within a three to 12-week window after initial request, Nicomatic can now offer UK buyers additional support following the relocation of field applications engineer, Quentin Rillié, from its French manufacturing facility to the company's UK operation. www.nicomatic.com

Terminal block snaps into action

A new 36-pole strip-style PCB terminal block from Hylec-APL can easily be snapped to length by hand or with a blunt knife. It is useful and cost-effective for R&D projects and short production runs. The block features professional rising clamp terminals, is rated at 24A/250VAC and is manufactured from UL94-0 flame-retardant polycarbonate. www.hylec-apl.com

Compact display features ZIF connector

GTK has added a new high resolution 10.1in TFT display to its portfolio. It features a low-profile, compact design and uses a MIPI interface for high-speed signalling. The panel displays a WUXGA 1920 by 1200 resolution and has an integral 34 pin ZIF connector, located on the rear. www.gtk.co.uk



RENESAS

Farnell
AN AVNET COMPANY

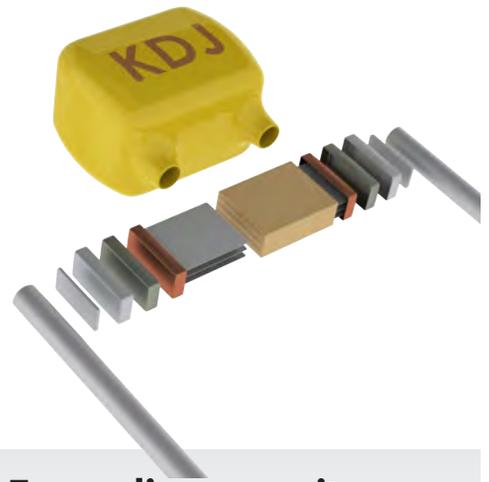
Faster time-to-market

Farnell has increased its semiconductor portfolio following the acquisition of Dialog Semiconductor by Renesas Electronics. The integration of Dialog products lets customers access more embedded solutions for Internet of Things (IoT), Industrial IoT (IIoT), infrastructure and automotive applications. The portfolio showcases Renesas and Dialog's products for embedded processing, analogue, power and connectivity.

Farnell customers can access over 35 Winning Combinations of product packages featuring products from Renesas and Dialog which work together to deliver solutions. Winning Combinations focus on vertical markets including IoT, IIoT, infrastructure, automotive and consumer segments.

Farnell's global head of semiconductors and SBC, Lee Turner, said: "Winning Combinations include product combinations for embedded computing, analogue, power and connectivity. These complimentary products are now available from a single manufacturer, offering our customers faster time-to-market with cutting edge technologies."

www.farnell.com



Expanding capacitance range

Buyers sourcing capacitors for critical applications at high operating temperatures will be pleased to discover the expanding capacitance values of Goldmax ceramic capacitors with radial through hole configuration. The X8L dielectric portfolio in commercial and automotive grade is designed to offer a robust, reliable solution in automotive circuits and general high-temperature applications.

The X8L has a time and voltage-dependent capacitance. Capacitance change in relation to the ambient temperature is limited to ± 15 per cent from -55 to 125°C . Capacitance extensions are available on Goldmax types C320, C322, C323, C326 and C328. The 50V capacitance range is new from $1.2\mu\text{F}$ to $2.2\mu\text{F}$. Lead spacing is 2.54 and 5.08mm.

www.rutronik24.com



Investing in distribution warehousing

Mouser Electronics is continuing to invest in automation in its global distribution centre to increase order processing, accuracy and speed. To date, the company has installed 102 vertical lift modules (VLMs), the most at any company in the Western Hemisphere and the fourth largest VLM installation in the world. VLMs are essentially giant vertical filing cabinets, complete with shelves and an automated elevator to bring the components to the employee's workstation. This increases efficiency and floor space and can reduce an employee's walking time by 45 per cent or more.

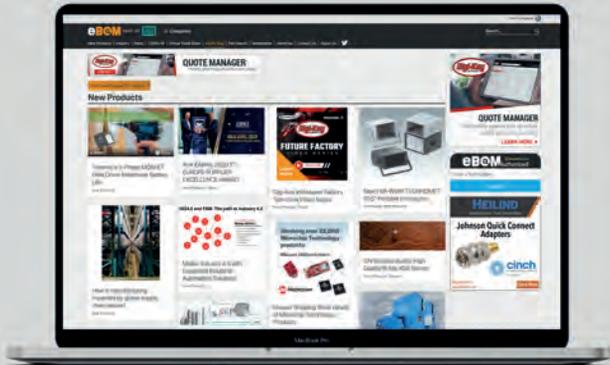
The centre also features Ultipack and I-Pack machines, an automated system for sealing and labelling shipments that can process up to 14 orders per minute. The company is also installing Opex Perfect Pick and AutoStore systems focused on getting orders processed, picked, packed and shipped in a short time.

Mouser's senior vice president of business operations, Pete Shopp, said: "As automation technologies continue to evolve at a rapid pace, so too do advances in warehousing and logistics. The resulting efficiencies in picking and packing help meet our goal of providing exceptional customer service."

mouser.com

eBOM.com

DISCOVER • SOURCE • COMPARE • BUY



Unique Virtual
Trade Show

Latest Electronic
Components

New Products

Search part number -
real time stock and
price check

sign up to our weekly eNewsletter
at <https://www.ebom.com/enewsletter>

Find us on:



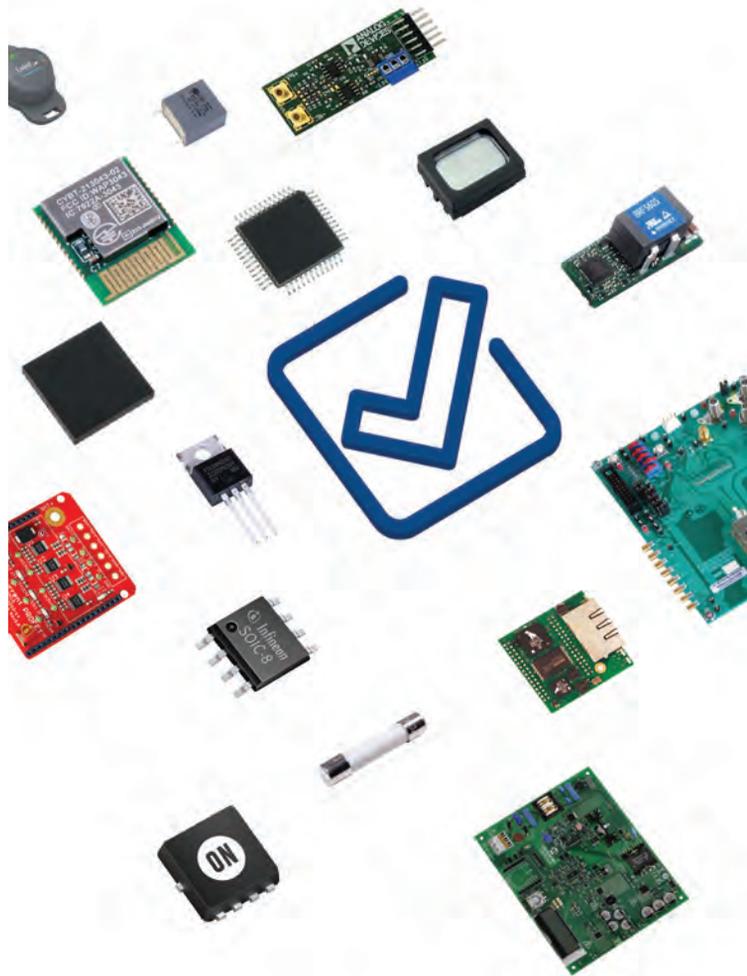
twitter.com/elecbom



<https://www.linkedin.com/company/ebom-com/>

Ensure your products are 100% authentic

Mouser was the first SAE
AS6496 accredited distributor



**MOUSER
ELECTRONICS**

Widest selection of electronic
components in stock
mouser.com/authentic-products

Force that binds innovation together

In this article, Electronics Sourcing's editor, Jon Barrett, explores the concept of innovation and discovers a new UK-based service designed to underpin the process

As a product designer I have had the great fortune of playing a role in many engineering projects which could be described as innovative. For example, I once worked for a robotics company which specialised in solving tough automation problems that other suppliers had walked away from. Innovation, as a value added service, was part of the organisation's DNA. Without going into too much detail, one fascinating project which 'sticks' in my mind, involved temporarily assembling products using ice rather than traditional adhesive. That was fun.

What that role taught me was that engineering innovation is a process, where one specialist team passes the baton to another team as the project proceeds.

Over recent years, almost every step along that process from initial problem identification to manufacturing of the finished project has seen significant progress. As examples: ideas can be virtually explored in software; prototypes can be 3D printed; circuits can be tested in the cloud; finances

can be raised through crowd sourcing; and manufacturing can be outsourced via online marketplaces.

Yet, regardless of this progress, one thing has remained missing: some form of 'glue' to bind this whole process together. Over the years I have pressed hard for different sectors of this industry to take the lead role in underpinning the innovation process. I've asked component manufacturers, distributors, contract manufacturers, institutions, government and academic organisations. They all have the gravitas to achieve this but, when interviewed, they also have legitimate reasons for not accepting the role.

So, against this background, I was pleased to have the opportunity to speak to Anglia Component's about Anglia Unicorn, a dedicated division designed to help technology start-ups get off the drawing board and into the market faster.

Anglia Unicorn was conceived to provide start-ups with the innovative technology ideas they need and offers engineering resources,

evaluation hardware and software tools along with samples from Anglia's world class technology partners, all free of charge.

Anglia Components' chief technology officer, John Bowman, said: "The support offered by Anglia Unicorn has been carefully curated to help technology start-ups and university spin-outs all the way through to venture capitalists, investors and equity funds who are working with technology companies that need help getting to the next level. We want customers to think of the Anglia Unicorn team as their technology adviser alongside their legal and financial advisers. This service isn't a 'one size fits all' solution. We listen to what companies need and provide a bespoke programme to meet those specific requirements."

Although the partnership between Anglia Unicorn and the start-up ideally begins with a concept, in practice, the customer may already have a proof-of-concept based around an off-the-shelf solution such as a credit card sized single board computer or Arduino-



To get technology companies to the next level, support has been curated to help start-ups and spin-outs all the way through to venture capitalists, investors and equity funds

Continues on page 10 →



CML Innovative Technologies Ltd.

69/70 Eastern Way,
Bury St Edmunds, Suffolk,
IP32 7AB, United Kingdom

Tel: +44 (0) 1284 714700
email: uksales@cml-it.com

www.cml-it.com



KITTING FACILITY



STOCK HOLDING



CONTRACT ASSEMBLY



CUSTOM SOLUTIONS



Rebound
Electronics

Not just a warehouse

Our vigorous quality processes are implemented in all our global logistics centers, allowing us to source and deliver the highest quality obsolete products to global customers exactly when they need it, to mitigate issues in their supply chain.

- ✓ Creative Electron Prime X-Ray System
- ✓ Abi Sentry Counterfeit IC Detector
- ✓ Keyence VHX-5000 Series Microscope
- ✓ Baking Oven



www.reboundeu.com



+44 (0) 1635 555999



enquiries@reboundeu.com

ODU CIRCULAR CONNECTORS

⊕ **Push-Pull** locking for a self-securing connection



Contacts for solder, crimp ⊕ and PCB termination

⊕ ASSEMBLY



SECURE CONNECTIONS WITH UNLIMITED APPLICATIONS

ODU circular connectors benefit from Push-Pull locking that secures the connection from unmating. Due to the robust construction and the reliable ODU contact technology, the high performance is maintained through thousands of mating cycles. The Push-Pull product range includes different versions that can be used in a large variety of applications.

⊕ COMPLETE SYSTEM SOLUTIONS

ODU provides pre-assembled component solutions. Our development and manufacturing expertise, combined with our state-of-the-art manufacturing facilities in Europe, China and the USA, enable us to offer our customers outstanding assemblies and a full range of logistics services.

ODU-UK Ltd.
Phone: 0330 002 0640
sales@odu-uk.co.uk
www.odu-uk.co.uk



A PERFECT ALLIANCE.

type platform. Anglia Unicorn is able to offer help regardless of what stage the project is at, they offer start-ups a free confidential consultation where they can discuss the concept, the key project milestones and the ultimate vision for the product. This meeting will yield key technology recommendations to help deliver this vision as quickly, reliably and cost-effectively as possible. This proposal

is backed up with support from Anglia's engineering resource, which includes a skilled and experienced field application engineering team, along with access to other specialisations from the Anglia eco-system if needed.

Unicorn is being introduced at a time during which this industry is reforming around two significant goals: the electrification of the world; and the repositioning of

supply chain resilience over cost alone. The former should drive an explosion of engineering innovations and startups, while the latter should encourage more 'homegrown' businesses to buy into UK-based supply chains and manufacturing facilities. Only time will tell.

www.anglia-live.com/unicorn/

“
Anglia Unicorn offers start-ups a free confidential consultation to discuss the concept, milestones and vision
”



Rittal – The System.

Faster – better – everywhere.

Simple

- Digital configuration
- Consistent data quality
- Intelligent engineering



ENCLOSURES

POWER DISTRIBUTION

CLIMATE CONTROL

Seven steps to specifying metal enclosures

Manufacturers can specify fully customised aluminium enclosures in very small batches. Read on to discover how

Step 1: What is the enclosure for?

Consult a specialist enclosure manufacturer early in the design process to discuss the application and explore options which saves time, budget and stress. The following summarises the main options.

Nineteen inch racks and enclosures comprise standardised floor-standing or desktop mini-racks (typically heights from 3U to 42U) for mounting 19in subracks (84HP), chassis and cases.

Nineteen inch rack cases are equipment housings for mounting in racks (typically in heights from 1U to 9U).

Then comes 10.5in half-width desktop enclosures which are compact standard housings for 10.5in subracks (42HP) and chassis (typically in heights of 3U to 6U).

Desktop and portable instrument enclosures are usually available with or without a tilt/swivel carry handle which acts as a desk stand.

Sloping-front desktop enclosures offer an ergonomically inclined operating front panel for terminals and data-entry.

Finally, wall-mount enclosures, which can also be mounted on machines.

Note that standard enclosures are designed to be versatile. For example, a sloping-front desktop case can be ideal for wall-mount applications such as access control.

Step 2: How will components be mounted?

This consideration is important for installation and maintenance. PCBs that slide in/out on guide rails are faster to install and remove

than boards mounted on pillars. Advanced instrument enclosures such as Metcase's Technomet offer both options.

For 19in rack applications, how will users open the case: via the front, rear, top or base? Will they need access while the case is in the rack?

Step 3: Standard/customised or bespoke?

Customising a standard enclosure is usually quicker and more cost-effective than opting for a bespoke housing. Not always: simple bespoke cases can be cheaper but customised is usually better.

Determined to go bespoke? Ask your enclosure partner about prototyping offers. Combining prototyping with an initial production run can offer exceptional value. Batch sizes can be as low as 10 for larger rack cases or 25 for smaller instrument enclosures.



Custom instrument enclosures



Desktop and portable instrument enclosures are usually available with or without a tilt/swivel carry handle which acts as a desk stand

The new one: the AX/the KX. Opens up perspectives.

The new generation of compact and small enclosures.

Step 4: Which standard model is best?

Most designers take the standard/customised enclosure route. Choosing the right model is critical. Similar looking cases can offer different advantages. Expert advice pays dividends.

Does the preferred standard model offer all the required features? Is it available in a range of sizes? Can it be manufactured to a custom size in all three dimensions? What are the standard ventilation options? Does the enclosure have earthing studs on every panel?

Bezels are key for two reasons: they enhance aesthetics but add cost; they are diecast, usually limiting custom sizes. However, enclosures without bezels don't have to look prosaic. A flat front rack is elegant and offers a customisable enclosure at a sensible price. Metcase's Combimet rack cases are an example.

Step 5: Download a 3D model

Downloading a 3D model of a preferred enclosure helps engineers spot design opportunities or pitfalls early. Specify apertures for controls/

connectors and see exactly how components will look inside.

Presenting your enclosures supplier with a signed-off 3D model shortens the design process and speeds up production. Ask if 3D models are available for every enclosure in the range (as they are for Metcase). You will usually need to register to download the design-protected 3D models.

Step 6: Customising the standard enclosure

Metcase's marketing director, Robert Cox, said: "It makes



Custom 19in rack mount enclosures



Custom 19in rack enclosures



Most designers take the standard/customised enclosure route. Choosing the right model is critical. Similar looking cases can offer different advantages. Expert advice pays dividends

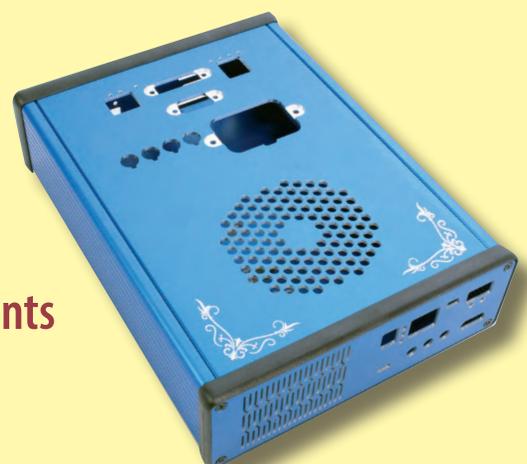


HAMMOND MANUFACTURING®

Ask Hammond to customise any of our 5000+ standard stocked enclosures to your requirements

Learn more: hammfg.com/mods

uksales@hammfg.com • 01256 812812





sense to order your enclosures from a single-source supplier so they're fully customised and with all the accessories assembled. Your housings will be PCB ready when they arrive at goods-in so you can send them straight to your production line."

Metcase's customisation services include: CNC machining (punching, forming, milling, drilling and tapping); fixings and inserts (threaded studs for mounting PCBs, connectors and electronics assemblies); colours including 'always in stock' custom colours, panels, trims, legends and logos. Digital printing's low set-up costs make customisation viable for low-volume orders.

Step 7: Project timings, how long will it take?

Customised standard enclosures will always be the fastest option because the manufacturer can concentrate on the customised parts.

For bespoke housings, finalising the design is usually the longest part of the process. A clear specification regarding component location speeds the process. However, multiple prototypes may be needed, extending timings.

Metcase's project delivery times are typically four to eight-weeks for customised standard enclosures and six to ten-weeks for bespoke projects.

www.metcase.co.uk

19" ENCLOSURES FOR DESKTOP ELECTRONICS

NEW



TECHNOMET 19" CASES

Highly attractive and versatile table-top rack cases for 19" chassis and subracks. Standard heights: 3U, 4U and 6U, painted in light grey or anthracite. Supplied assembled with side handles, chassis supports, ventilation and non-slip feet. Can be customised to your exact requirements.

METCASE ENCLOSURES

Tel. 01489 583858 | www.metcase.co.uk

Ask about your own custom version!



METcase

Digital printing's low set-up costs make customisation viable for low-volume orders

Exclusively sponsored by



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

Battery and chip investment tsunami

John Denslinger explores how downstream demand and the corresponding upstream response is driving levels of investment that were expected but are stunning in their enormity

Investment • By John Denslinger

The magnitude of investment reported over the last few months foretells a cost and market share race among two ultra-critical, technology-driving components: Li-ion batteries and semiconductors. Triggered partly by pandemic consequences, demand from downstream manufacturers across all market segments exploded, challenging the best supply lines. That situation set the upstream response: a global investment tsunami in new production capacity and all-out research.

One can't help think the investment might also be linked to another factor as well: brand survival and the need to invest or perish. Batteries, for example, occupy the position as the most expensive component in EVs at a cost of \$7,000 to \$20,000 according to Beroe Inc, a provider of procurement intelligence. Above and beyond the usual avid consumer demand, mandates from governments and environmentalists worldwide greatly accelerated adoption timelines forcing critical investment in EV battery production now. It was expected at some point, but the enormity is stunning. The price tag to build a Li-ion battery facility is somewhere above \$2B depending on number of lines and gigawatt hours (GWh) of installed capacity. Given the range variation, installed GWh capacity seems a better metric for comparison. A research paper *Applied Energy, Volume 286, 116499*, dated 15 March 2021, indicates LG Chem will have an installed capacity of 189GWh, CATL at 113GWh and Tesla at 102 GWh at the height of their currently announced investments. Seven other third party suppliers will contribute another 200GWh of available capacity within the same timeframe.

Since that paper was released six months ago, key automakers have moved aggressively forward with plans to build in-house Li-ion battery capacity adding to the already large 3rd party tsunami. Volkswagen announced intent to buy and build additional EV battery facilities in Europe delivering 240GWh capacity before the end of

the decade. Toyota revealed its plan of 200GWh internal battery production by 2030 as well. Assuming an operating factory costs about \$50M/GWh, Volkswagen and Toyota will spend in excess of \$20B in that horizon. GM and Ford said they will build their own battery factories, most likely rivalling installations of VW and Toyota.

With 65 per cent of the Li-ion battery as material cost, research is center stage. Trials continue on lower cost lithium and cobalt substitutes and alternatives like solid-state. Processing operations are being further groomed to optimize battery performance. The cost of the current Li-ion battery pack is around \$140/kWh, but to effectively replace the internal combustion engine (ICE), \$100/kWh level must be achieved. Who can argue the company achieving that goal will have a significant competitive and brand edge?

Now, let's talk chips. They may be small, but future investment seems to dwarf all the EV Li-ion battery investment discussed above. First, TSMC announced \$100B in fab expansion over the next three years. That was followed by Samsung's plans to invest a significant portion of \$205B (also over next three years) in fab and chip manufacturing with \$17B of that amount earmarked for a USA chip manufacturing plant. Intel followed with plans to spend \$95B over the next decade with two new factories in Europe and \$20B more for two new factories in Arizona. This is only the tip of the iceberg with many smaller companies committing to substantial capacity expansions as well.

Collectively, the investment numbers funded solely by private enterprise are staggering. It's a tsunami the industry rarely sees. None the less, supply constraints will continue for some time as there's no magic panacea for growing capacity of either in the short term.



The World's Largest Selection of Electronic Components & Automation Products for Immediate Dispatch. **VISIT DIGIKEY.CO.UK TODAY!**



TrustedParts.com

Built by the companies you know and trust.



- ✓ Best defense against counterfeit components
- ✓ Proper packaging and handling
- ✓ Fully warrantied and supported by the manufacturer

FACTORY
AUTHORIZED

Search authorized distributors at  [TrustedParts.com](https://www.TrustedParts.com)

Unite around a collaborative supply chain

FermionX' supply chain manager, Dan Haines, highlights how opportunistic the distribution marketplace has become and then offers solutions

Component prices have risen dramatically over the last 12-months. Increasing demand and lack of availability has led many distributors to increase prices accordingly, knowing many manufacturers have no choice but to pay.

But how honest are these distributors being? A new trend is emerging, where advertised stock levels are often false or massively inflated. These distributors seemingly have no intention in keeping stock levels accurate on their online portals. Instead, they're continuing to advertise non-existent stock to help drive traffic and enquiries.

As manufacturers, we're also finding distributors are consistently asking us to commit to higher, longer-term scheduled orders to release quantities of existing stock to satisfy (sometimes only partially) short-term supply issues.

The underhand tactics used by some distributors merely highlight the lack of loyalty shown to existing customers. We're seeing distributors claim

all current stock is reserved for existing customer demand. However, they're prepared to release some of that stock if we commit to longer-term schedules. If true, this means the stock reserved for their existing customers is being used to fulfil our demand, leaving the original customer short.

Do we want to engage in this kind of activity when we're all working hard to ensure the UK electronic manufacturing industry gets back on its feet after 18-months of uncertainty?

Adding to this, distributors rarely update customers when stock availability or delivery dates against an existing order change, leaving many businesses expecting delivery and planning manufacture around phantom delivery dates. This creates a knock-on effect for their customers, who are let down when stock doesn't appear.

The only people benefitting from these tactics are distributors and their finances.

So, what can we do as an industry? How can we support

one another to ensure stock availability without effectively pinching it from someone else's order?

FermionX has always been proud of its supply chain management, employing a dedicated team which works hard to manage customer expectations. We don't want to see that slip and we don't want to let anyone down. Thus, the company is diverting requirements to more trustworthy sources where possible and working closely with customers to forward plan. We're also looking at our business model to reduce the burden of cost on our customers.

Now is a time for CEMs to work collaboratively by sharing information on excess stock which may benefit other manufacturers. Let's unite around this rather than falling for distributor tactics which leave us all fighting in the dirt.

Dan invites CEMs to discuss working collaboratively by calling on 01903 524600 or email danhaines@fermionx.com.

www.fermionx.com



FermionX' supply chain manager, Dan Haines



Increasing demand and lack of availability has led many distributors to increase prices

**B.E.C
GROUP**

Plastic Injection Moulding & Tooling
www.becgroup.com
01425 613131

BESPOKE ELECTRONIC ENCLOSURE MANUFACTURE

CUSTOMISE SHAPE, SIZE, COLOUR, FINISH AND BRANDING FOR YOUR ELECTRONICS ENCLOSURES

- IN-HOUSE ASSEMBLY
- ISO 9001 CERTIFIED
- SMALL BATCH TO MASS PRODUCTION
- RELIABLE AND PUNCTUAL DELIVERY

Lean systems improve purchasing processes

Incap Electronics UK's technical director, Dave Elms, shares how the company is enhancing its material in-feed, storage and kitting processes

The rapidly changing business environment over the last 18-months has encouraged companies to constantly review their processes, aiming for a lean journey that improves the overall material receiving, storing and kitting operations, resulting in a more efficient, flexible and agile organisation.

Working from its Newcastle-under-Lyme factory, Incap mainly operates in the lower volume, higher mix environment, regularly changing production runs daily.

Technical director, Dave Elms, said: "At Incap we analyse all aspects of material flow and it was apparent significant improvements could be made

by restructuring the warehouse with a lean material flow as the goal." This has led to better visibility, reduced binning away times, improved kit picking times and increased space to accommodate growth.

"Quickly processing production kits is paramount to the overall operation and ensuring our MRP system data is up-to-date."

To this end, the company has invested in an X-ray counting machine to help the factory ensure inventory counts are accurate, while part-used reels, tubes and trays are quickly counted and placed in stock or awaiting kits.

Elms added: "This process has improved our overall stock integrity, removed human error and eliminated the time-consuming task physically counting remaining parts on a reel."

In addition, the process has helped Incap accurately appraise customers' free-issue kits, while also letting the organisation verify delivered quantities, in many cases without opening the original packaging. This highlights any parts that have been shipped short of the expected quantity.

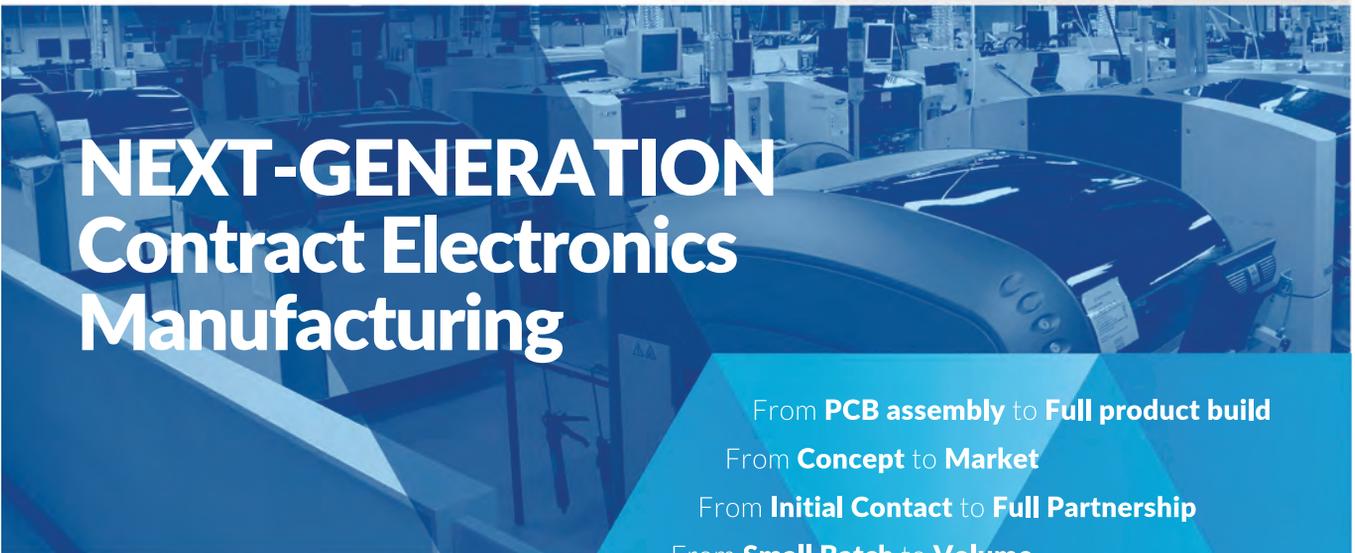
www.incapcorp.com



Nordson Assure X-ray component counter



01438 346600
www.nemco.co.uk



NEXT-GENERATION Contract Electronics Manufacturing

- From **PCB assembly** to **Full product build**
- From **Concept** to **Market**
- From **Initial Contact** to **Full Partnership**
- From **Small Batch** to **Volume**
- From **Prototype** to **Production Ready**



How do OEMs choose the right CEM?

In this article Peter Shawyer guides OEMs through the process of matching their organisations to their ideal CEM partner

Over two hundred CEMs operate in the UK, delivering more than £2.3 billion of electronic products. The terms CEM (contract electronics manufacturer) and EMS (electronic manufacturing services) are interchangeable and used to describe organisations that provide outsourced manufacturing services to OEMs (original equipment manufacturers).

The CEM sector is pyramid shaped, with a few large organisations, a greater number of medium sized companies and a large band of small businesses. So, faced with this choice, how do organisations looking to outsource manufacturing select the right partner?

The relationship between OEM and CEM is a partnership. To be successful, both parties must work closely to understand each other's strengths and foster a good fit. The OEM should scorecard the attributes they require with weighting specific to the OEM and influenced by its organisational structure and markets served.

An OEM should ask itself the following six questions:

Firstly, does the organisation have sufficient internal engineering resource or should the CEM provide expertise in design, production engineering and alternative component selection?

Are the products mature, requiring few amends/ up-issues or are they new and requiring changes and enhancements over time?

Is product demand easily forecast and planned for or will the CEM need to assist with short term dynamic scheduling and buffer stocks to help smooth supply requirements?

Is the CEM a good fit size-wise. Will the OEM be a small fish in a big pond or vice versa?

How agile is the CEM, how quickly can it respond to changing requirements?

Finally, does the CEM have knowledge and experience in the vertical markets the OEM operates in?

In addition to these specific questions, there are standard factors to consider such as financial stability, industry approvals, quality standards and price competitiveness. These days, location is less of an issue as technology and logistical advances have reduced the need for a CEM and OEM to be geographically close.

Other important but intangible qualities include problem-solving skills. An example would be a CEM taking the initiative to modify a product or process to avoid product failures and scrapped components.

The last two years have seen a seismic shift in the business environment which has impacted UK manufacturing. This will have resulted in a review, and possibly a reshuffle, of these-priorities. For example, financial stability, agility and procurement/logistics expertise have become even more important.

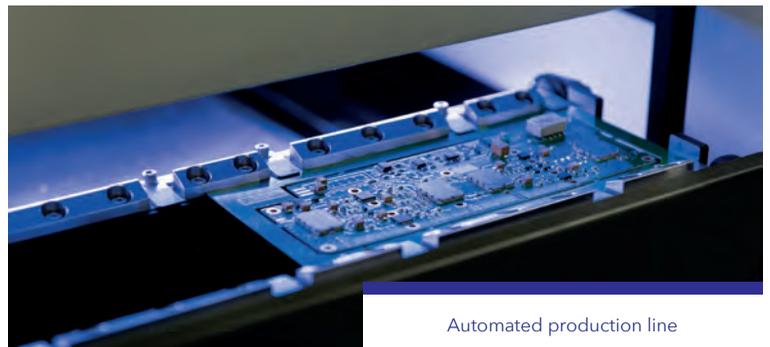
The process of selecting the right CEM shouldn't be underestimated. A mismatch will be painful for both parties. As a CEM with over 40-years' experience, Texcel can identify the right fit and makes a large upfront investment onboarding new OEMs and integrating their people, processes and products into the organisation.

So, if you are an OEM looking to outsource your manufacturing, make sure you invest time up front to think about what you need from the OEM/CEM partnership. It will pay dividends in the long term.

www.texceltechnology.com



Peter Shawyer: Commercial Director



Automated production line



Testing and Inspection



We're proud to play our part in keeping the UK electronic manufacturing industry moving



FermionX provides a full range of CEM services and processes, right here in the UK.

Our customers rely on our strength of supply chain and obsolescence management *now more than ever.*

Get in touch today

Tel: +44 (0)1903 524 600
Email: sales@fermionx.com
www.fermionx.com/ECS

The background of the advertisement features a blue-tinted image of a hand using a soldering iron on a printed circuit board (PCB).

PHOENIX
SYSTEMS UK LTD

**CONTRACT ELECTRONIC
MANUFACTURING SOLUTIONS**

| Your Design > Our Expertise |

- PCBA/CABLE ASSY
- BOX BUILD
- CONFORMAL COATING
- X-RAY
- VIBRATION TESTING
- COMPLEX TEST SOLUTIONS
- ESS-LN2

AS9100D
CERTIFIED
ISO 9001

JOSCAR
REGISTERED

sales@phoenixsystemsuk.com | 0845 658 6111
www.phoenixsystemsuk.com |

Sourcing enclosures that perform without compromise

BEC Group's sales and new business manager, Holly Cummins, encourages readers to investigate the benefits of bespoke plastic injection moulded enclosures

The first port of call for electronics enclosures is usually standard project boxes. Although these provide a quick, low-cost solution they always involve a compromise: shape, size, colour, IP ratings, specifications of flame retardancy, hole pitching for fixings, the list goes on.

On the other hand, bespoke plastic injection moulded enclosures allow complete

customisation, utilising heat, shock, water and dust resistant thermoplastics to exacting specifications. Customers can design enclosures to perfectly fit circuit boards, batteries, connectors and fixings in the precise colour, shape and size they wish.

Metallic coatings such as nickel, silver and copper can be applied post-production for EMC/RFI shielding.

Attractive branding options, such as embossed logo inserts, offer cost effective methods of differentiating products from competitors.

A design for manufacture consultation is key for streamlining a bespoke enclosure, highlighting inefficiencies, reducing costs and giving the buyer exactly what they need.

www.becgroup.com



BEC Group's sales and new business manager, Holly Cummins



Bespoke plastic injection moulded enclosures allow complete customisation



corintech

ELECTRONICS

www.corintech.com info@corintech.com

DESIGN & MANUFACTURE

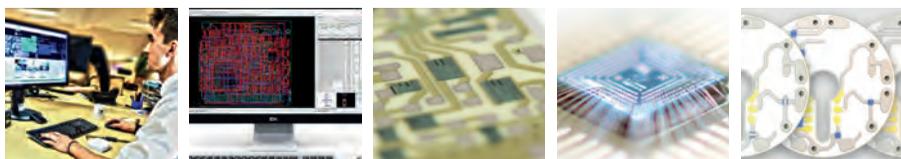
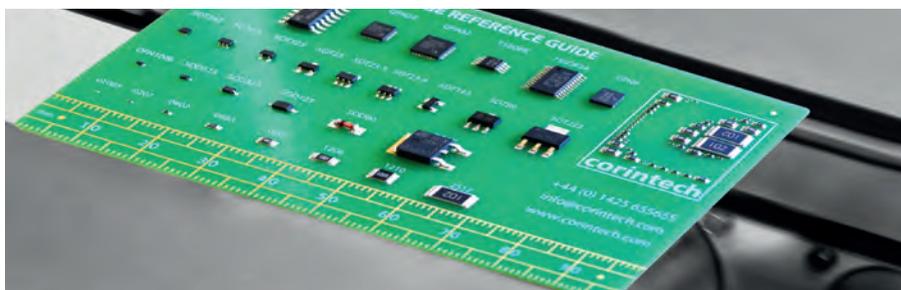
+44 (0)1425 655655



Experts in Electronics

Improved Quality • Lower Cost • On-Time In-Full Delivery

Three reasons to choose and stay with Corintech.

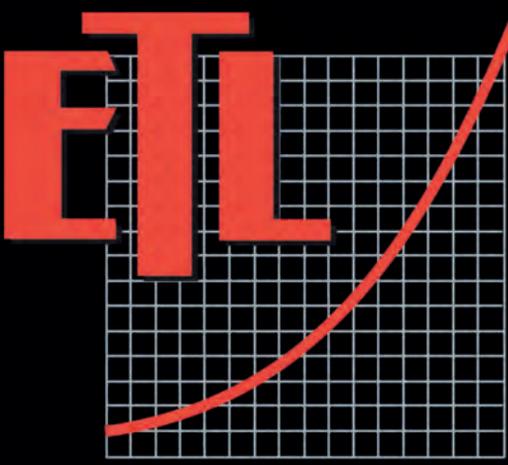


ELECTRONICS MANUFACTURE

- Component sourcing
- PCB assembly
- Hybrid microcircuits
- Full product assembly
- Rapid UK and scalable offshore production
- Flexible stockholding and supply
- AS9100, ISO 9001, IPC, J-STD

ELECTRONICS DESIGN

- Advanced electronics engineering
- PCB layout
- 3D CAD
- Design for manufacture
- Wireless and IoT integration
- Software and firmware development
- Cloud service and app development



Top flight electronic manufacturing
www.etluk.co.uk






49 years
in PCB
industry

GLOBAL PCB SUPPLIER

UK engineers working directly with
 low-cost, established manufacturing
 facilities in Shenzhen China

TATECIRCUITS.COM

Excellence in Electronic Manufacturing

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

We pride ourselves on delivering:

- First-class customer service
- Extensive supply chain capabilities
- Flexible and collaborative approach

Contact us to find out how we can meet your CEM needs today!



+44 2380 455 411
 sales@espritelectronics.com
 espritelectronics.com



Collaboration: from manufacturer to end user

NOTE Windsor's logistics manager, Brendon Jones, explores some of the key challenges facing the electronics industry from accurate stock information to reel recycling

The last two years has seen every aspect of electronics manufacturing face challenges from material availability, cost and lead time to logistics and communications. Ever-increasing demand for new and improved electronic products, coupled with exceptional events including factory fires and labour restrictions, have led to increased costs and extended lead times.

Such factors have led some OEMs to depend on the component manufacturing sector to flex its muscles in securing as much supply as it can, in an already constrained market.

Another knock-on effect of rising demand was the increase in warehousing required to process large shipments from the manufacturers to the smaller shipments required for each of the distributors' customers. This impacted franchised distribution's ability to communicate accurate availability and delivery information in a timely manner.

Most buyers have little or no influence over these issues, so making use of supply chain relationships fostered over many years is key to providing as much accurate information as possible for planning production output and meeting customers' expectations.

An increasingly important tool is the distributor's website. However, in current times this information is

often out of date within hours, particularly regarding available stock and open order book delivery information. In a world reliant on information, it is critical that information is updated daily, if not hourly. One supplier offers information so current we can respond to changes promptly and minimise the impact on customers. More of this throughout industry would make reaction and planning far more effective. This does not remove the need for direct communication. The personal touch is important given distributors are our bridge to manufacturers. However, a fully functioning website reduces emails and saves time.

Live data also reduces RFQ noise in the market. Previously, polling all our independent suppliers created fictitious demand which consequently drove up prices, particularly on the commodities most affected by circumstances mentioned earlier. By limiting RFQ output to a few trusted independents we can get the best availability and price.

Another aspect which is increasingly difficult to manage is recycling the plastic reels and trays components are packaged on. Unlike plastic trays that are easily recycled, by the nature of the cleaning process and type of plastic, reels are not readily recycled. Farnell had implemented a recycling programme however, following the pandemic restrictions, the

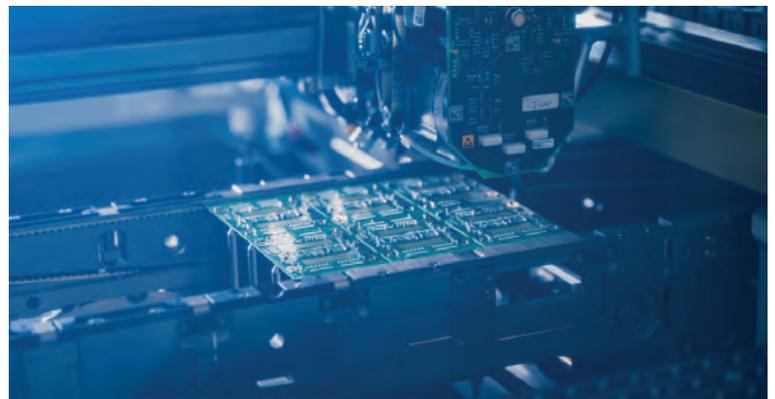
service was suspended and there doesn't appear to be another operator. It would be useful if the industry could establish a programme where reels could be recycled back to manufacturers to minimise waste.

These challenges are not issues any one part of the supply chain can fix. Working together we need to find more collaborative solutions, from manufacturer to end user, to overcome these.

www.note-uk.co.uk



NOTE Windsor's logistics manager, **Brendon Jones**



NOTE™

YOUR MANUFACTURING PARTNER

HOW MUCH MORE COULD YOU SELL IF YOU HAD A FLEXIBLE PARTNER?

NOTE Group offer three flexible manufacturing locations in the UK, Windsor, Stonehouse and Haddenham.

- Flexible Product Fulfilment Solutions
- Global Network of Manufacturing Locations
- Product Lifecycle Management
- Development & Engineering Collaboration
- Flexible Supply Chain Solutions



MEDTECH



INDUSTRIAL



COMMUNICATION



GREENTECH

- Committed
- Proactive
- Quality Focused
- Flexible

To discuss your manufacturing requirements
call Andy Thwaites on 07766 311419
or visit www.note-uk.co.uk for more information



Counterintuitive solution to PCB shortages

Offshore Electronics' purchasing director, Paul van der Tang, explains why the company decided to sign a sole-source agreement with NCAB Group for its PCBs

Raw materials required to manufacture semi-conductors and printed circuit boards have been running low for some time. In response, Guernsey-based contract manufacturer, Offshore Electronics, has taken the counterintuitive step of signing a sole-source agreement with NCAB Group to manage its own PCB supply.

What brought about the agreement? Offshore has closely worked with NCAB Group over the past decade and the company has always performed exceptionally well when sourcing PCBs. This became especially clear over

the last 18-months in the face of unprecedented pressure. The team's determination and transparency made it much easier for Offshore to communicate with customers and fulfil their orders in difficult circumstances. So, it seemed natural for Offshore to direct all its PCB procurement through NCAB.

Offshore has benefited from consistent pricing and stable lead times over the last 18-months, in large part due to NCAB's network of manufacturing facilities across the world and its ability to change factories when required. This allowed

Offshore to complete orders on time and create savings that have been passed on to customers. While expectations have had to be adjusted, this consistency has ultimately kept disruption to a minimum.

The raw material price of copper remains high and demand is still increasing across the globe for manufacturing and this is expected to continue for some time. NCAB is currently providing Offshore with both stability and competitive pricing.

www.offshore-electronics.co.uk



Offshore electronics, purchasing director, Paul van der Tang



Raw materials required to manufacture semi-conductors and printed circuit boards have been running low for some time

4783

IEC appliance inlet with V-Lock

- Prevents unintentional removal of power
- Simple cable assembly
- Rewireable
- Halogen free

+44 1296 319 001
sales.uk@schurter.com
schurter.com/v-lock

SCHURTER
ELECTRONIC COMPONENTS

Kemtron
Proven EMC Shielding Performance

RFI/EMI shielding

Trust Kemtron for high performance RFI/EMI shielding for extreme climatic, environmental and operational conditions.

Manufacturers of RFI/EMI Shielding Gaskets & Components

ENQUIRE TODAY OR REQUEST A VIDEO CALL

Our dedicated manufacturing facility and team produce materials and components to your needs.

+44 (0)1376 348115 | info@kemtron.co.uk
www.kemtron.co.uk

tioga

25 years of manufacturing excellence



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.



Tioga is Celebrating 25 Years with the Grand Opening of the Tioga Lounge!

With a strong focus on Mental Health & Wellbeing at Tioga, we have created space for our people to relax, chill and enjoy

quiet time or play a few games of pool, table tennis, darts and much more during their breaks, lunch and after work.

 This month we have raised £6,472 for breast cancer awareness, a fantastic achievement to everybody involved!

Visit our Website to view our New Corporate Video.
www.tioga.co.uk

ten reasons to team up with tioga

- State Of The Art Electronic Assembly
- 4 Fully Automated Mycronic SMD Production Lines
- BGA, μ BGA and Complex Technologies
- EKRA X5 Screen Printers / Mycronic MY700JX Jet Printer
- Large Board Capability 560 x 600mm
- Nikon XTV 160 X-ray with Laminography
- ISO 9001 / ISO 13485 / ISO 14001
- Full Turn Key Solution / Boxbuild
- Wide Ranging Expertise
- Design Partnership



t +44 (0) 1332 360884
email sales@tioga.co.uk

<http://www.claytoncreative.co.uk>

tioga
electronic assembly
PART OF SYMPATICA GROUP LIMITED

Finding the right CEM partner

In this article Esprit Electronics helps OEMs understand the benefits of a CEM partnership and appreciate the differences between UK based CEMs

Whether an OEM is looking to out-source for the first time, change partners or dual-source, it is essential to get the decision right following careful consideration. Read on to discover the four key benefits of working with a CEM, followed by nine important considerations.

The first benefit is reducing capital expenditure. The equipment needed to manufacture at scale is a huge investment, not to mention servicing, maintenance and upgrades. To keep pace with the industry's rapidly changing technology requires constant investment in new equipment. CEMs cover all

this for the customer, who only pays for the service and products they receive.

Second comes reducing operational expenditure. Using a CEM, an OEM also saves on overheads including rent, heating, lighting, electricity, staff and training. This is significant in cost and effort. Consider the time and energy needed to find and manage the right people.

Third is reducing stock costs and risk. A rule of thumb is that 60 to 70 per cent of product cost is materials. Not having to hold stock is a huge cost saving. Working with a CEM, OEMs only buy what

they need, when they need it. CEMs will have excellent relationships with their distribution network and may have greater buying power. So, the OEM should save on stock purchasing too. Using a CEM will free up cash that would otherwise be tied up in inventory.

The final key benefit is added value. CEMs often provide a design for manufacture service, where they advise on changes to an OEM's product that will save time and money. The OEM gains the CEM's experience, knowledge and relationships, on top of the manufacturing benefits.



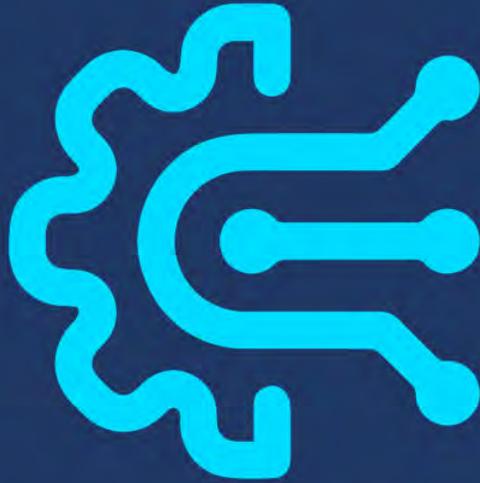
 sellectronics

Helping you assemble
the future

We offer all your electronic requirements
from quick turnaround prototyping
through to complete box build services.

Sellectronics Ltd
Church View Business Park
Falmouth, Cornwall TR11 4FZ
T: +44(0)1326 450393

info@sellectronics.co.uk
www.sellectronics.co.uk



M-Tek

ASSEMBLY LTD

Your PCBA UK Fast Response Prototype Task Force



Contact Us

M-Tek (Assembly) Ltd
Unit 18, Stadium Way
Reading
Berkshire
RG30 6BX

Tel +44 (0) 1189 455 377

Sales enquiries@mtek.co.uk

www.mtek.co.uk

Having identified the benefits of a CEM partnership, then comes the process of finding the right manufacturer. 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 a CEM that is an expert, covering all the solutions required now and in the future. OEMs should choose a partner that will grow with them, not hold them back. For example, conformal coating isn't provided by all CEMs. If this is critical, seek a manufacturer with this capability.

Certifications and accreditations: Do products need to meet industry standards and accreditations. Make a note of the accreditations required and consider providers who can meet these requirements.

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

Size: It is vital to select the right size CEM. Most customers don't want to be more than 20 per cent of their CEM's turn-over. Less and they may feel that they don't receive the best customer service, more than 20 per cent and there is a risk that they are too reliant on the business.

Investment: The electronics industry moves fast, so a CEM should commit to continually investing in their equipment, training and technology to ensure the best output.

Stability: This covers two aspects, is a CEM financially stable, profitable and can

demonstrate growth, and is it well established.

Technical support. The best CEMs provide solutions to problems. Especially in the current market where there is huge pressure on the supply chain, look for a partner who can provide options and advice when needed most. Case studies, testimonials and recommendations are the perfect place to seek these out.

Partnership: The best relationships are established when the customer sees its CEM as an extension of its own business. A good CEM will be flexible, quick to respond and provide excellent customer service to ensure a high-quality output with on-time delivery.

Recommendations: Seeking recommendations is a good way to find the perfect partner.

www.espritelectronics.com



**Your
Electronic
Design &
Build Partner**
From PCBs to Full Box Build

Over **42 years**
of UK manufacturing

Call us on **01322 621 700**

**Texcel
Technology** Electronic
Manufacturing
Solutions

www.texceltechnology.com

Why manufacturers need to rethink supply chain practices

Tanaka Precious Metals' vice president, William Crockett, argues that manufacturers need to pivot their supply chain management in the face of chip shortages

We're 18 months into the Covid-19 pandemic and almost no part of the semiconductor supply chain has returned to any semblance of 'normal'. In fact, the supply chain remains in crisis mode—and it's hurting manufacturers desperate to deliver goods and products.

Manufacturers that need semiconductors are dealing with what seems like endless problems. Factories in Malaysia—a critical hub for semiconductor

production—aren't operating at full capacity due to government-mandated factory closures and the Singapore-Malaysia border closure. Price increases for chips in short supply are forcing manufacturers to hike operational and product costs. Dozens of container ships backed-up off Southern California ports are creating supply chain bottlenecks.

With the chip shortage expected to continue

until at least 2022 and semiconductor lead times recently climbing to a staggering 20.2 weeks, manufacturers need to retool their supply chain practices and the way they source precious metals to push production forward.

Issues are a given for the current semiconductor supply chain, but adjustments can be made to ensure business continuity. The following are two practices which can be implemented to make



Tanaka Precious Metals' vice president, William Crockett

Supply chains will be indefinitely unpredictable, making agility crucial to continue operations as a manufacturer



- 131 STAFF & 35,000 sq ft PREMISES INCLUDING 3 CLEANROOMS
- 6 SMT LINES PLACING 01005, BGA's CSP's DAILY
- RAPID PROTOTYPING FOR DEVELOPMENT PCBA
- ASSCON VP6000 VACUUM ASSISTED VAPOUR PHASE REFLOW
- MULTIPLE KOH YOUNG 3D AOI & TAKAYA FLYING PROBE TEST SYSTEMS
- DAGE QUADRA 5 X-RAY & CT SCAN SYSTEM
- SONOSCAN GEN7 SCANNING ACOUSTIC MICROSCOPE
- LASER PCBA DEPANELING
- 6 AUTOMATIC WIRE BONDRERS COVERING Au BALL / WEDGE & AI WEDGE
- K&S ASTERION AUTOMATIC HEAVY GAUGE AI & Cu WIRE/RIBBON
- 4 AUTOMATIC DIE BONDRERS USING EPOXY, EUTECTIC & SILVER SINTER
- SILVER SINTERING SiC & GaN PROTOTYPE AND PRODUCTION PROCESSING
- APC15 @FutureBEV PROJECT WORKING WITH BMW ON AUTOMOTIVE BATTERY ELECTRIC VEHICLE (BEV) ELECTRONICS
- ISO9001, ISO13485, AS9100 & CYBER ESSENTIALS ACCREDITED



www.cil-uk.co.uk
sales@cil-uk.co.uk
 Tel:- 01264 321321



semiconductors supply chains more agile.

Firstly, consider dual sourcing. Relying on a single source for materials and equipment can be a critical blow to operations during this chip shortage. If a supplier needs to shut a factory due to rising Covid-19 cases or has too many back orders to fill, customers may be forced to halt their operations completely.

To ensure continued operations, dual source with another supplier. Even if a buyer only sources a small percentage of materials from a second partner, they have another supplier available in case of emergency. Also partner with suppliers that provide proactive communication about their operations—buyers should be receiving

a scheduled status update every two weeks and real-time updates for any delays or emergencies.

Secondly, find partners with onshore and offshore distribution. Most conversation about the chip shortage has focused on manufacturing delays for current products. However, the lack of materials also hinders research and development efforts. With a supplier that operates completely offshore, you run a greater risk of shipping delays. Without even a small amount of materials, you can't test chip designs for new products, which can set back timelines.

To continue R&D efforts, consider partnering with suppliers that operate onshore and offshore distribution. Although a supplier may not possess

most of its material stock onshore near your locations (eg there's a smaller supply of precious metals in North America v Asia), you can still use this source for IC tape-outs and prototype assembly. Ensuring new products are tested and ready for production can set a company apart from competitors that are solely focused on current supply chain production.

The light at the end of the chip shortage tunnel is still far away. Supply chains will be indefinitely unpredictable, making agility crucial to continue operations as a manufacturer. To succeed in this difficult period, set up for business continuity through dual sourcing and use onshore distribution to continue R&D projects.

tanaka-preciousmetals.com

“
We're 18 months into the Covid-19 pandemic and almost no part of the semiconductor supply chain has returned to any semblance of 'normal'
”

Contract Electronics Manufacturer



Successfully supporting the Aerospace & Defence sector since 1994.



CHALLENGER
 AEROSPACE & DEFENCE

+44 (0)1245 325252
 sales@challengersolutions.com

challengersolutions.com



... YOUR PARTNER IN CONTRACT ELECTRONIC MANUFACTURE



IEW are a sub-contract electronic manufacturing house based in Swindon and have been supplying the medical and scientific industry for over 35 years with a highly trained workforce of over 60

Thinking of Reshoring?
Avoid delays. Manufactured in the UK

- We build:**
- Box and panel builds
 - Plc controllers
 - Cable assemblies
 - Wiring looms and harnesses
 - Pcb's

Based on customer specifications

CONTACT US TODAY TO DISCUSS HOW OUTSOURCING CAN HELP YOU

Tel: 01793 694033
 Email: sales@iew.co.uk





TrustedParts.com

Genuine electronic components from
only authorized sources.

Enter a component part number



54B+

PARTS
IN STOCK

25M+

UNIQUE PART
NUMBERS

4K+

LEADING
MANUFACTURERS

2.3M

USERS
PER YEAR

120M

SEARCHES
PER YEAR

ALWAYS REAL-TIME PRICING AND AVAILABILITY

Search authorized distributors at  **TrustedParts.com**

CEM

Map of UK



Custom Interconnect
Andover
01264 321321
www.cil-uk.co.uk

Challenger Solutions
South Woodham Ferrers
01245 325252
www.challengersolutions.com

Industrial Electronic Wiring Ltd
Swindon
01793 694033
www.iew.co.uk

Sellelectronics Ltd
Falmouth
01326 450393
www.sellelectronics.co.uk

Esprit Electronics Limited
Hamble
02380 455 411
www.espritelectronics.com

InCap
Staffordshire
01782 753200
www.incapcorp.com

Texcel Technology
Dartford
01322 621700
www.texceltechnology.com

B.E.C Group
New Milton
01425 613131
www.becgroup.com

Corintech Ltd.
Fordingbridge
01425 655655
www.corintech.com

Nemco
Stevenage
01438346600
www.nemco.co.uk

Tioga electronic assembly
Derby
01332 360884
www.tioga.co.uk

M-TEK
Reading
01189 455377
www.mtek.co.uk

NOTE Windsor
01753 746700
NOTE Stonehouse
01453 797580
www.note-uk.co.uk

FermionX Ltd.
Worthing
01903 524600
www.fermionx.com

Phoenix Systems
Fareham
08456 586111
www.phoenixsystemsuk.com

Electronic Technicians Ltd
Wimborne
01202897722
www.etluk.co.uk

Tate Circuit Industries
Lichfield
01543 622435
www.tatecircuits.com

INCAP

FULL SERVICE PROVIDER IN ELECTRONICS
MANUFACTURING SERVICES

FAST TRACK

The fast response you need to complete your prototype or pre-production build on time.

Rapid PCBA prototyping and small batch assembly with an extremely fast, accurate and reliable service. Fast Track builds typically within 3 to 14 working days depending on complexity.

Quick turnaround cable assembly service.



**DEDICATED FAST TRACK
LINE AND TEAM**



**PROJECT QUOTED AND
PROJECT BUILD**



**FLYING PROBE TEST AND
X-RAY ON SITE**



**FREE OF CHARGE PCB TOOLING
(SUBJECT TO T&C'S)**



CorporateLiveWire

**INNOVATION
& EXCELLENCE
AWARDS 2020**

Incap Electronics UK

2020/21 Award Winner

**Most Innovative Electronics
Manufacturer | Europe**

CONTACT US:

fast-track@incapcorp.com

+44 1782 753200



[INCAPCORP.COM](http://incapcorp.com)



Fast, secure connections

Cliff Electronics is offering a range of single-pole spring terminals designed to provide simple, fast and reliable connections. Applications include professional and consumer audio systems, test/measurement instruments, power supplies, industrial equipment and pyrotechnic installations.

Terminal spindles and mounting hardware are manufactured from solid brass and nickel-plated. Plastic parts are moulded from glass reinforced nylon or polypropylene and mounting hardware is normally supplied unassembled. All are rated at 48V, 1A.

Cliff Electronics' general sales manager, Dan Walker, said: "Single-pole spring terminals are used in a huge number of applications where fast, and often repeated, connections have to be made quickly and reliably. We can supply a range of mounting options to allow system designers and panel builders to find the best fit for their needs."

www.cliffuk.co.uk



Mezzanine connectors target high-density industrial

Harwin has announced the Archer .8 series. With a 5mm stack height, these dual-row 0.8mm-pitch board-to-board connectors suit applications with limited space and where cost-effectiveness is important. Uses include factory automation, environmental monitoring equipment, smart meters, point-of-sales units, servers/data centre hardware and EV battery management systems.

Each phosphor bronze contact can carry 0.5A. Available in 30, 40, 60, 80, 100 and 120 pin count versions, these connectors are polarised which helps orientation/alignment and prevents mis-mating.

Harwin NPI product manager, Ryan Smart, said: "Archer .8 brings a whole new dimension to our industrial connector offering. These components combine the large pin counts and attractive price points that our industrial clients expect, as well as featuring the high levels of build quality that Harwin has always been well known for."

Operating temperature range is -40 to 125°C.

www.harwin.com

Simplify safe signal transmission in sensor-actuator applications



Binder is adding further straight over moulded M8 snap-in connectors to the 718 product series. In addition to three and four pins, these are now also available in five and six-pin versions. They are available with either PUR or PVC cables up to 2 or 5m standard length. Customised lengths are available.

Since the locking mechanism does not require any rotating elements, these connectors are particularly easy to handle. While the electrical connection is established by mating and un-mating, the mechanical locking is provided by snap-in elements. These are pushed axially into one another during the mating process and then held in position by spring force.

To release the connection, this force must be overcome and the plug pulled off backwards in an axial movement. As the connector latches and unlatches, a clicking sound will be heard. As a major advantage over screw or bayonet locking, the snap-in technique does not require any rotating elements. This makes the corresponding connectors very easy to handle, an essential requirement for efficient, time-saving installation.

www.binder-connector.com/uk/



PEI-Genesis offers a robust breadth of interconnect solutions from industry leading manufacturers such as:

Amphenol, ITT Cannon, Cinch Connectivity Solutions, HARTING, TE Connectivity, Positronic and Sure-Seal®.

Use code: **FALL10** at checkout to save 10% on all qualifying purchases.

SHOP NOW



AlphaWire at Short Lead-Times

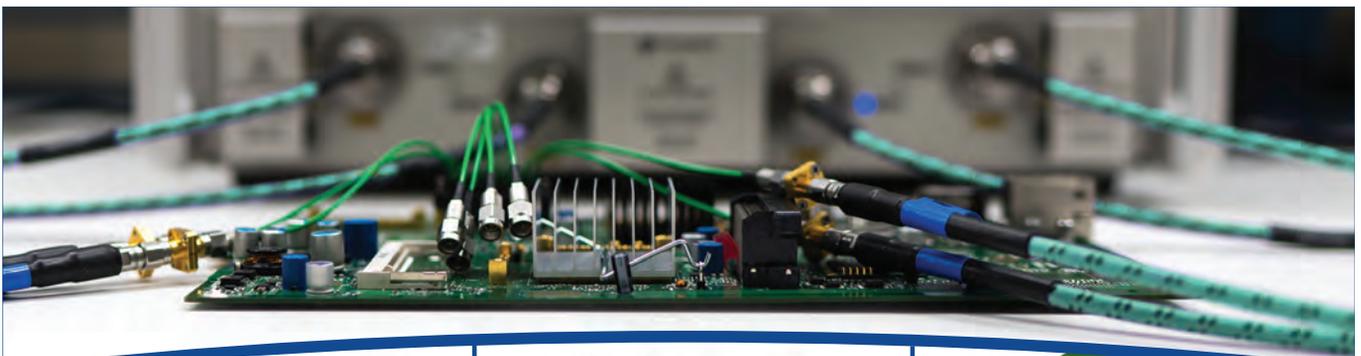
Aerco now offers custom spooled lengths of AlphaWire products from stock

All with UL approval

As the premier distributor for AlphaWire in the UK, Aerco are able to offer access to the complete range of AlphaWire products.



Tel +44 (0) 1403 260206 | Email: sales@aerco.co.uk | www.aerco.co.uk



DESIGN | BUILD | TEST | CERTIFY

Performance with Purpose

CarlisleIT.com |    

Higher density. Lower losses. Higher data rates.
It's precise performance, delivered.

Our CoreHC product family, Card Edge Contact systems, and Gen-Z solutions offer high-density interconnects with lower insertion and return losses at densities as high as 2.5 mm. CarlisleIT leads the way with high-performance interconnect solutions by offering unmatched signal integrity for today's faster and more complex communication systems operating up to 70 GHz.



Lane Electronics is highlighting its Positronic industry standard D-Sub high reliability connectors for military, aerospace and industrial applications.

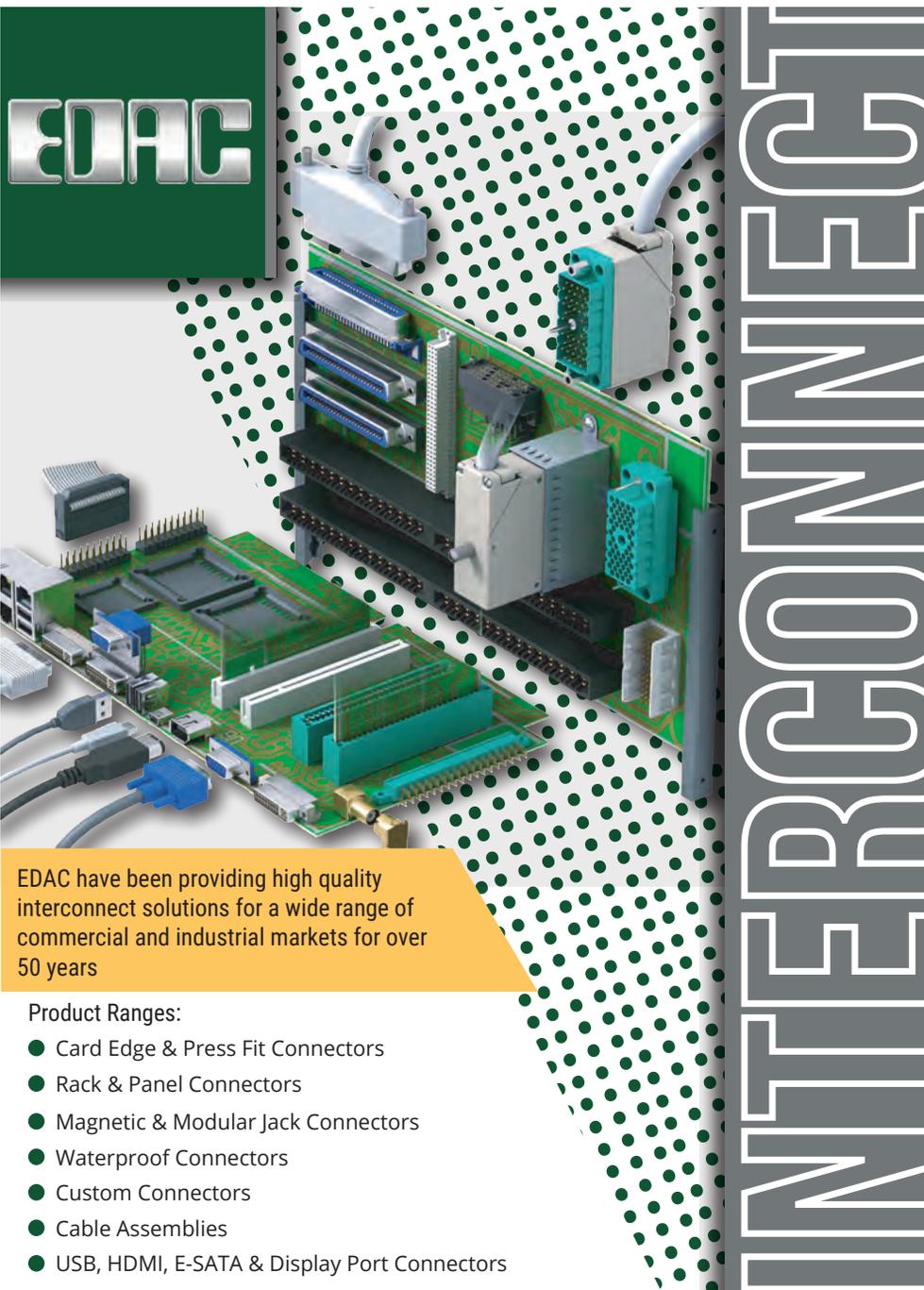
All Positronic D-sub connectors feature solid, machined contacts for reliability, durability and strength, with many series providing the option of the high-performance PosiBand contact. PosiBand contacts use a two-piece contact design. Each piece serves a separate function. The main body of the contact provides the mechanical platform for the contact system. This includes a true closed entry contact opening. The PosiBand spring clip provides normal force on the male contact.

Several contact termination styles are available, including crimp, solder cup, PCB solder, PCB press-fit and wire wrap connections. Locking systems are implemented to ensure the connectors remain securely mated under shock and vibration conditions.

The standard density high reliability product types are available in six package sizes with 9-50 size 20 or 22 contacts with current rating per contact up to 14A. The Combo-D connector is a sub-category of D-sub connectors, which is characterised by a mixed density insulator that combines size 8 and size 20 or 22 contacts allowing for the combination of signal, power, fibre optic, coax and/or high voltage contacts in a single package.

www.fclane.com

Built for reliability



EDAC have been providing high quality interconnect solutions for a wide range of commercial and industrial markets for over 50 years

Product Ranges:

- Card Edge & Press Fit Connectors
- Rack & Panel Connectors
- Magnetic & Modular Jack Connectors
- Waterproof Connectors
- Custom Connectors
- Cable Assemblies
- USB, HDMI, E-SATA & Display Port Connectors



Save 86 per cent PCB space

Mouser has introduced TE Connectivity's Ampmodu 1.0mm centreline interconnect system which is said to offer 85 per cent PCB space savings when compared to standard 2.54mm pitch connectors.

The dual beam contact design is engineered to provide a reliable electrical connection even in severe shock/vibration environments. The system serves a broad range of design requirements with up to 100 positions and two plating options with support for automated surface mounting and reflow processes.

Applications include: industrial controls, building/home automation, servo drives, PLCs, I/O devices, telecommunication equipment, robotics and instrumentation/test equipment.

Specifications of this SMT device include: vertical mounting angle, five to 50 positions per row, 1A max per contact, 30VAC operating voltage, 300VAC dielectric withstanding voltage and -55 to 125°C operating temperature range.

www.mouser.co.uk



Compact connector features integrated backshell

Nicomatic has launched its new DBMM hi-rel connector range which combines the advantages of 2mm pitch metal DMM connectors with a new integrated backshell to provide 360 degree EMI shielding in an ultra-compact form factor. The design suits applications where space and weight are important such as missile systems, military aircraft and radar systems.

The connectors conform to MIL-DTL-83513G. Contacts can be signal, power and coax, with hundreds of thousands of combinations possible.

The DBMM range measures only 15mm deep compared to a standard backshell and separate DMM connector which measures 35mm minimum, Nicomatic also states the new DBMM range is lightweight and easy to handle. A further advantage is cost when compared to DMM connectors with separate mono or split backshells.

Two models are currently available: the DBMM220 with four to 32 signal, power or coax contacts; and the DBMM320 which offers between six and 48 signal, power or coax contacts. Both models are available for straight to cable fix in either male or female orientation with D53B jackscrews.

www.nicomatic.com

Isolators and circulators delivered fast

Powell Electronics is now stocking connectorised coaxial ferrite isolators and circulators for space and defence applications from DiTom Microwave. The product line includes commercial-off-the-shelf and high-reliability ferrite isolators and circulators from 400MHz to 43.5GHz.



Applications range from telecommunications and test setups to military aerospace and space flight applications. Customised versions are also available. Thanks to in-house testing capabilities at DiTom, all products are available on short lead-times.

DiTom's connectorised RF isolators provides narrow and broadband high performance, covering every band from UHF through Q-band. Ultra-low loss and high isolation models are available. With multiple connector type (N-Type, SMA, K, and 2.4 mm) and gender configurations as well as broad operating temperatures, DiTom isolators suit applications including 5G, phased array radar, VSAT terminals, satellite communications, test lab equipment and RF chain VSWR optimisation.

Models are available in popular 5G, RADAR, and VSAT bandwidths, plus every other band up to 43.5GHz. Maximum insertion loss is as low as 0.1dB and minimum isolation is as high as 30dB.

www.powell.com

Connector products

HRS[®] HIROSE ELECTRIC EUROPE B.V.

Creative Links to World Electronics with more than 50,000 connectors...



- Compact: 75% smaller in size than a RJ45
- Robust: 5000 mating cycles
- High-speed: Ethernet 1Gbps/10Gbps
- High EMC resistance
- Complies with IEC 61076-3-124

- FFC/FPC
- PCB-to-PCB
- Wire-to-PCB
- Wire-to-Wire
- Backplane
- Mezzanine
- RF Coaxial
- Interface
- Circular
- Modular
- Optical
- Power
- Automotive

Email: eu.info.3d@hirose-gl.com

www.hirose.com/eu

Car sector in crisis

Company Debt director, Simon Renshaw, reflects on how semiconductor shortages are impacting the automotive industry and causing a ripple across associated sectors

A global microchip shortage is having a huge impact on the motor manufacturing sector, with many leading brands experiencing production delays. For example, in the UK, new car registrations for July were the lowest since 1998, down 29.5 per cent year-on-year, according to trade body SMMT.

SMMT CEO, Mike Hawes, said: "The automotive sector continues to battle against shortages of semiconductors and staff, which is throttling our ability to translate a strengthening economic outlook into a full recovery. The next few weeks will see changes to self-isolation policies which will hopefully help those companies across the industry dealing with staff absences, but the semiconductor shortage is likely to remain an issue until

at least the rest of the year." The world's biggest semiconductor producer, Taiwan's TSMC has said the shortages will extend into 2022, while analyst IHS Markit estimates that the shortage will cost the industry \$60 billion in lost sales this year.

The following highlights four reasons for the global shortage of microchips.

Pandemic: From early 2020, factories producing microchips were forced to close, particularly in Asia where most are based. Although they are now reopened, there is a backlog of orders. During lockdowns, home working and gaming rose and microchips were bought up in vast amounts by electronics manufacturers. Even rising numbers of crypto-currency miners who

use high-end chips impacted availability. New car sales fell during the pandemic, but rising demand is now affected because there are insufficient components.

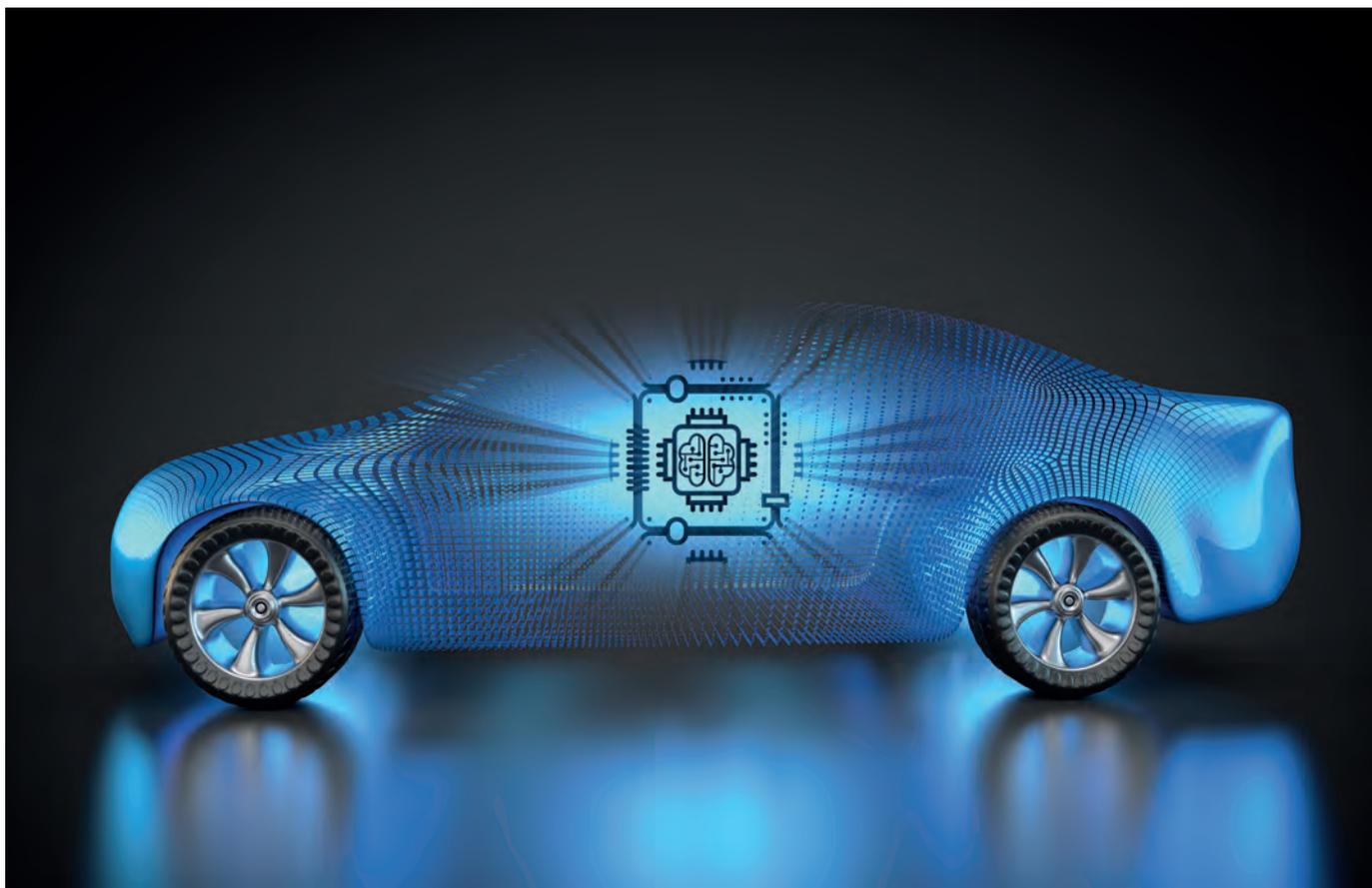
Political: Actions by the Trump administration led to a reduction in microchips from China as the US blocked technology transfers and imposed tariffs.

Natural catastrophes: Production of microchips requires water and Taiwan is affected by drought, with TSMC bringing water in trucks. Other producers have faced disasters, with a major fire halting production at Japan's Renesas facility and freezing conditions stopping manufacturing in Texas. Other reasons impacting supply hold-ups range from the container ship blocking the Suez Canal to Brexit.



A global microchip shortage is having a huge impact on the motor manufacturing sector, with many leading brands experiencing production delays

-> page 40 & 41



SOUTHERN 22 Manufacturing & Electronics

FARNBOROUGH | Hants | GU14 6TQ

8th | 9th | 10th FEBRUARY 9.30am - 4.30pm
(3.30pm close Thurs)

Where Industry and Innovation converge

Over 600 national and international suppliers come together to exhibit at Farnborough International Exhibition and Conference Centre this February for Southern Manufacturing and Electronics (inc AutoAero) 2022. Meet the power behind UK manufacturing industry and see live demonstrations and new product launches of machine tools & tooling, electronics, factory & process automation, packaging & handling, labelling & marking, 3D print technology, test & measurement, materials, composites & adhesives, rapid prototyping, ICT, drives & controls and laboratory equipment.

Free industry seminar programme online @
www.industrysouth.co.uk

The exhibition is **free** to attend, **free** to park and easy to get to. Doors open at 9.30am on Tuesday 8th February.

Incorporating The Subcontract
Engineering Exhibition
AUTOAERO
FARNBOROUGH • 8 - 10 FEBRUARY 2022



**FREE
SEMINARS
FREE
PARKING**

- AUTOMATION
- DEFENCE
- FOOD & DRINK
- AUTOSPORT
- MARINE
- AEROSPACE
- TRANSPORTATION
- PACKAGING
- ELECTRICAL & MECHANICAL
ENGINEERING
- ADDITIVE MANUFACTURING
- LOGISTICS
- ELECTRONICS
- ENERGY
- SPACE ENGINEERING
- R&D
- MEDICAL
- COMPOSITES
- CONSTRUCTION

PRE-REGISTER TODAY
for your Fast Track Entry Badge, Preview Magazine and Event Catalogue at
www.industrysouth.co.uk

SOUTHERN MANUFACTURING & ELECTRONICS
is an ETES event organised by European Trade & Exhibition Services Ltd
Tel 01784 880890 • email philv@etes.co.uk



Microchips are largely manufactured in Asia, including Taiwan, China, Japan, the Philippines, Thailand, Vietnam and Malaysia, although the know-how largely comes from the US. The US is keen to manufacture more microchips at home and is engaging with TSMC to build a plant in Phoenix, Arizona costing up to \$12B.

In March, the European Commission set out a plan to grow its share of the global microchip market to 20 per cent by 2030. The German car sector is lobbying hard for this as the most important producer in the EU's economy.

This would put the UK in a potentially weaker position. There is also concern about Newport Wafer Fab, a UK microchip manufacturer in South Wales, which has been purchased by China's Nexperia. There has been

anger that the business, which had received state funding, was allowed to be sold off.

The following summarises how the microchip shortage is impacting some motor brands.

Toyota said it would cut worldwide vehicle production by 40 per cent in September. It had planned to make almost 900,000 cars but will now produce 540,000 vehicles.

Jaguar LandRover is thought to be one of the worst affected because its luxury cars contain more microchips. It has predicted a 50 per cent fall in sales for the next quarter and told leasing companies that lead times for some of its models are now over a year.

Daimler said Mercedes-Benz production has reduced at three plants in Germany

and temporarily halted in Hungary because of the microchip shortage.

BMW-owned Mini paused production for several days in April because of the microchip shortage.

Volkswagen has not released any details other than saying it expects this quarter to be 'very volatile and tight' because of the microchip shortage.

Ford temporarily closed its Kansas City assembly plant, halting pick-up truck manufacture and its plant in Turkey also closed.

Stellantis, which includes Vauxhall, Citroen, Peugeot, Jeep and Chrysler, will cut production by 1.4 million during 2021 and to date, some eight of its 44 global plants have been affected by the temporary closure.



Microchips are largely manufactured in Asia, including Taiwan, China, Japan, the Philippines, Thailand, Vietnam and Malaysia, although the know-how largely comes from the US

ELECTRONICS **sourcing** UK Annual Edition

January's annual edition of Electronics Sourcing magazine provides purchasing professionals in the UK electronics industry with a year-long sourcing tool designed to highlight the wealth of products and services offered by a wide range of component manufacturers, distributors and CEMs.

This edition features the title's classic 'what to buy', where to buy' and 'how to buy' editorial styles which help purchasers track industry trends and make well informed sourcing and buying decisions.

The A4 printed publication features an eclectic mix of industry news, company profiles, focused purchasing advice and, most importantly, early opinions on the trends shaping the industry over coming months and years.

Now in its 16th year, this bumper special edition of Electronics Sourcing is an ideal annual companion for purchasers searching for distribution and manufacturing partners who can help them streamline their electronics supply chain.

**THE NUMBER 1 MAGAZINE FOR
PURCHASING PROFESSIONALS**



Company Debt director, Simon Renshaw, said: “It’s a concern that the fall in vehicle sales is holding back economic recovery. The situation is extremely serious and will have knock-on effects on smaller companies involved in the supply chain, such as dealerships and leasing companies. It has also raised the issue of ‘microchip

security’ and highlighted the need for innovation—Tesla, through proprietary software development, has been less impacted, for example.

“But, microchips are not all about the motor market and Goldman Sachs analysis found that the shortage affects some 169 other industries.

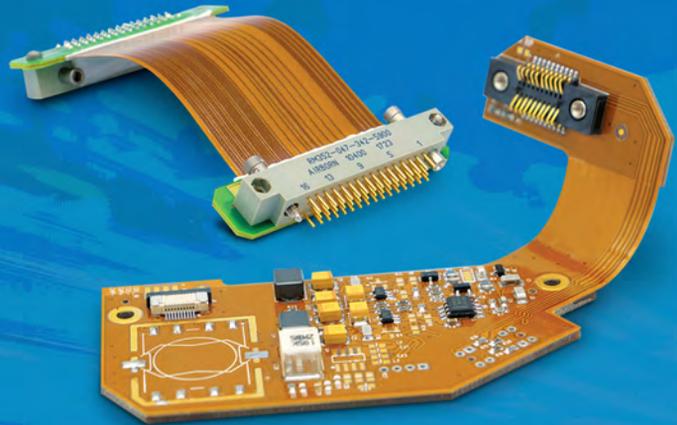
“What is more, a shortage of technology is also preventing some employees from returning to their offices. Although we are seeing the supply situation improving, I expect to see the fallout from this microchip crisis continue, well into next year.”

www.companydebt.com

Automotive is worst hit by scarcity of critical technology caused by “perfect storm” of disasters



AirBorn Flexible Circuit Assemblies



- Fully populated with components — much more than mere jumpers
- Single-sided, double-sided, multi-layer, rigid, & sculptured varieties
- Extremely rugged and reliable, ideal for designs with challenging geometries
- Rely on our design/manufacturing team — we’re your “Flexperts”

a i r b o r n . c o m

Electronic Component Show, date announced



Important date for readers' diaries. In six months, the Electronic Component Show takes place on 19 May 2022 at the Kassam Stadium, home to Oxford United Football Club

The event offers *Electronics Sourcing's* readers an ideal opportunity to meet over 80 component suppliers and service providers for electronic design, purchasing and production requirements.

In addition to the exhibition area, a comprehensive seminar program is designed to update readers on topics including obsolescence, lead times, component comparisons and more: what-to-buy, where-to-buy and how-to-buy.

Entrance to the exhibition and seminar program are free and the Oxford venue provides 2,000 free car parking spaces, plus refreshments during the day.

If you are considering new or alternative suppliers for your design, procurement or manufacturing facilities, *ECS* provides an opportunity to meet with over 80 potential suppliers, making any visit time efficient and worthwhile.

Current exhibitors include; European Circuits, INCAP, G-English, Solid State Supplies, Phoenix Contact, ODU, FC Lane, Data Sound Laboratories, Luso, EDAC, Cliff Electronics, Würth, Pacer, Force Technologies, Cupio, Fischer Connectors, FermionX, Switchtec, Nexus, NCAB, Rebound, Retronix, Lincoln Binns, Rochester Electronics, Midas Displays, Foremost Components, Mouser, Nicomatic, Powell Electronics, Omron, Charcroft, APC, Yamaichi Connectors, Esprit Electronics, Photronix,

TT Electronics, Future Facilities, Camden Boss Enclosures, CML, Winslow Adaptics, Farnell, DVR, NICAB, M-TEK, Harwin Connectors & Anders PLC. Find regular exhibitor updates at www.electronic-component-show.co.uk.

Meet existing or potential new suppliers at this focused event for professionals designing, buying or manufacturing electronic and electrical products.

When: Thursday 19 May 2022

Opening times: 10am to 3pm

Where: Kassam Stadium, OX4 6DE. Home to Oxford United Football Club

Why: Educational seminar programme; meet 80-plus current or potential new suppliers; easy and free car parking; free refreshments; free to enter; time effective meeting many suppliers in one day

Register now for your free entrance ticket to ensure Fast Track entry on the day

Organised by the publishers of *Electronics Sourcing Magazine*

www.electronic-component-show.co.uk



Semiconductor shortages in automotive will ease in 2022

Chipmakers are adding production capacity and demand is expected to weaken which will lead to improved supply conditions for semiconductor purchasers

Electronics purchasers in the auto industry can expect shortages of microcontrollers, MOSFETs and a range of other chips used in automotive systems to continue until the second half of next year and maybe longer.

While integrated device manufacturers (IDMs) and foundries are adding semiconductor production capacity, much but not all of the investment is for chips produced on leading-edge technology nodes, such as 5nm, 7nm and 10nm and on 12-inch wafers.

With a few exceptions, chips produced on such process technology nodes are not used in automotive systems, but in servers, PCs, laptops and smart phones. Most semiconductors produced for use in vehicles are often built on 8-inch wafers using more mature process technology nodes such as, 130, 110, 90 and 65 and 28nm. There are some chips used in automobiles that are built on 5nm nodes.

While chipmakers are increasing capacity to existing fabs, it can take a year or more for capacity to be added. New fabs can take two to three years to be built and equipped and ready for production. In addition, there is limited assembly and test capacity. When new semiconductor capacity comes online, shortages could continue until more assembly and

test capacity is also added. Most buyers, suppliers and analysts say current shortages impacting the auto industry and all other electronics industry segments is the worst they've ever seen. There are many allocations and lead times are long for most semiconductors. Component shortages have resulted in automakers temporarily stopping production of vehicles.

For instance, Toyota said it would produce 60,000-80,000 fewer vehicles in October in North America because of component shortages and ongoing challenges in its supply chain. Ford announced it cut back production of its popular F-150 pickup in September because of a lack of chips. Nissan said it plans to make fewer vehicles in 2021 as it did in 2020 because of the semiconductor shortage.

Unprecedented shortages
“We’ve never seen anything like this before,” said Dave Valletta, executive vice president of global sales and marketing for Vishay Intertechnology, which supplies MOSFETs and other components to the auto industry. “We’ve had times of shortages in the automotive industry before, but never like this.”

Many of Vishay’s MOSFETs are on allocation. “In some cases, we’re forecasting out to the end of 2022 and into 2023,” said Valletta. “It is really severe. We are adding

capacity as quickly as we can but it takes time,” he said.

Next year Vishay will have a double-digit increase in capacity, Valletta said. But “it’s nowhere near enough to cover demand,” he said.

Vishay makes MOSFETs internally but also outsources some production to foundries. The company is trying to outsource more to foundries but “we are running into the same problem as everyone: foundries are completely booked.”

Vishay also supplies diodes and optoelectronics to the auto industry. Diode supply is tight but it is not “quite as restricted as MOSFETs,” said Valletta. “Diode supply is more manageable. Optoelectronics are in pretty good shape in terms of support for automotive programs,” he said

Guarav Gupta, vice president analyst at researcher Gartner Inc., said microcontrollers, power management ICs, discretes, analog ICs, MOSFETs and display drivers used by the auto industry were in short supply at the beginning of the fourth quarter. The shortages will not end anytime soon,” he said.

“Our prediction right now is we will see a better balance of demand and supply in the second half of 2022. When I say there will be a better balance, it probably won’t be true for all devices or all applications or all industry



We’ve had times of shortages in the automotive industry before, but never like this

Dave Valletta, executive vice president - worldwide sales for Vishay Intertechnology

verticals,” said Gupta. “But overall, you will see a much better environment” for semiconductor supply, he said.

More capacity coming

He said there are several reasons why supply will improve for semiconductor buyers next year. One is the addition of more chip capacity. Foundries and integrated device manufacturers have invested in increasing production capacity.

TSMC, UMC, Vanguard SMIC, Bosch and Infineon, which make semiconductors for the auto industry, have new fabs coming online. “Some of that capacity will come online by the end of this year or early next year but most of it will start coming online towards the end of 2022,” he said.

In some cases, new capacity has already been added. C. C. Wei, vice chairman of foundry TSMC, said the chipmaker has increased production of microcontrollers by about 30 per cent in the first half of 2021 compared to the first half of 2020.

“For the full year, we expect to increase output for MCUs by close to 60 per cent over the 2020 level which also represents about a 30 per cent increase over the 2018 pre-pandemic level,” he said. As a result, he expects that the automotive component shortage will be reduced for TSMC customers starting this quarter.” Overall TSMC’s capital

spending this year will be \$30 billion, a 74 per cent increase from 2020.

Other semiconductor companies are also building new fabs, and increasing capital spending. For instance, Infineon’s capital expenditures this year will increase 59 per cent, according to IC Insights.

Infineon has just opened a new \$1.86 billion 300mm fab in Austria that will build power semiconductors for the industry in other segments.

The fab, which had been under construction for the past three years, began producing chips in September, the company said. At first chips produced at the fab will primarily be used to meet demand from the automotive industry, data centers and renewable energy generation of solar and wind power. The fab will enable Infineon to serve the growing market for power semiconductors by those business segments. Bosch has begun production of a new 300mm fab in Dresden Germany which will also produce chips for the auto industry and other industries.

Chip demand to weaken

Another reason that supply conditions will improve is semiconductor demand is weakening in certain segments such as consumer electronics, according to Gupta. “Softness in demand will also

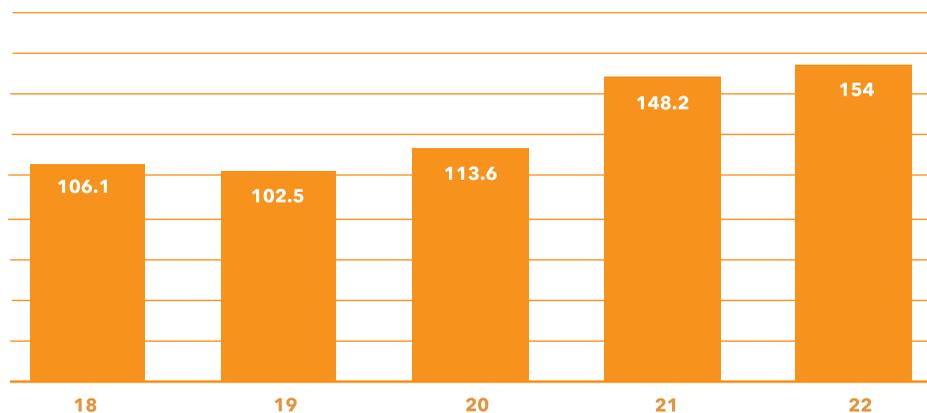
Chip capacity rise as chipmakers increase capital spending

The good news for semiconductor buyers who are working overtime trying to source parts that are on allocation is that chipmakers are building new fabs to boost semiconductor supply. The bad news is that most of the capacity from the new fabs won’t come online until 2023.

Most chip makers have increased their capital spending to add more capacity at existing fabs and some are building new production facilities. Worldwide semiconductor capital spending was expected to increase 30 per cent in 2021 to \$148.2 billion from \$113.6 billion in 2020, when expenditures grew 11 percent from \$102.5 billion in 2019, according to researcher IC Insights. In 2022 capex will grow another 5 per cent.

Much of that investment will be for new fabs. By the end of this year, chipmakers will have started construction on 19 new high-volume fabs and plan to break ground on another 10 in 2022 to meet growing demand, according to industry association SEMI. Equipment spending for new fabs will be more than \$140 billion over the

Semiconductor capital spending rises sharply



Source: IC Insights

Chipmakers will add more production capacity as their capital expenditures rise to nearly \$155 billion.

help ease the chip shortage,” he said. Shortages may also ease because some foundries are looking for long-term, non-cancelable orders because of panic buying from some buyers who are double and triple ordering parts, according to Gupta. TSMC chairman Mark Liu recently said his company was trying to figure out which companies really needed chips and which ones were hoarding. The foundry was delaying orders to customers that may be stockpiling semiconductors.

While semiconductor manufacturers are adding capacity to address chip shortages, there are other issues that may impede those efforts. One headwind in eliminating shortages is a lack of an assembly and testing capacity and shortages of lead frames and other materials needed for packaging, according to Nina Turner, research manager, semiconductor applications forecaster. She noted a lot of assembly and test for semiconductors is done in China. Recent power outages in China have contributed to semiconductor supply delays.

“Because of higher coal prices, China has decided they want to enact new policies to reduce energy consumption,” said Turner. They are doing power outages and not prioritizing manufacturing,” she said. As a result, production of assembly and test materials needed for semiconductors is slow, further exacerbating tight supply.

In the longer term, while chipmakers are adding capacity, it may not be enough because demand for chips is expected to grow robustly in the auto industry and other segments.

In automotive, more electric vehicles and hybrids will be built, replacing internal combustion vehicles. Electric vehicles typically have many more semiconductors than traditional vehicles. For instance, an internal combustion car has about \$620 worth of semiconductors, a hybrid has about \$800 of chips and electric vehicle semiconductor content totals \$1,200 on average, according to IC Insights. EVs require more microcontrollers, power management ICs, IGBTs, small signal transistors, rectifiers, and diodes. More silicon carbide and gallium nitride chips will be used in electric vehicles.

In addition, more vehicles will be equipped with driver assistance systems features such as lane change warning, automatic braking in an emergency and collision avoidance. Such systems are mainly used in higher-end vehicles but will migrate to lower-cost vehicles over the next five years. Driver assistance systems require a wide range of semiconductors and will further boost chip demand.



next few years which should help reduce semiconductor shortages, according to Ajit Manocha, SEMI president and CEO. The new fab capacity will help address demand for chips from emerging applications including autonomous vehicles, artificial intelligence and high-performance computing.

China and Taiwan will build eight new fabs each; six will be constructed in the Americas; three each in Europe and the Middle East and two each in Japan and Korea, the association said.

Fifteen of the new fabs being built in 2021 will produce 300mm wafers. In 2022, seven more 300mm fabs will be built. Over the next two years, seven fabs will be built that will produce 100mm, 150mm and 200mm wafers, according to SEMI. Much of that capacity will be used for chips used by the auto industry and other segments that don't require the most advanced semiconductors.

The 29 fabs could produce as many as 2.6 million wafers per month (in 200mm equivalents). About 15 of the new fabs will be foundries and will produce 30,000-220,000 wafer per month. Four of the new fabs will produce memory chips.

Many of the fabs won't start production until 2023, although some could begin installing equipment as early as the first half of 2021, said SEMI. Much of the production will be for integrated circuits and not discrete semiconductors. "There isn't anything I can see that will quickly improve availability of MOSFETs, diodes, and other discretes," said Rob Lineback, senior market analyst for IC Insights. "The MOSFET business is still very tight overall and automotive is very much plagued by short supplies and prices are rising," he said. The average selling price of a discrete in 2021 will rise 5.2 per cent compared to .2 per cent in 2020, he said.

Improvements in chip supply are "much further down the road," said Lineback. He added it might take a market slowdown in demand for new cars and trucks before supply catches up with demand. Chipmakers currently are slow to add capacity during an upturn because when demand cools off it results in oversupply and lower prices.

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 |
| EPICOS/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 |
| 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 |
| AEL Crystals Ltd | AEL Crystals Ltd | 01293 789200 | www.aelcrystals.co.uk | N | N/A | £200,000 | £50 | 100% | 3 | 15 | 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 |

Services Sourcing

CEM



Wilson
PROCESS SYSTEMS
ELECTRONICS MANUFACTURING SERVICES

In-house processes including:
Oversized PCB Capability
Automated SMT/Through-Hole Assembly
Hand Assembly/Box Build
Design For Manufacture
Environmental Testing
Wide Range of Coatings/Encapsulation
Full Test Services
IPC Certified Staff

www.wps.co.uk
01424 722222
enquire@wps.co.uk

IPC Certified PCB & SMT Assemblers
BSI ISO 9001

DEVICE PROGRAMMING



action circuits
(UK) LIMITED

device programming & reeling specialists



I.C. PROGRAMMING & LASER MARKING SERVICES

Tel: 00 44 (0)1582 412323
Email: sales@actioncircuits.com
www.actioncircuits.com

TAPE REELING



action circuits
(UK) LIMITED

device programming & reeling specialists



SMD TAPING & REELING SERVICES

Tel: 00 44 (0)1582 412323
Email: sales@actioncircuits.com
www.actioncircuits.com

CELL PACK SOLUTIONS

Custom Battery Pack Design & Assembly
Battery Distribution

TRACER
High Performance Lithium Batteries
12-24V - 4-170Ah

Tel: 0191 496 9999
www.cellpacksolutions.co.uk

INTERCONNECTION



Hirose
ELECTRIC EUROPE BV

More than 50,000 connectors



www.hirose.com/eu
eu.info.3d@hirose-gl.com

Want to Advertise here?

Contact Emma at
emma.evernden@electronics-sourcing.com
Or call us on 01892 613400

Want to Advertise here?

Contact Emma at
emma.evernden@electronics-sourcing.com
Or call us on 01892 613400

Want to Advertise here?

Contact Emma at
emma.evernden@electronics-sourcing.com
Or call us on 01892 613400

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 |
|---------------------------------|--------------------------|---------------|--------------------------|------------------------|----------------------------|---------------------------|---------------------|---------------------------------|--------------------------------|--------------------|-----------------------|
| Geyer Quartz Technology | Geyer Electronic UK Ltd | 01794 329341 | www.geyer-electronic.com | N | N/A | N/A | £0 | 100% | 6 | 50+ | Y |
| Golledge Electronics Ltd | Golledge Electronics Ltd | 01460 256 100 | www.golledge.com | N | N/A | £800,000 | £0 | 100% | 3 | 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 |
| 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 |
| 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 |
| Infinion | 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 |
| Hellermann Tyton | Lane Electronics | 01403 790661 | www.fclane.com | Y | N/A | N/A | N/A | N/A | N/A | N/A | Y |
| Hirose Electric | Mouser Electronics | 01494-427500 | www.mouser.co.uk | Y | 7,850 | N/A | 0 € | N/A | 50 | 2,500+ | Y |
| Huber+Suhner | Lane Electronics | 01403 790661 | www.fclane.com | Y | 766 | £116,000 | £0 | 100% | 6 | 38 | Y |
| Intelliconnect (Europe) Ltd | | 01245 347145 | www.intelliconnect.co.uk | N/A | N/A | N/A | N/A | 100% | 5 | 30 | |
| ITW McMurdo | Lane Electronics | 01403 790661 | www.fclane.com | Y | 866 | £219,000 | £0 | 100% | 6 | 38 | Y |
| 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 |
| Polamco | Lane Electronics | 01403 790661 | www.fclane.com | Y | 218 | £146,000 | £0 | 100% | 6 | 38 | Y |
| Positronic | Lane Electronics | 01403 790661 | www.fclane.com | Y | N/A | N/A | N/A | N/A | N/A | N/A | 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 |
| Souriau | Lane Electronics | 01403 790661 | www.fclane.com | Y | 1,929 | £806,000 | £0 | 100% | 6 | 38 | 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 |

| 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 |
|------------------------------------|-----------------------|-----------------|-----------------------------|------------------------|----------------------------|---------------------------|---------------------|---------------------------------|--------------------------------|--------------------|-----------------------|
| MEDICAL CERTIFIED | | | | | | | | | | | |
| Review Display Systems | | 01959 563 345 | www.review-displays.co.uk | | | | £100 | | | | |
| 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 | | | | | | | | | | | |
| FRIVO 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 |
| EAO Ltd | EAO Ltd | 01444 236000 | www.eao.co.uk | N | 5,000 | £500,000 | £150 | 100% | 6 | 22 | 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 |
| Sanyo Denki | EAO Ltd | 01444 236000 | www.eao.co.uk | Y | 4,300 | £150,000 | £150 | 99% | 6 | 22 | 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 | £230,000 | £100 | 100% | 6 | 12 | 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 |

Best
Windings Ltd

For the Best in Windings

ISO 9001 Design, Manufacture and Supply



- Transformers, inductors, coils, modules
- Custom and standard
- Through hole, surface mount, low profile, encapsulated
- Signal, power, high voltage, safety critical
- Low, medium and high volume
- UK and offshore manufacture
- Security, military, avionics, medical, industrial, telecoms, datacoms, consumer, audio, video . . .



Why settle for less? Talk to Best Windings

Tel: +44 (0)1394 448424 sales@bestwindings.co.uk www.bestwindings.co.uk
Best Windings Ltd, Viking Works, Bucklesham Road, Ipswich, IP10 0NX, UK

Contract Manufacturers Buyers' Guide

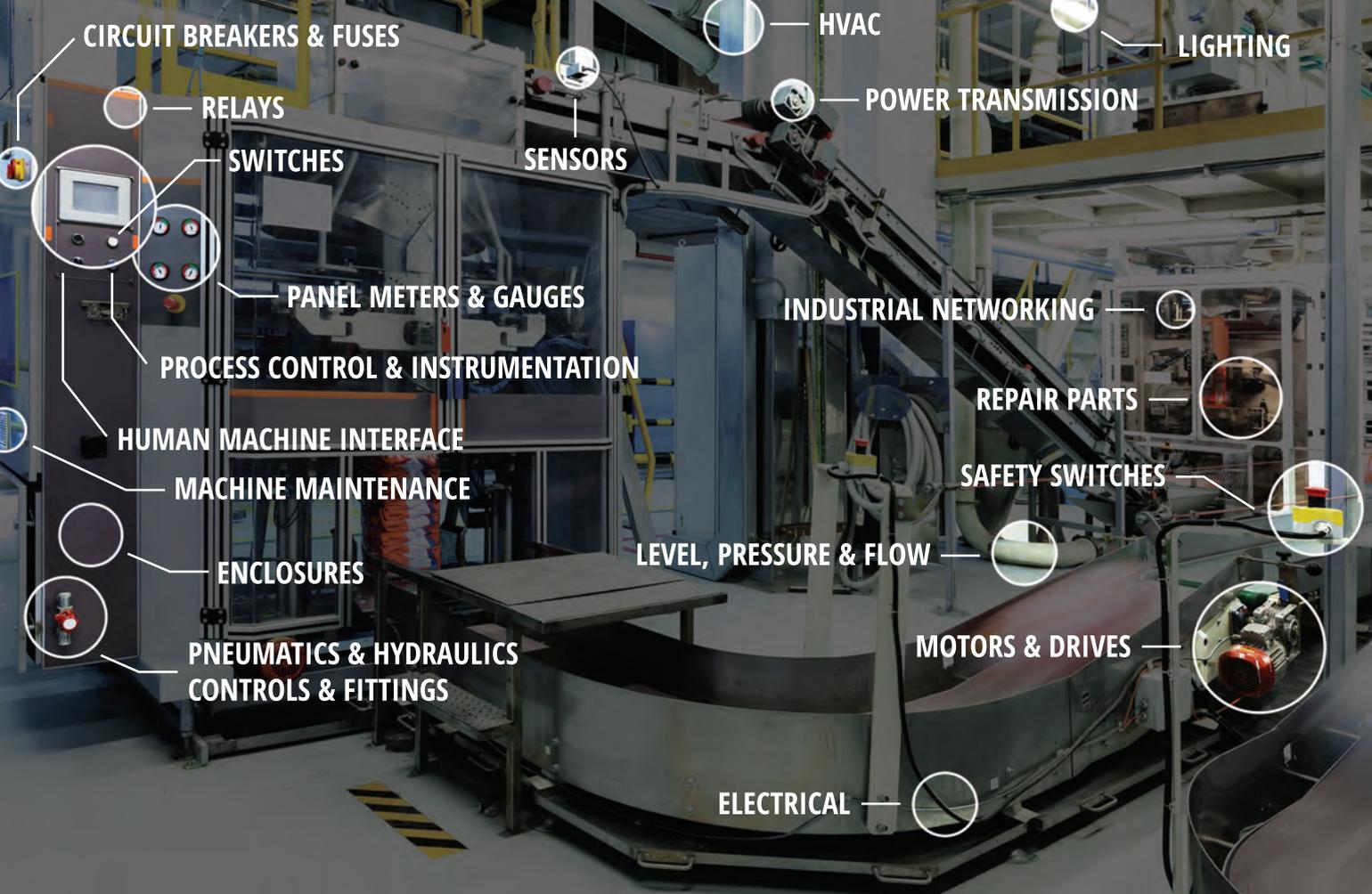
| Manufacturer | Telephone | Website | Turnover | Location | Employees | Number of Surface Mount Lines | Approvals | BCA Capacity | Lead Free Manufacturer | Prototyping | Design Capability | Full Turnkey | Cables and Harnessing |
|--------------------------------------|--------------------|-----------------------------|------------|-------------------------------|-----------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------|--------------|------------------------|-------------|-------------------|--------------|-----------------------|
| Challenger Solutions Ltd | 01245 325252 | www.challengersolutions.com | £10m | Essex/SE | 70 | 9 | AS9100 Rev D, ISO9001:2015, ISO 140001:2015, 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 | £12.5m | UK & Far East | 72 | 10 | 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 |
| Esprit Electronics Ltd | 02380 455411 | www.espritelectronics.com | £11m | Hampshire | 80 | 4 | ISO9001:2008, IPC610 to Class 3 | Y | Y | Y | Y | Y | Y |
| FermionX Ltd | +44(0)1903 524600 | www.fermionx.com | £5m | Worthing, W. Sussex | 40 | 4 | ISO9001:2015, ISO14001:2015, IPC 610 A Class 2 & 3 | Y | 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 | N |
| Hallmark Electronics Ltd | 01782 562255 | www.hallmarkelectronics.com | £2.4m | Staffordshire | 26 | 2 | ISO9000/UL, IPC610/D | Y | Y | Y | Y | Y | Y |
| Icon Electronics Limited | 01423 449080 | www.iconelectronics.co.uk | £6.5m | Hampshire & Yorkshire | 70 | 5 | AS9100, ISO9001, BS EN ISO/IEC 80079-34:2018 ATEX, IPC-A-610 Class 3 | Y | Y | Y | Y | Y | Y |
| Incap Electronics UK Limited | 01782 753200 | www.incapcorp.com | €113m+ | UK, Slovakia, Estonia & India | 2,000 | 20 | ISO9100, ISO14001, ISO13485, AS9100D, ISO45001 & IATF16949 | Y | Y | Y | Y | Y | Y |
| Industrial Electronic Wiring Ltd. | +44(0)1793 694033 | www.iiew.co.uk | £5.5m | Swindon, UK | 60 | N/A | ISO9001:2015, IPC610, IPC620 | N | Y | Y | N | Y | Y |
| Jaltek | 01582578170 | jaltek.com | £10m | UK | 90 | 3 | AS9100, ISO9001, ISO13485, IPC-A-610 Class 3, Certified IPC Trainer (IPC-A-610, J-STD-001 & J-STD-001 Spare Addendum) | Y | Y | Y | Y | Y | Y |
| KEY-TECH ELECTRONIC SYSTEMS | 01592 597711 | www.key-tech.co.uk | £5 Million | UK | 65 | 2 | ISO9001:2015, J-STD-001, IPC-610/620 CLASS 3, IPC-7711, BS EN ISO13485:2016 | Y | Y | Y | N | Y | 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 | Y |
| NOTE Group | 01753 746700 | www.note-uk.co.uk | £151m | UK/EU/China | 1,100 | 18 | 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 | £15.5m | SE | 131 | 7 | ISO9001, ISO14001, IPC610 Class 3, | Y | Y | Y | Y | Y | Y |
| Tioga Limited | 01352 360884 | www.tioga.co.uk | £16m | Derby | 130 | 6 | ISO 9001, ISO 13485, ISO14001, IPC 610, 620, 7711/7721 | 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 (i.e. Broker, Manufacturer &/or Repair) | Location | Approvals | Volume - Small, Medium, Large | Double-sided | Multi-layer 4-10/10-20/20-30 | Metal PCBs | Ceramic PCBs | Heavy Copper PCBs | Flexi / Flex-Rigid | Obsolescence Solutions | Modifications | Prototyping |
|----------------------------------|---------------------|-----------------------------|----------------------------------------------------------|------------------|------------------------------------------------------------------|-------------------------------|--------------|------------------------------|------------|--------------|-------------------|--------------------|------------------------|---------------|-------------|
| ABL Circuits Ltd | 01462 894312 | www.ablcircuits.co.uk | M | SE | ISO9000: 2015 | SML | Y | 4-10 | Y | N/A | N/A | Y | Y | Y | Y |
| 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 |
| Fineline VAR Ltd | +44 (0)1249 815 815 | www.fineline-global.com | B | UK / Global | ISO9001:2015 / UL/ TS16949 / Nadcap/ AS9100/ISO14001 | SML | Y | 4-60 | Y | N/A | N/A | Y | Y | Y | Y |
| GSPK Circuits Ltd | 01423 798740 | www.gspkcircuits.ltd.uk | M/R | UK, Europe, Asia | IS 9001:2015, IATF 16949:2016, EN (AS) 9100 | SML | Y | 4-34 | Y | Y | Y | Y | Y | Y | Y |
| LEF Circuits Ltd | 0116 2891122 | www.lefcircuits.co.uk | M/R | M | ISO 9001:2015, IPC-A-610 | SML | Y | 4-30 | Y | N/A | N/A | F/R | Y | Y | Y |
| Stevanage Circuits Ltd | 01438 761811 | www.stevanagecircuits.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 |

Advert Index

| Advert | Page | Advert | Page |
|---------------------------------|--------------|---------------------------------|---------|
| Aerco Ltd | 35 | Incap Electronics Ltd | 33 |
| AirBorn | 41 | Industrial Electronic Wiring | 30 |
| Anglia Components Ltd | BC | Kemtron Ltd | 24 |
| B.E.C Group | 16 | Metcase | 13 |
| Best Windings Limited | 49 | Mouser Electronics | 7 |
| Carlisle | 35 | M-Tek | 27 |
| Challenger Solutions Limited | 30 | Nemco Ltd | 17 |
| CML Innovative Technologies LTD | 8 | ODU (UK) Limited | 9 |
| Corintech Ltd | 20 | PEI-Genesis | 34 |
| Custom Interconnect Ltd | 29 | Phoenix Systems UK Ltd | 19 |
| Digi-Key Electronics | FC, IFC & 14 | Rebound Electronics UK | 9 |
| eBOM.com | 7 | Rittal | 10 & 11 |
| ECIA (Trusted Parts) | 15 & 31 | Schurter Electronic Components | 24 |
| EDAC | 36 | Sellelectronics Ltd | 26 |
| Electronic Technicians Ltd | 21 | Southern Manufacturing Show Ltd | 39 |
| Esprit Electronics Limited | 21 | Speedboard (NOTE GROUP) | 23 |
| FermionX Ltd | 19 | Tate Circuit Industries Ltd | 21 |
| Galco | IBC | Texcel Technology | 28 |
| Hammond Electronics | 12 | Tioga | 25 |
| Hirose Electric Europe B.V. | 37 | | |



MILLIONS OF PRODUCTS. THOUSANDS OF APPLICATIONS. YOUR GLOBAL RESOURCE.

Your Source for Industrial Electronics & Automation

Finding the right part for the job has never been easier. Galco carries more than 3 million electrical products, with free technical support to help you find the part you need and get it quickly.



WORLDWIDE SHIPPING

GALCO

Galco.com • +1 888-851-0301



life.augmented

Solutions for Smarter Mobility

Accelerating designs with leading-edge solutions based on proven technology platforms for Electromobility, Hybrid (HEV) and Battery Electric Vehicles (BEV).



- EV Charging Stations
- Battery Management Systems (BMS)
- On-board Chargers
- Electric Traction Inverters
- Hybrid & Mild Hybrid Systems
- HV Battery Safety Systems

Discover our extensive portfolio

angliaLive

www.anglia-live.com



View products with
your Smartphone