

ELECTRONICS

JULY 2021

# sourcing

AN MMG PUBLISHING TITLE

UK & IRELAND



## UNMASKING WORKPLACE CULTURE

John Denslinger, what will post pandemic workplaces look like

19



## IDENTIFYING PRODUCTS

Mouser explains the simplest ways to manage obsolescence

20



## INTERCONNECT: WHERE NEXT?

Jeff Behlendorf discusses major developments impacting the interconnect sector

08



## SUPPLY CHAIN SHORTAGES

Margaret Cunha explains how Digi-Key is helping buyers weather the supply shortage storm

22

Included free

ELECTRONICS

# sourcing

THE SOURCING GUIDE

Year-long Sourcing Tool 2021 / 2022  
Find a new or alternative supplier

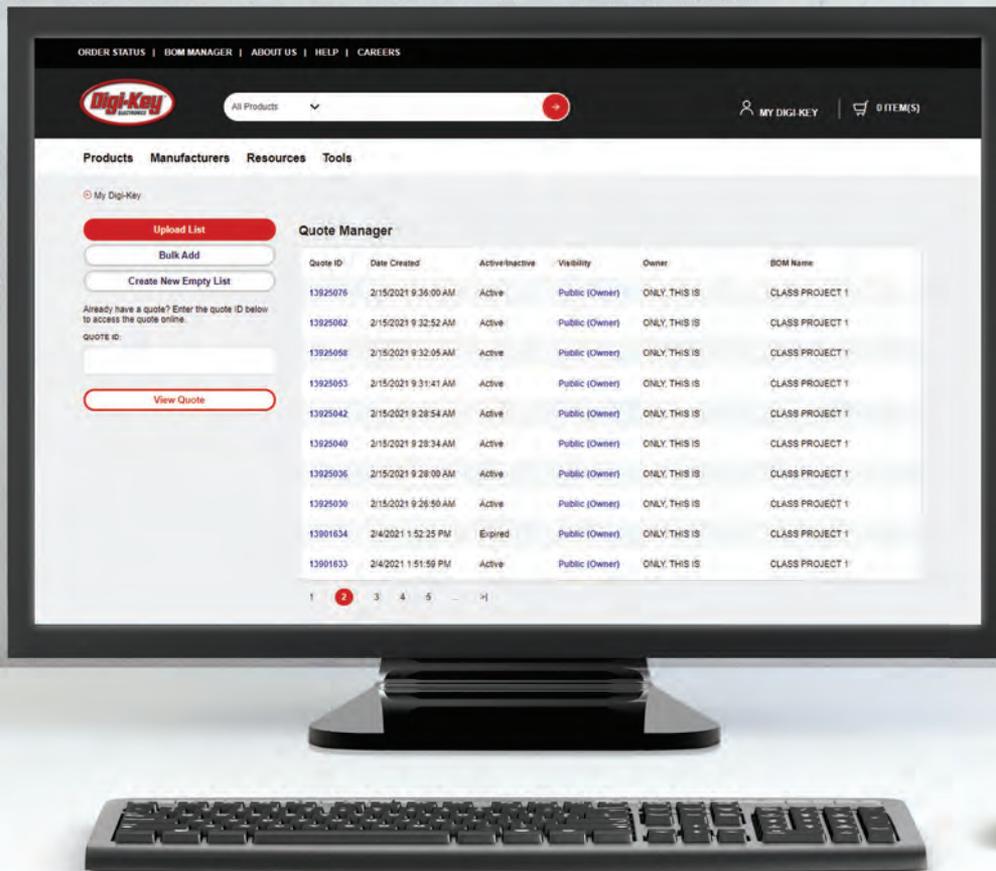
AN MMG PUBLISHING TITLE

# FORM TAPE, DON'T BUY PAGE 14



Access to  
10 Million+  
Products Online

**DIGIKEY.CO.UK**



# QUOTE MANAGER

Instantly generate quotes  
with secure pricing

- Secure pricing for 30 days
- Check lead time and stock information
- Share quotes with colleagues
- Upload and download lists
- Generate quotes for projects, components, and BOMs



Create a quote now: [digikey.co.uk/quotemanager](https://digikey.co.uk/quotemanager)



## On the cover – July 2021

Form tape, don't buy  
page 14

## Contents

# 08

### Interconnect: where next?

Jeff Behlendorf discusses major developments impacting the interconnect sector



# 19

### Unmasking workplace culture

John Denslinger, what will post pandemic workplaces look like



# 20

### Identifying products

Mouser explains the simplest ways to manage obsolescence



# 22

### Supply chain shortages

Margaret Cunha explains how Digi-Key is helping buyers weather the supply shortage storm



# 31

### Buyers' Guide

All the facts and figures to help you buy



## Editor's Word



### What next JIT

I'm no JIT expert but I appreciate that reducing work-in-progress is a sensible goal. However, I've watched JIT in action in some very expensive manufacturing environments and two questions always niggled at the back of my mind.

Firstly, every component in an assembly will have its own individual manufacturing profile. Some will be very quick to make (small pressings etc) while others will take much longer (hand assembled interconnects etc). So, unless one hundred per cent of the disparity is accommodated via production capacity, someone, somewhere in the supply chain is going to have to hold stock.

Secondly, is it really feasible to build a JIT infrastructure that can accommodate every conceivable unexpected event? I guess it is, provided someone, somewhere, holds stock.

From my own perspective, there was never a better time for JIT than the last 30-years. The steady expansion of globalisation, unlimited labour, increasing automation, reducing border controls, stable governments, improving transport infrastructure, digital communications/commerce. Everything favoured the expansion and refinement of JIT.

However, things are changing. All of the above, apart from digital communications/commerce, is being impacted by events beyond any individual's control. From new diseases closing borders, decarbonisation increasing transport costs or shifting politics reducing access to cheaper labour, everything JIT relies on is changing.

There must come a point where the cost of chasing ever tighter JIT becomes more expensive than holding stock. My guess is that the next 30-years will see a strong focus on improving the efficiency of holding and moving industrial stock, just like the consumer sector is doing right now.

Jon Barnett

## 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 Poole  
emma.poole@electronics-sourcing.co.uk

### DESIGN

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

ELECTRONICS  
**sourcing** **mmg**  
PUBLISHING LIMITED

### 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 182, Vol.17 No.07

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



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.

View current editions online

[www.electronics-sourcing.co.uk](http://www.electronics-sourcing.co.uk)



## Expanding wiring and connectivity portfolio

RS Components has launched the RS Pro wiring and connectivity portfolio, comprising connection products for industrial and networking applications.

Products include connectors (circular, heavy-duty, power and DIN), plus a selection of cables and cable assemblies for industrial automation and Ethernet network applications, along with glands, accessories and hook-up/equipment wires.

Head of product and sourcing at RS Pro, Evonne March, said: "By making available this wide coverage of high-quality specification products at competitive prices, we will realise major value for manufacturers, panel builders and system integrators across a multitude of different markets and applications."

The company states the RS Pro portfolio comprises high-quality products at industry-leading price points to provide choice and reliability to customers, while also maintaining value and margin. Products in the RS Pro range have high in-stock availability and have been through stringent testing processes to ensure reliability to meet design and compliance specifications. They are covered by the RS Pro Seal of Approval and come with a three-year warranty.

[uk.rs-online.com/web/](http://uk.rs-online.com/web/)

## Modular computing with short development times

Products in Intel's NUC Elements series are available at Rutronik UK. Intel NUC Elements can be used to quickly design and implement customer-specific embedded solutions and mini-PCs. Their small design and modular approach are designed to simplify upgrading components.

At the heart of the series is the Compute Element with options including Core i7 and i5 (with or without Intel vPro technology) plus i3, Pentium Gold and Celeron processors. Intel also offers Board Elements and Chassis Elements.

[www.rutronik24.com](http://www.rutronik24.com)

## High reliability connectors available across Europe

Glenair's high reliability glass-sealed hermetic connectors are available in Europe via Powell Electronics. They resolve gas, moisture and particle ingress problems and feature superior pressure resistance to >32,000psi. The devices suit harsh environment air-tight-seal applications such as submarines, satellites, underground applications, vacuum chambers, laboratory equipment and commercial/military aircraft.

The connectors benefit from: high resistance to extreme operating temperatures from -180 to 260°C; excellent mechanical strength; and no material breakdown or aging over time.

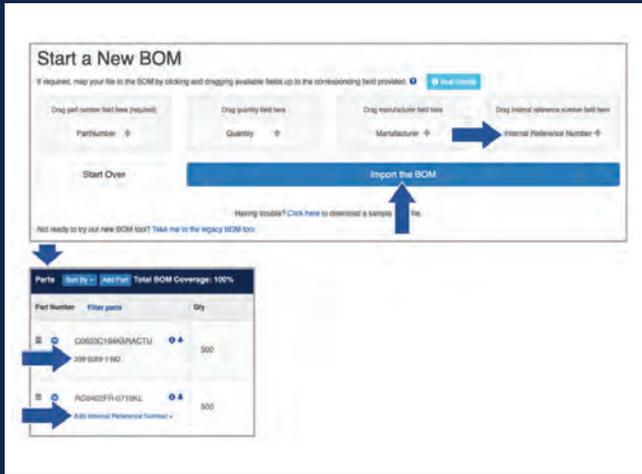
All hermetic connectors are 100 per cent tested prior to shipment. A helium leak test is performed to certify the hermetic seal. This test is conducted by inducing a 1 atm vacuum on one side of the connector. Helium gas is released on the other side and a mass spectrometer counts the number of helium molecules that penetrate the connector seal.

Glass-sealed hermetic connectors are manufactured by Glenair in the United States and Italy for all Mil and EN-standard designs and for custom designs.

[www.powell.com](http://www.powell.com)



# New powerful tools and features for optimized TrustedPart.com searches.



## BOM Tool Enhancements for Reference Numbers, Pricing, and File Export

- Upload and export internal reference numbers
- Quickly view or hide expanded price breaks
- Edit and sort export file fields

## PLUS

## Packaging Types and Minimum Order Quantities Now Display in Search Results

- Search results for applicable parts include packaging and minimum order quantity (MOQ) details
- The Pkg (MOQ) column lets our authorized distributors list even more information about their products

MFR Part #	Manufa	Pkg (MOQ)
CGA2B3X7R1H473K050BB	TDK	Tape & Reel (TR) (10,000)
CGA2B3X7R1H473K050BB	TDK	Cut Tape (CT) (1)
CGA2B3X7R1H473K050BB	TDK	Digi-Reel® (1)

**100% AUTHORIZED SOURCES**

Search authorized distributors at



**TrustedParts.com**

## In Brief

### Empowering hardware innovators

Mouser Electronics has entered into a partnership agreement with the Central Research Laboratory (CRL) for 2021. The distributor will be supporting the Start-up Accelerator programme, which will enhance the growth and learning of product makers and start-ups in the UK. This year's programme concludes in November following Demo and Investor Day. [eu.mouser.com](http://eu.mouser.com)

### Pi chip available standalone

Farnell has today announced the availability of the 2040 chip built on Raspberry Pi-designed silicon. This chip, which is at the core of the \$4 Raspberry Pi Pico delivers a combination of high performance, low cost, and ease of use. The microcontroller offers high performance for integer workloads. [uk.farnell.com](http://uk.farnell.com)

### MMIC ready to ship

Digi-Key has signed a global distribution partnership with Mini-Circuits to offer its MMIC product line up of 50GHz, LTCC filters, baluns, couplers and patented reflectionless filters. Mini-Circuits products are used in commercial, industrial, and military applications including cellular wireless, aerospace, satellite, mil-spec, CATV/broadband, RFID, test instrumentation and diagnostic imaging. [www.digikey.com](http://www.digikey.com)

### Supporting IoT

TT Electronics has been selected as hardware partner to communications and IoT provider Telenor. Telenor's IoT partner manager, managed IoT cloud & ecosystem, Jon Petter Andersen, said: "We are confident that TT's hardware, industry expertise, and culture of partnership will play an important part in Telenor's IoT Partner Ecosystem in the Nordics." [www.ttelectronics.com](http://www.ttelectronics.com)

## Rising prices

IPC has published its *May 2021 Economic Report* which explains how strong demand coupled with supply chain disruptions has created large imbalances that have driven prices higher across the board. This was first seen with transportation costs early in the pandemic but has now spread to most input costs. The US price for hot-rolled coil steel was around \$500 per ton prior to the pandemic. It is now near \$1,600.

The price of copper and other commodities are near all-time highs. Prices are expected to remain elevated through at least the first half of next year.

Given tight supply, strong demand and rising prices, expect businesses to look to buy as much as they can, as early as they can. In some instances, shortages have led distributors to allocate supply, which will force businesses to order more than they need or double book. Further out this could lead to a glut.

[ipc.org](http://ipc.org)



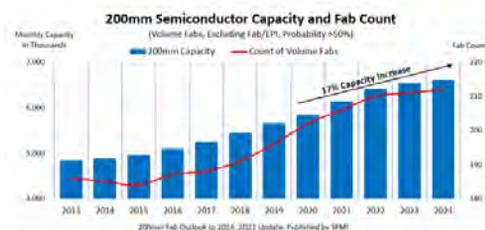
## Fab capacity on pace to meet surging demand

Semi's *200mm Fab Outlook Report* states semiconductor manufacturers worldwide are on track to boost 200mm fab capacity by 950,000 wafers or 17 per cent from 2020 through 2024 to reach a record high of 6.6 million wafers per month. The equipment spending increase reflects, in part, the industry's push to overcome the current chip shortage with 200mm fab utilisation continuing at high levels.

Semi president and CEO, Ajit Manocha, said: "The report shows that, during the same period, wafer manufacturers will add 22 new 200mm fabs to help meet growing demand for 5G, automotive and IoT devices that rely on analog, power management and display driver integrated circuits, Mosfets, microcontroller units and sensors."

The report also reveals that foundries will account for more than 50 per cent of fab capacity worldwide this year, followed by analog at 17 per cent and discrete/power at 10 per cent. Regionally, China will lead the world in 200mm capacity with 18 per cent share in 2021, followed by Japan and Taiwan at 16 per cent each.

[www.semi.org](http://www.semi.org)



## Reduced component count

Mouser Electronics is now stocking Analog Devices' ADAQ4003 μModule data acquisition solution. Using system-in-package technology, the device reduces the development cycle by transferring component selection, optimization and layout from the designer to the device.

The component combines a low-noise, fully differential analog-to-digital converter driver; stable reference buffer; and a high-speed 18-bit, 2 MSPS successive approximation register ADC. It also incorporates Analog Devices' iPassive technology, supplying passive components with superior matching and drift characteristics, to minimize temperature dependent error sources.

Supplied in a 7 by 7mm BGA package, it can save up to 75 per cent board space compared with multi-component equivalent solutions, enabling smaller-form-factor instruments without sacrificing performance.

With the integration of multiple common signal-processing and conditioning blocks into a single device, the ADAQ4003 reduces end system component count along with development cycle time for systems such as automatic test equipment, machine automation, process controls, medical instrumentation and digital control loops.

[www.mouser.com](http://www.mouser.com)

**Looking for more news?**

Receive the weekly electronics e-newsletter for Electronics Purchasing Professionals. Register now to receive your free industry news, components releases, announcements and developments within the global electronics supply chain. Register for free at [www.electronics-sourcing.co.uk/newsletter](http://www.electronics-sourcing.co.uk/newsletter)

# Simplify your BoM process

Mouser Electronics' Mark Patrick explains how the company's intelligent FORTE tool is helping purchasing professionals ease the task of building bills-of-materials

As a product design heads towards completion and becomes production-ready, the chore of creating the bill-of-materials (BoM) takes hold. A crucial part of any new product development—and the key to unlocking future profits—creating the BoM demands diligence. BoMs may potentially include thousands of components, each with individual part numbers, challenging purchasing professionals with an arduous task of obtaining pricing and availability information.

Churning through each component becomes a repetitive task beset with part number and code challenges. For example, parts flagged as 'no longer suitable for new designs' require purchasing professionals to go back to engineering to check alternative part numbers. Even simple part code errors introduced when creating the BoM can take ages to rectify.

So, what can buyers do? Mouser Electronics suggests saving time, improving order accuracy and increasing purchasing confidence with its FORTE intelligent BoM tool.

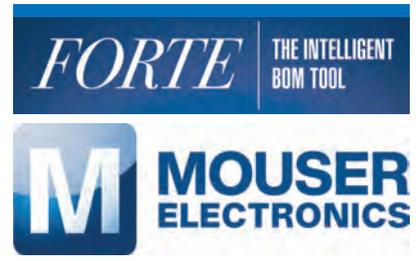
FORTE removes the uncertainty of specifying and purchasing semiconductors and electronic components. To save time, buyers can upload their BoMs from a spreadsheet or CSV file or cut-and-paste it from another document. Designed to offer a clean, easy-to-understand interface, FORTE enables adding and deleting parts and checking price breaks for multiple quantities without committing to changing the BoM.

Intelligent part number capabilities can analyse partial part numbers and part descriptions to check for correct part numbers and suggest alternative components. FORTE accesses

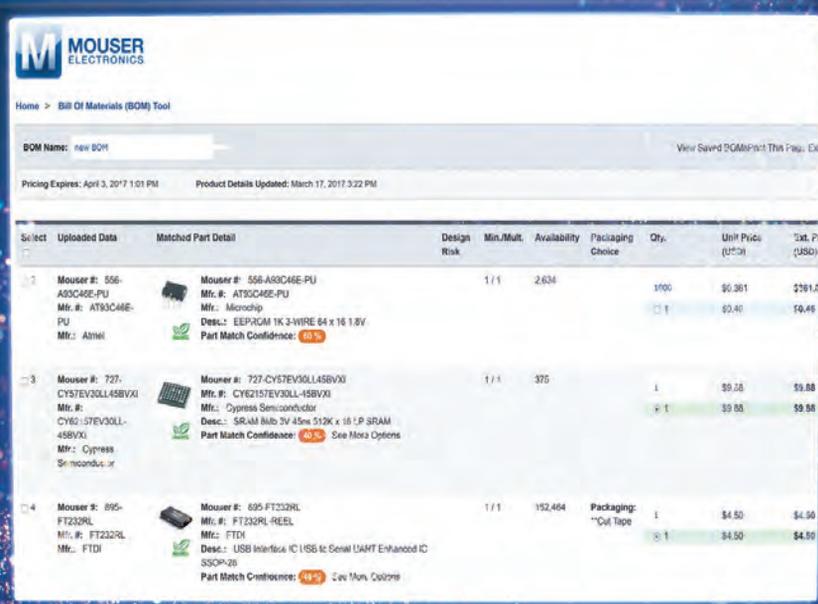
Mouser's online database of millions of orderable part numbers to recommend alternatives that reduce product lifecycle risks. FORTE is free to use and no subscription is required.

To try FORTE's intelligent and time-saving features, just log into your My Mouser account. Once logged in, select whether to upload a spreadsheet document in a Microsoft Excel or CSV file format or paste in part numbers or quantities. To start the import process, simply assign each column of your import file to the nominated BoM heading (part number, quantity, etc.). FORTE then processes the file and displays instances where a product match hasn't been found, notifies minimum order quantities, and highlights products with lead times and products at the end of their production life.

[www.mouser.co.uk/bomtool/](http://www.mouser.co.uk/bomtool/)



**Churning through each component becomes a repetitive task beset with part number and code challenges**



# Interconnect: where next?

CarlisleIT's director of product management, Jeff Behlendorf, discusses major developments impacting the interconnect sector

## Q What trends are driving the interconnect sector?

We see a focus across all markets on increased connection density and reduced weight. This can be smaller packages for connectors overall or ways to get more signals and power into a smaller space. To add to this challenge, manufacturers are also striving to reduce weight and boost performance, particularly in aerospace applications.

Interconnect manufacturers are always under pressure

to get more into connectors due to growing demand for electronics within aircraft of all sizes. Couple this with the impacts of wiring on payload capacity and range and every ounce counts. Space and weight are two areas where customers consistently need our expertise and the pressure for manufacturers to create higher-functioning, smaller-form factor, multi-purpose interconnects is increasing.

The industry-wide shift to electric aircraft is also accelerating changes in the interconnect market. These aircraft require interconnects

that can handle a high power—often over double the highest voltages common in current aircraft.

## Q How are raw material costs affecting pricing and lead time?

Over the last 12 months Covid-19, pent-up market demand and producer inflation have impacted the price of copper, silver and gold. Where possible, our team is looking at alternatives like fibre optic solutions that meet cost and speed-to-market requirements and allow large amounts of



**We see a focus across all markets on increased connection density and reduced weight**

ATTENTION ALL ESUK READERS

sourcing



**DON'T MISS OUT!**

# WE DON'T WANT TO LOSE YOU!

Your **FREE** subscription for monthly copies of ESUK is about to end if we have not heard from you for over 12 months!

Reactivate your subscription now to continue to receive your **FREE** monthly copies of ESUK.



[electronics-sourcing.co.uk/subscribe-renew](https://electronics-sourcing.co.uk/subscribe-renew)



[circulation@electronics-sourcing.co.uk](mailto:circulation@electronics-sourcing.co.uk)



01892613400

data interconnect, all while achieving size and weight requirements. However, with everything trending towards electrification, there is no escape from precious metals. Materials used vary with the application so our team works with customers to identify the right solution.

**Q How would you advise a purchaser to engage with a new or alternative connector supplier?**

Building a high-performing interconnect system is a complex undertaking but is instrumental to the overall success of a project. When engaging with a connector supplier, purchasing professionals should consider three key strategies to ensure success: know your requirements; focus on quality and on-time delivery; and select a partner who knows the industry.

After identifying a project's requirements, buyers will be prepared to select a partner with the required components and capabilities. Identifying a partner with a wide product range helps organisations quickly build and test by using a complete portfolio of certified and proven designs and materials. Suppliers must have the capability to deliver existing or custom solutions on time and at a high quality. They should be well-versed in the customer's industry and have a demonstrated ability to innovate and deliver at scale. In addition, the partner must understand certification requirements and help achieve them.

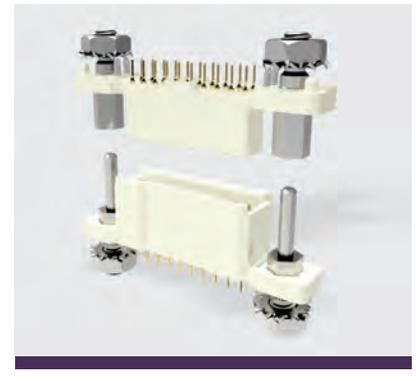
**Q What are today's fastest-growing markets for connectors?**

Increasing automation and electrification of vehicles and aircraft present a significant

opportunity for interconnect innovation. Both require connectors that push power without adding pounds, leading manufacturers to explore new materials, metals and layering strategies to meet evolving size, weight and power requirements.

Space applications are also growing due to the deployment of more rockets, satellites and probes. Currently, there are nearly 6,000 satellites in Earth's orbit and projections show that nearly 50,000 more will be added over the next two years. This means space-rated hardware needs are ramping up dramatically, driving the space industry to scale significantly to get these satellites in orbit and keep them in service.

[www.carlisleit.com](http://www.carlisleit.com)



## LEDs

# Sealed lamps take on toughest environments

Sealed top and rear (STR) indicator lamps are part of Oxley's high-performance range. The company states its rugged LED panel indicator lamps, with ingress protection up to IP68, have met the toughest applications for over 40-years. The unique modular design allows incorporation of different colours and options including: mounting sizes, voltages, lenses,

bi/tri segmented colours, and customer specials.

The LEDs are electrically screened ensuring typical mean time between failure from 90,000 to over 100,000 hours. Many devices are UK MoD and US DoD approved and hold allocated NATO stock numbers.

[www.oxleygroup.com](http://www.oxleygroup.com)



**OXLEY**   
[www.oxleygroup.com](http://www.oxleygroup.com)

## Oxley Sealed Top & Rear Indicator Lamps

High performance and reliable for rugged environments



+44 (0)1229 483226 • [sales@oxleygroup.com](mailto:sales@oxleygroup.com)

# Investing for the future

*FermionX' commercial director, Will Patrick, explains the positive, post pandemic changes the company is making to processes, operations and the teams' well-being*

**Q** How is FermionX improving its customer service?

We've become more agile and proactive in our response to set-backs and issues, especially when it comes to supply chain and obsolescence management. This isn't going to change. Our new processes mean we'll remain as vigilant and reliable as ever.

Going forward we hope to upskill and train our team to offer a better solution for our customers, allowing us to go the extra mile when it comes to the service we offer.

**Q** What has the past year taught you about managing a team?

The last 18-months has been an eye-opener. We're a small, close-knit team and the pandemic really shook us. Especially when we had a number of colleagues contract Covid-19. It was a frightening time and really enhanced our commitment to the wellbeing of the team, both physically and mentally.

We're working closely with our new HR manager to improve our support structure and promote more awareness around a healthy work-life balance. We're reviewing the perks on offer and how we can enhance our employee benefits offering.

**Q** What are your hopes for the future?

The pandemic has taught us how fragile life can be, that's why we're investing in the future. We're investing in capital, the team and the service we provide customers. We are committed to supporting UK innovation and manufacturing.

We also want to do more to improve our sustainability and reduce our carbon emissions and are working to make positive changes across our business.

[www.fermionx.com](http://www.fermionx.com)



FermionX' commercial director, **Will Patrick**



**We are committed to supporting UK innovation and manufacturing**



With lock-down restrictions lifting in the UK, we're looking forward to welcoming our partners in for a visit, safely and securely.

**Get in touch today**

\*Photo taken previous to Covid-19 and social distancing restrictions - no floor managers were harmed in the taking of this photo

Tel: +44 (0)1903 524 600  
Email: [sales@fermionx.com](mailto:sales@fermionx.com)  
[www.fermionx.com](http://www.fermionx.com)

# 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.



**Helen Higginbotham;**  
Operations Director of  
Tioga is retiring at the  
end of July.

Helen has worked alongside  
Warwick Adams (MD) for 36 years  
and has been the co-owner of  
Tioga for over 20 years.

We are going to miss Helen, she has been the backbone of our manufacturing production process as well as a friend and mentor to all our staff.

We wish her all the best in her retirement, it has been a constant rollercoaster over the years so thank you Helen for your hard work, loyalty and commitment to making Tioga a huge success.

Big hugs from  
everybody at Tioga.



Visit our Website to view  
our New Corporate Video.

[www.tioga.co.uk](http://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,  $\mu$ 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](mailto:sales@tioga.co.uk)



PART OF SYMPATICA GROUP LIMITED

# One purchase order

*Using Tioga as a case study, sales director, Angela Williams, shows how contemporary manufacturers can help purchasing managers tie up all their needs in a single purchase order*

Tioga's core competencies encompass design, engineering, global procurement, supply chain management, manufacturing, test, configuration, warehousing and distribution. In short, the company can manage customers' products in their entirety from initial design to delivery to the end user.

The transition from PCB assembly was driven by customers asking for more services during the build process, taking the next steps to final build, test and configure to customer specifications then package, warehouse and ship on request.

To achieve this the company is continually investing in its 'one-stop-shop' capabilities. By listening to customers, Tioga has grown its portfolio to encompass all build steps including potting, conformal coating and ultrasonic welding.

Microsoft Dynamics NAV works alongside Aegis FactoryLogix to merge state-of-the-art technology with the company's knowledge

and experience to redefine the concept of manufacturing business technology.

For Tioga, Aegis Factory Logix (FLX) has allowed the company to provide the shopfloor with a range of work instructions, from basic colour-coded ECAD and BoM headers to full scale multiple-level sub-assembly builds with 3D ECAD capabilities. It has allowed the creation of flexible pathways through the factory to suit the build flow. The way FLX has been developed ensure strict control of BoM versions, machine programs and works instructions.

Tioga has worked hard to build exceptional relationships with its suppliers, developing and maintaining an established, local and global supplier network of small, medium and large distributors and subcontractor facilities. The company's materials control solutions use e-commerce to deal with the supplier base for purchase orders, expediting and rescheduling orders and requirements. Efficient progress chasing, especially with component

availability, reduces lead times and shortages to controlled and acceptable levels.

Tioga's QHSE team is trained and experienced in multiple industries, ensuring regulatory, statutory and customer requirements are translated into value added processes that deliver effective performance to customers. Following product from concept, NPI, pre-production and production through to shipment to customers or the customer's customer, Tioga follows the quality mission and manual to conform to ISO 9001:2015, ISO 13485:2016 and ISO 14001.

By placing one order, a purchasing manager can rest assured Tioga will manage the full process with care and integrity. By endeavouring to meet deadlines, push and pull stock when required, warehouse and only invoice when it leaves the factory, Tioga is highlighting the benefits of full box build moving forward.

[www.tioga.co.uk](http://www.tioga.co.uk)



Potting process



**Efficient progress chasing, especially with component availability, reduces lead times**



# NOTE™

YOUR MANUFACTURING PARTNER

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

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

- 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-ems.com](http://www.note-ems.com) for more information



# Form tape, don't buy

*Adaptsys' technical director, James Cawkell, argues that owning the entire component taping process can drive out supply-chain risks, reduce costs and shorten turnaround time*

Although many electronics companies operate in-house taping, the pocketed tape is often purchased pre-formed from external suppliers. Various tape widths, pocket sizes and designs are required for different ICs, discrete and passive components. Orders cannot be fulfilled if tape is not available. Producing pocketed tape in-house, when needed, helps overcome this challenge. It also simplifies inventory, reduces expenditure and saves storage space.

Adaptsys introduced the Re-flex II tape-forming system as a cost-effective solution. With the latest upgrades, Re-flex II can form pockets at four metres per minute, faster

than typical component-taping equipment. Users can feed freshly pocketed tape directly into their component-packaging process which eliminates storing and retrieving lengths of pocketed tape. Storing flat tape on standard sized reels can save up to 95 per cent of the space needed for pre-formed tape.

The machine can contain up to 1,000m of flat tape so, if the taping process operates at 2m/min, this allows up to eight hours of continuous operation. A similar reel of pre-formed tape can contain only about 40m assuming a pocket depth of 6mm. Hence, the reel needs to be changed every 20 minutes. Thus, Re-flex II reduces operator intervention, raising

productivity and enabling faster order fulfilment.

Up-front investment can be surprisingly low, with companies recouping their investment within 12-months, depending on usage. Measuring 750 by 350mm the machine occupies minimal floorspace in the packing area and the system requires only a standard AC supply and compressed air.

Re-flex II handles tapes up to 88mm wide and offers users the flexibility to create pockets in standardised or custom dimensions by changing tooling. Quality inspection and traceability are provided for each formed pocket.



Re-flex II interface



**Adaptsys**  
introduced the  
**Re-flex II tape-**  
**forming system**  
as a **cost-effective**  
**solution**

Top flight electronic manufacturing  
[www.etluk.co.uk](http://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](http://TATECIRCUITS.COM)

# 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



sales@phoenixsystemsuk.com | 0845 658 6111

www.phoenixsystemsuk.com |



## What we do

Design, develop and manufacture reliable, cost-effective and innovative electronics.

The products we develop are designed and manufactured to stand the test of time and our solutions are designed for the long-term, factoring in future changes in technology, potential obsolescence and physical durability. From the very latest security systems for E-Vehicles to contactless medical hygiene solutions we work with major global brands and operate across a range of markets including Automotive, Agriculture, Construction, Consumer and Leisure, HVAC, Off-Highway, Medical Hygiene, Safety.

## How we do it

- Flexible and responsive approach
- Close collaboration with customers and suppliers
- Named contacts throughout the business
- Electrical engineering experience across multiple industry sectors
- All engineering and testing and validation facilities on single site - enables complete control, fast turnaround and reduced costs

For more information on how Pektron can help your business, contact James Malcolm on **01332 832424** or **jamesmalcolm@pektron.co.uk**



www.pektron.com

Pockets can be simple shapes (square, rectangular or rounded) or specifically shaped to fit a particular component or provide functions such as protecting vulnerable pins or protrusions. Adaptsys can help customers create custom tooling and has developed solutions for special components such as modules and connectors.

Re-flex II can produce intricate pocket designs suitable for protecting large semiconductor components (often supplied in trays), plus smaller ICs, discretes and passives that are typically supplied on tape and reel. It can also create pocketed tape for small engineering components such as stamped metal shields or miniature springs.

Changing the tooling requires no special skills and takes just a few minutes, letting users produce pocket designs in almost any quantity: low, medium and high volume.

Re-flex II can be used with standard input and output reels up to 560mm dia, taking unformed tape from the input reel and delivering formed tape to the output reel.

Adaptsys has also introduced an option that further enhances tape/reel storage and transport. While Re-flex II typically feeds pocketed tape into a component taper, the new Crosswinder option offers the flexibility to produce tape onto reels for later use.

Crosswinder winds tape of a standard width (say 12mm) across a 100mm-wide reel to increase the storage capacity by a factor of eight compared to an ordinary 12mm reel. Also, a crosswound reel can supply significantly more parts to a high-speed component taper before needing to be replaced, thereby reducing changeovers. Crosswinder ensures tape is neatly ordered to unwind smoothly, which helps avoid problems that may otherwise require the taper to stop. Crosswound reels are available in various widths to provide high maximum capacity.

[www.adaptsys.com](http://www.adaptsys.com)

<http://reflex-odt.com/thank-you-semi/>



Re-flex II carrier tape forming machine



**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](mailto:uksales@cml-it.com)

[www.cml-it.com](http://www.cml-it.com)



KITTING FACILITY



STOCK HOLDING



CONTRACT ASSEMBLY



CUSTOM SOLUTIONS



01438 346600  
[www.nemco.co.uk](http://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**



# ELECTRONICS

[www.corintech.com](http://www.corintech.com) [info@corintech.com](mailto:info@corintech.com)

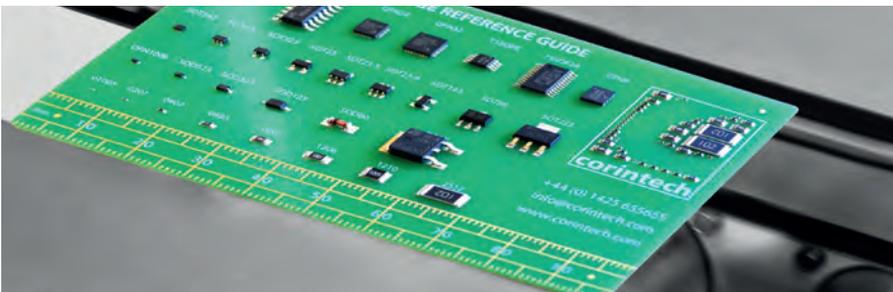
## DESIGN & MANUFACTURE

+44 (0)1425 655655



## Experts in Electronics

Improved Quality • Lower Cost • On-Time In-Full Delivery  
 Three reasons to choose and stay with Corintech.

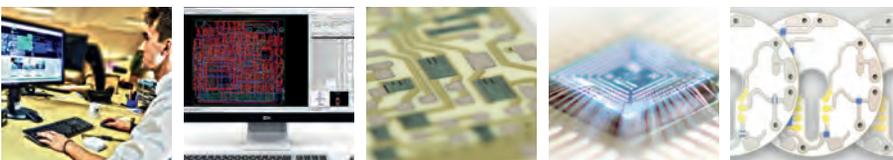


### ELECTRONICS MANUFACTURE

- 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

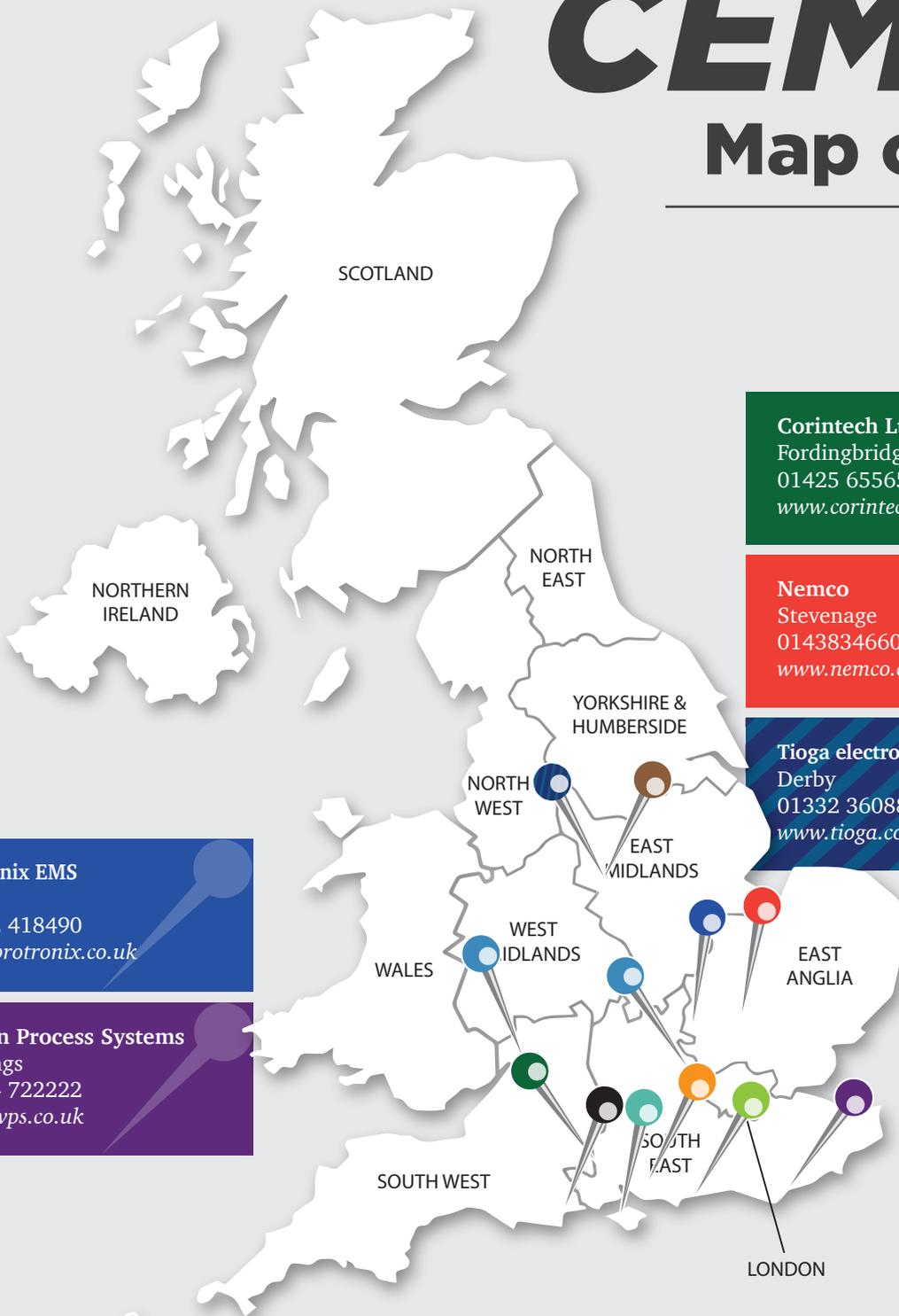
### ELECTRONICS DESIGN

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



# CEM

## Map of UK



**Corintech Ltd.**  
Fordingbridge  
01425 655655  
[www.corintech.com](http://www.corintech.com)

**Nemco**  
Stevenage  
01438346600  
[www.nemco.co.uk](http://www.nemco.co.uk)

**Tioga electronic assembly**  
Derby  
01332 360884  
[www.tioga.co.uk](http://www.tioga.co.uk)

**Protronix EMS**  
Luton  
01582 418490  
[www.protronix.co.uk](http://www.protronix.co.uk)

**Wilson Process Systems**  
Hastings  
01424 722222  
[www.wps.co.uk](http://www.wps.co.uk)

**Pektron**  
Derby  
01332 832424  
[www.pektron.com](http://www.pektron.com)

**NOTE Windsor**  
01753 746700  
**NOTE Stonehouse**  
01453 797580  
[www.note-uk.co.uk](http://www.note-uk.co.uk)

**FermionX Ltd.**  
Worthing  
01903 524600  
[www.fermionx.com](http://www.fermionx.com)

**Phoenix Systems**  
Fareham  
08456 586111  
[www.phoenixsystemsuk.com](http://www.phoenixsystemsuk.com)

**Electronic Technicians Ltd**  
Wimborne  
01202897722  
[www.etluk.co.uk](http://www.etluk.co.uk)

**Tate Circuit Industries**  
Lichfield  
01543 622435  
[www.tatecircuits.com](http://www.tatecircuits.com)

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

# Unmasking workplace and company culture

*John Denslinger wonders what post pandemic workplaces will look like given all the data squarely points to hybrid*

Workplace • By John Denslinger

A careful look at a CDC demographic shows 62 per cent of the US adult population received at least one vaccine dose as of May 2021 and 50 per cent are now fully vaccinated. CDC guidance suggests vaccinated Americans can forego masks and social distancing: the two biggest impediments to everyday person-to-person interaction. As one would expect, the news generated swift policy changes across the country from state governments to business. America is open again.

Given the steady pace of vaccinations, business leaders must now orchestrate the post Covid employee workplace. Will it be a return to the old-school workplace circa 2019? Will it be a continuation of the 2020 new-school thinking: remote forever? Or will it be a hybrid? If hybrid, who, why, where, when, what conditions, and for how long are the likely questions employees will ask. For executives, the decision is extremely consequential to talent retention, morale, flexibility, inclusivity and bottom-line productivity. Good or bad, it will define the company and its culture.

So here are the numbers to digest. According to a March 2021 KPMG article, 45 per cent of CEOs do not expect 'normal' to occur until late 2022. Surprisingly only 30 per cent are considering hybrid working models with most requiring two to three workdays in the office. But the Genie is out of the bottle. Employees may resist if pushed too aggressively to return. Another survey by Gallup reports seven in ten white-collar workers are still working remotely. Forty per cent would like to continue working from home because they prefer it, while another 11 per cent would opt to stay remote citing Covid anxiety.

To be fair, management has legitimate concerns about productivity, worker motivation, spontaneous creativity, employee development, worker dedication and keeping teams engaged in a remote environment. Additionally, how does the

company fairly assess and retain its talent pool, safeguard its data and circumvent potential cybersecurity threats? From the employee's perspective, what about long-term isolation from peers, lack of stimulation, a feeling of invisibility to management, timely tech support, and perceived response indifference. Caregiving responsibilities only serve to complicate matters.

The post Covid workplace model will not be an easy decision for any company. Misjudging employee sentiment could be a disaster. A May 2021 survey by Ernst & Young revealed 90 per cent of employees wanted work rule and workplace flexibility as to when and where they work. More than half said they would consider quitting their jobs absent this flexibility. Also, many workers made life-defining choices during the pandemic: where to live. That stat seems confirmed by Accenture plc who found 83 per cent of workers viewed the hybrid workplace as optimal. If not permitted to work remotely, retaining these employees will be problematic.

Office, remote or hybrid? All the data squarely points to hybrid, but that's not the end of the story. The new workplace must still assure the organization can deliver on its mission. While each company promotes a unique culture, the successful ones typically expound the virtues and value of agility, innovation, respect and customer focus. If employees can work from anywhere, achieve assigned goals, realize their own potential, be available when/where needed, and deliver on company values, then the hybrid model works for the long term.

The World's Largest Selection of Electronic Components  
In Stock for Immediate Dispatch™ [DIGIKEY.CO.UK](https://www.digikey.co.uk)



# Identifying products not recommended for new designs

*Mouser explains that one of the simplest ways to manage obsolescence is to avoid components classed as 'not recommended for new designs'*

In the quickly evolving world of electronic components, Mouser Electronics works hard to identify products not recommended for new designs (NRND). The company identifies end-of-life, obsolete and NRND products to avoid older components making their way into new designs.

Serving purchasing professionals sometimes involves telling customers what not to buy. This way, customers can be confident they're designing with the

most advanced, genuine electronics available, and can subscribe to receive product notifications online.

Mouser Electronics' vice president of Americas sales and service, Coby Kleinjan, said: "We work closely with all our manufacturer partners to provide the fastest and easiest access to the industry's newest components. Having the most advanced technology to develop cost-efficient prototypes limits costly redesigns, manufacturing

delays or even the termination of a project. It also leads to a design edge in delivering more product features and capabilities, as well as longer lifecycles."

Identifying product lifecycle and NRND products are two examples of Mouser's commitment to value-added services beyond component supply. The company also suggests component alternatives, including their risk level.

[mouser.com](http://mouser.com)



Mouser Electronics' vice president of Americas sales and service, **Coby Kleinjan**



**Serving purchasing professionals sometimes involves telling customers what not to buy**

Lascar bridges the gap between customer and supplier

We are experts in managing the supply nightmare, eliminating long lead times and overcoming component obsolescence.

+44 (0)1794 884567

[www.lascarelectronics.com](http://www.lascarelectronics.com)

## CEM

# Bridging the gap between customer and supplier

Nobody likes being put on hold, especially for component supply. It's all too easy to get caught out when a manufacturer discontinues a critical component. As the pace of development increases, this can happen with alarming frequency.

Information is the key. Acting quickly as soon as a component is announced as end-of-life means an alternative can be found and the design modified as required. If this is done

soon enough, there need be no disruption in the supply of products to customers.

Buyers can remove the headaches of obsolescence by working with a company that maintains close ties to component manufacturers and has an in-house engineering team to assess and design in alternative parts.

[www.lascarelectronics.com](http://www.lascarelectronics.com)

# Allocation causing further supply chain issues

*Solid State Supplies' Paul Dale underlines the importance of securing a trusted source when searching for obsolete or allocated components*

With the current global electronic component allocation issues, many companies are having to venture outside their usual distributors to ensure timely deliveries. Having a trusted source is crucial.

Whilst counterfeiting has been an ongoing issue for many years, it has increased considerably due to the recent allocation issues. Now, more than ever, purchasing teams must ensure that appropriate safeguards are in place to protect their supply chain.

Vast amounts of money are being made by criminal organisations from

counterfeiting goods. This is why modern counterfeits are such good replicas—they're impossible to detect, appearing identical to the genuine article. The days of visual-only inspection for counterfeits are long gone. Sourcing agents must have at least ISO 9001 accreditation and use industry-approved counterfeit avoidance procedures. Counterfeit devices are costing the industry profoundly due to damaged finished units, loss of production time and locating replacements.

Correct inspection is critical. If an assured source cannot offer approved in-house

counterfeit avoidance testing, then using a qualified test house is essential, especially if additional expertise is required for complex electrical testing.

Solid State Supplies' offers a specialist division with over 25-years' experience to assist in sourcing obsolete or allocated components. The Sourcing and Obsolescence Solutions team only use AS9120-certified assured sources and incorporate the latest counterfeit detection procedures, using AS6081 inspection as a minimum.

[www.sssltd.com/SOS](http://www.sssltd.com/SOS)



**Solid State Supplies' offers a specialist division with over 25-years' experience to assist in sourcing obsolete or allocated components**



## Allocation problems? We can help.

- Hard-to-Find Components
- Component Shortages
- Obsolete Parts
- Lengthening Lead Times
- Component Electrical Re-Testing
- Long Term Storage of Devices

## Sourcing & Obsolescence Solutions

**SOLID STATE SUPPLIES**

[sssltd.com/SOS](http://sssltd.com/SOS)

# Navigating supply chain shortages

*Digi-Key's director of regional supply chain solutions, Margaret Cunha, explains how the company is helping buyers weather the supply shortage storm*

While the term borders on overuse 'unprecedented' certainly describes the current supply chain shortages of electronic components. Supply chains were beginning to tighten before Covid 19 and the effects of the global pandemic slowed or shuttered production of essential components for days, weeks or even months.

As we see light at the end of the tunnel, industries are beginning to ramp up production and electronic component demand is through the roof. While the 'perfect storm' of supply chain issues rains down, Digi-Key is helping purchasing professionals shore up electronic components and navigate shortages.

In nearly every industry demand for components has rapidly revved up, all at the same time. From automotive and smartphones, to medical and IoT markets, all need increasingly larger numbers of components for finished products.

The following examples highlight the issues. The smartphone market is expected to grow by a compound annual growth rate of 11 per cent from now through 2026. Smartphone manufacturers alone use approximately 1.5 trillion multilayer ceramic capacitors, accounting for 50 per cent of worldwide production.

In the automotive industry, global sales of electric vehicles are estimated to increase more than 30 per cent in 2021 and electric

vehicle engines use up to 22,000 MLCCs each. Gartner reports the IoT market will grow by more than six times from \$212 billion in 2018, to \$1,319 billion in 2026. IoT devices like smart home thermostats, doorbells, alarm systems, cameras, appliances, fitness equipment and more, need sensors and multiple components to run.

While demand has rapidly increased, supply has been under significant pressure due to the pandemic and a compounding range of challenges as described below.

Staffing capacity has been a common issue for many manufacturing facilities as they adhere to Covid prevention policies including social distancing.

For similar reasons, freight is taking longer to move, across all industries and countries. Fewer available commercial flights and port issues are causing delays in product transfers and receipt of materials, including the Suez Canal debacle in March.

Systemic issues include under-investment in eight-inch fabs, resulting in struggles to ramp up production. Without significant investment in a fab's early stages, the supply chain is impacted for many years. Unfortunately, under-investment in this standard size years ago is causing significant shortages today.

Extreme weather patterns are wreaking havoc on many areas including a drought in

Taiwan which is forcing some manufacturers to truck water in, creating delays that could continue into June 2021. Several major factory fires have impacted commodity production, from the Asahi Kasei Micro and Renesas Electronics plant fires in Japan, to the Panjit International factory fire in Taiwan. All these factories were critical in producing specific oscillators, semiconductors and chips, and could take several months to resume full operations.

Suppliers are doing their best to overcome these challenges and keep up with demand, working around the clock to get components where they're needed around the world. As with most storm clouds, there are silver linings. While increased demand puts pressure on suppliers, it is a positive sign of recovery. Many distributors, including Digi-Key, predicted this sharp spike in demand. They proactively invested in significant inventory, while working closely with suppliers to expedite orders to ensure enough product is on hand to help customers weather the storm now and into the future.

Working with global distributors like Digi-Key assures customers they will likely find what they need among 11.8 million available products, including 2.6 million in-stock parts from over 1,700 manufacturers.

[digikey.com](http://digikey.com)



**Digi-Key Electronics' director of regional supply chain solutions, Margaret Cunha**

## Rising demand for touchscreen enclosures

OKW reports increasing demand for its touchscreen enclosures: wall-mounted Smart-Panel, low-profile handheld Slim-Case, square-plan control centre Protec and multifunctional Interface-Terminal.

Smart-Panel houses edge-to-edge touchscreens for building services, electrical installations, smart home and security systems. These enclosures can be fitted to standard flush-mount cavity wall boxes. With no visible fixing screws, they blend seamlessly into modern residential, commercial and industrial environments.

Slim-Case (IP54/65) accommodates touchscreens up to 10cm for a wide range of high-mobility environmental technology and safety engineering applications. Contoured sides, bevelled rear panel and optional soft-touch intermediate ring make it comfortable to hold.

Protec (IP65 optional) has an ergonomic sloping front panel and is available in three sizes. This housing can be used on a table-top or wall mounted to suit the specific application. Three versions are offered with recessed, closed or extended rear section for the connections and cables.

Interface-Terminal (IP54 optional) can be ordered as mobile handheld; sloping front table-top or wall mounted; flush-mount for fitting in walls or front panels for harmonious integration in visually sensitive locations such as historic buildings.



[www.okw.co.uk](http://www.okw.co.uk)



## Growing enclosure range

Hammond Manufacturing's 1551 miniature plastic enclosure family comprises 49 sizes. A further 10 variants have been added in the latest range extension. A choice of colour, flanged lids, keying and USB C versions are also available.

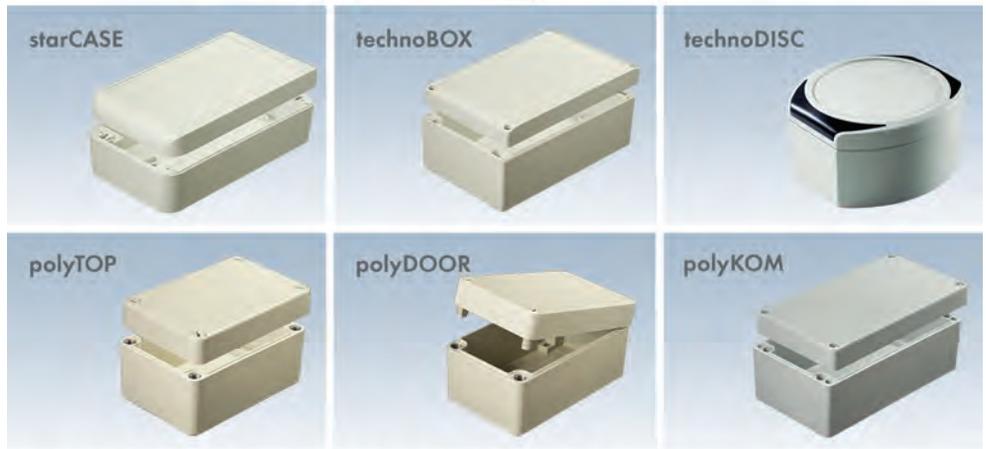
The 1551V ventilated sensor enclosures have been extended with 45, 60 and 80mm diameter round versions, with plain or vented covers.

A key feature of the 1551V design is the snap-fit closure, which allows repeated opening and closing without tools and maximizes internal space for PCBs by eliminating screw fixings. All options are available in black, grey and white UL94-HB ABS as standard. All bases feature 4mm high PCB stand-offs, wall mounting slots and a 15mm cable knock out.

All sizes are 20mm high, which gives enough space for board-mounted RJ45, USB and other standard communication interfaces.

[www.hammondmfg.com](http://www.hammondmfg.com)

## DESIGNER PLASTIC ENCLOSURES Perfect for your industrial electronics



## IP 66/IP 67 ENCLOSURES

Modern and sophisticated plastic enclosures with many unique features. These include recessed lids for keypads, lid retaining straps and clip-on trims which hide all of the fixing screws. Huge range of sizes and styles.

Tel. 01489 583858

[www.rolec-enclosures.co.uk](http://www.rolec-enclosures.co.uk)



# Flexible approach for switchgear enclosures

*Spelsberg UK's managing director, Chris Lloyd, discusses key considerations for specifying low voltage switchgear enclosures*

When housing low voltage switchgear the fundamental requirement is protection whatever the environmental conditions. An IP rating high enough to prevent ingress, combined with IK protection against impacts, are prerequisites. So too is protecting operators and the public from harm: typically achieved via IEC Protection Class II.

Regarding material options, some facilities prefer steel. However, difficulty creating a flexible, modular system in steel often results in a large enclosure. Polycarbonate is an alternative, providing durability and design flexibility, allowing a modular approach where smaller enclosures fit together to protect a more precise area. Polycarbonate is also lighter.

A common requirement of LV switchgear design is a

segregation architecture to provide isolated protection. Such an enclosure has to be modular with interconnected housings that are easily designed and assembled, often without on-site modifications.

Spelsberg's modular GTi enclosure features removable flange panels that can be locked into place to isolate areas of the switchgear network. Alternatively, they can be removed to allow connectivity of wiring and components. The enclosures and panels are flush-fit, leaving no penetrative gaps and affording maximum protection. Modularity and simple connectivity of enclosure walls also enable fast, easy expansion of the switchgear circuit if required.

With various sizes offered (up to 320mm wide and 640mm long) GTi housings

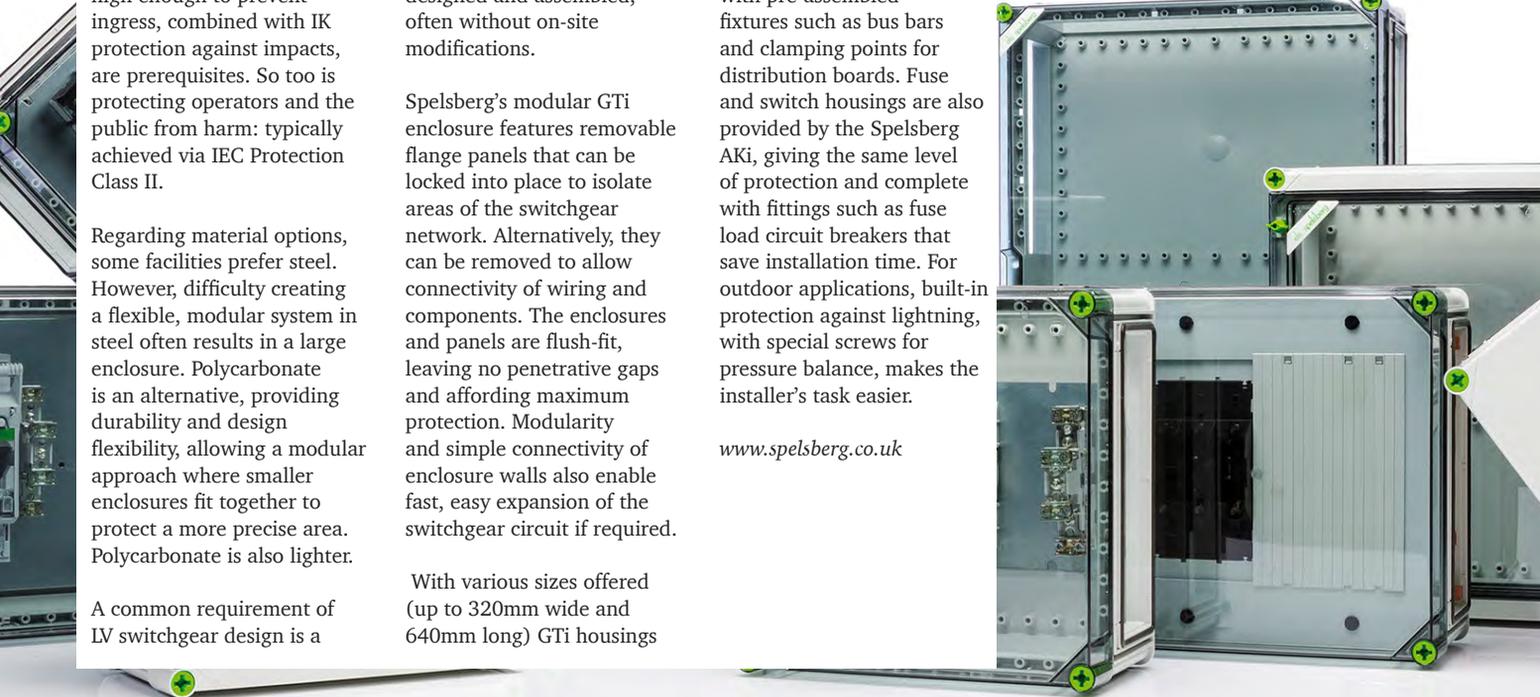
can be interlinked with one connector for all sizes of enclosure.

The enclosures are available with pre-assembled fixtures such as bus bars and clamping points for distribution boards. Fuse and switch housings are also provided by the Spelsberg AKi, giving the same level of protection and complete with fittings such as fuse load circuit breakers that save installation time. For outdoor applications, built-in protection against lightning, with special screws for pressure balance, makes the installer's task easier.

[www.spelsberg.co.uk](http://www.spelsberg.co.uk)



**An IP rating high enough to prevent ingress, combined with IK protection against impacts, are prerequisites**

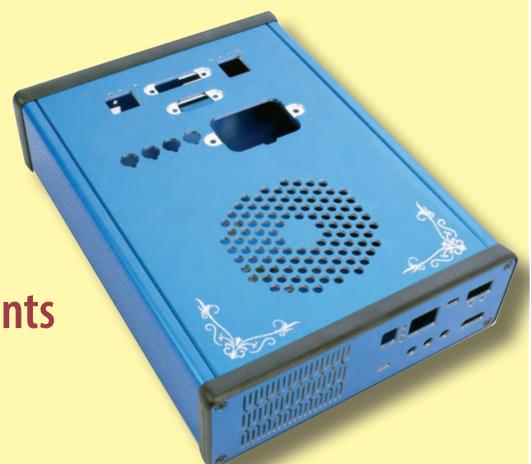


**HAMMOND  
MANUFACTURING®**

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

**Learn more: [hammfg.com/mods](http://hammfg.com/mods)**

**uksales@hammfg.com • 01256 812812**





SIMPLY INNOVATIVE. BETTER FOR SURE.



THE NEW FILTER FAN PLUS  
**EXPELS MORE AIR FROM  
AN ENCLOSURE.**

STEGO 'the protector of electronics' have developed a new filter fan series. This series has a more effective airflow and significantly increases air volume, thanks to its unique air-flap outlet technology, and only one filter mat. But there is more ...

TAKE A LOOK AT ALL PRODUCT HIGHLIGHTS:  
**➔ [WWW.FILTERFAN-PLUS.COM](http://WWW.FILTERFAN-PLUS.COM)**



## Gather around display innovation



Litemax's latest interactive circular 33in display is an eye-catching resized LCD ideal for bar tables in cafes and restaurants. It integrates a custom made Zytronic multitouch projected capacitive technology sensor with object recognition capability built into the associated Zytronic ZXY500 multitouch controller's firmware.

The interactive surface is a specially designed, round ZyBrid multitouch sensor capable of detecting up to 100 simultaneous touches. It features a printed border and machine polished edges for aesthetics and safety. Litemax mounts this on top of a 32in round LCD panel.

The durability of the sensor's 4mm thick thermally toughened, anti-glare glass protects the underlying display which suits public use and self-service applications such as hospitality and leisure sectors.

Litemax' president, David King, said: "The bar table is the next generation of bar or restaurant artificial IoT (AIoT) engagement and can be used for guests to play games or even interact with other tables to buy a round of drinks. The lighting halo can be programmed to the venue's music to create a lively atmosphere or set to a romantic mood or brand colour."

[zytronic.co.uk](http://zytronic.co.uk)



**Rebound Electronics**

Flexible Component Solutions

2021/2022

## THE AGE OF THE SEMICONDUCTOR UNICORN

We have seen a dramatic increase in lead time and supply restrictions since mid-2020, with the Covid-19 pandemic clearly compounding issues that were already in play.

We are now in a true allocation phase with manufacturers across a broad range of product groups regularly de-committing on scheduled deliveries. This has led to severely depleted stocks within the traditional distribution network.

PAGE 3



### How We Can Support

Rebound Electronics has invested heavily in a deep spread of supply worldwide to support clients with new sources and availability without compromising quality. In 2019 we created a new Asia focussed authorised line card focusing specifically on lesser known Chinese and Taiwanese brands. Our line card offers a broad technology mix covering a wide range of applications. It is designed to offer our clients more cost effective alternatives to tier one brands which are now under lead time pressure.

### Our Proactive Supply Chain Management

We work closely with our customers to understand their requirements and ensure that our customers buy at the right time and the right price to secure their supply chain and manage their costs effectively. Meticulously selected suppliers, demanding quality control and industry certifications ensure you can buy from Rebound with confidence.



[www.reboundeu.com](http://www.reboundeu.com)



+44 (0)1635 555999



[enquiries@reboundeu.com](mailto:enquiries@reboundeu.com)



## Displays ideal for smart home devices

GTK's display range now includes a 3.5in HVGA TFT with integrated graphics controller on the FPC, letting users interface directly with the display and eliminating additional graphics components on the PCB.

The TFT comprises a four-wire resistive touchscreen, polarised with a six o'clock viewing angle. It boasts 240cd brightness, 320 by 480px resolution and 500:1 contrast ratio. It features a serial interface and connects via a ZIF connector.

GTK's business manager for displays, Clive Dickinson, said: "This is a really innovative advance in display technology and helps OEMs save space on their PCB and speed up their graphics design element of new product designs. This is suitable for any application that requires a graphic controller and is perfect for products that need to be compact in size, such as handheld diagnostics, time-attendance systems or smart home devices."

[www.gtk.co.uk](http://www.gtk.co.uk)

## Purchasing industrial displays

Review Display Systems' displays division manager, Justin Coleman, explains what purchasing professionals should consider when buying industrial displays

Industrial displays have unique characteristics for use in harsh, extreme environments where temperature, humidity, vibration and shock can influence a display's ability to operate consistently and reliably. For example, the working conditions of a forklift operator panel or marine navigation system are significantly different from domestic coffee machine interfaces or smart meters.

Electrical, mechanical and optical specifications and operating characteristics need to be matched to the environmental conditions in which the display will be used.

Regarding longevity, buyers must ensure an industrial display's

continuity of supply can be maintained for the predicted lifetime of the end product. Displays, as with all electronic components, are not immune to discontinuation notices and phase out procedures. In this situation it is reasonable to expect a competent, specialist supplier partner to offer an equivalent replacement display in terms of mechanical fit, electrical interface and optical performance.

Looking at cost of ownership, a typical electronics system employing an industrial display, cover glass and touchscreen will also require drive electronics, power supplies, interconnect and mechanical fixtures and fittings.

An industrial display is often the most expensive item on a bill-of-materials. Engaging with an experienced supplier who can provide multiple components, sub-systems or complete product builds will positively impact the total cost of ownership.

Partnerships with established UK-based suppliers and distributors that can provide local stock holding, support the design and manufacture of system builds, and offer easily accessible, responsive support and communication are increasingly important.

[review-displays.co.uk](http://review-displays.co.uk)



### rds | REVIEW DISPLAY SYSTEMS



RDS provides fully integrated industrial display solutions

- Displays
- Touchscreens
- Optical Bonding
- Embedded Electronics
- Design and Manufacture



[review-displays.co.uk](http://review-displays.co.uk)  
01959 563345



Input Systems and Display Solutions

- Human-machine interface applications
- Suitable for medical environments
- EMC compliance
- Customised solutions

+44 1296 319 000  
[sales.uk@schurter.com](mailto:sales.uk@schurter.com)  
[schurter.com/Solutions](http://schurter.com/Solutions)

**SCHURTER**  
ELECTRONIC COMPONENTS

# Obsolescence rises as chipmakers focus on high-profit parts

*In addition, more longer lifecycle systems could result in even more parts going EOL*

Component obsolescence is not a new issue for the electronics supply chain but it is a continuing one and it could be getting worse as component manufacturers in some cases are opting to discontinue older products even if there is still healthy demand for them.

“It used to be when a component went end-of-life, it was because no one wanted the part anymore. It was obsolete,” said Steve Calabria, founder and CEO of PC Components, an independent distributor based in Seaside Park, N.J. But now EOL notices are being issued for products even if the products are still being used “by numerous customers who have many active and mature designs that need these products,” he said.

Manufacturers are not making as much money on the older products as they could so they are switching the lines “over to high-volume, high-demand stuff,” said Calabria. Automotive, mobile device and IOT markets as well as other new markets “are using electronic components in extremely high volumes which is causing havoc to the system,” he said.

Original component manufacturers (OCMs) are struggling to develop the capacity needed to produce high-demand, high-profit components, according to Calabria. Manufacturers have three options. They can invest and build new fabs and manufacturing facilities, outsource to

foundries, or stop making mature, less profitable products and use the “existing space, equipment, and personnel to produce components which are generating higher revenue,” he said. Many component manufacturers are choosing the third option.

Recent product change and end-of-life notices confirm this. For instance, component manufacturer Murata said it would discontinue making capacitors in 0403 and larger case sizes in order to increase capacity for other components for the automotive and consumer markets, said Calabria. TDK also discontinued MLCC and radial ceramic capacitors which were in wide use. “Consolidation of low demand product lines allows the OCM to dedicate lines to high-volume, high-profit parts,” he said. However, it causes major problems to OEMs and contract manufacturers who now need to design in alternate sources for the discontinued parts, said Calabria.

**Large case sizes go EOL**  
Often products in larger case sizes are targets for discontinuation. “The reality is most high-volume, high-demand parts are getting smaller in size, which is resulting in EOL for parts of larger sizes, said Calabria.

In some cases, component manufacturers site raw materials or contract assembly issues as the reason they are discontinuing a part. For

instance, KOA issued a product obsolescence notice (PON) in May for RN73 resistors with a last time buy date of September 2022, said Calabria. The PON states the series is being discontinued due to raw material availability issues.

Texas Instruments said it was discontinuing the LM3S microcontroller because its assembly contractor stopped supporting the part, according to Calabria.

Acquisitions have been another major source of discontinuation of active products. Some examples include Intel discontinuing the Altera series EPC2, Cyclone, and Stratix after Intel acquired Altera. ON Semiconductor discontinued many of the Fairchild 74VHC devices after Fairchild was purchased by On Semiconductor. Renesas acquired Intersil then discontinued ISL28, ISL63, ISL68, and X9268 series.

Calabria said many of these parts were discontinued by the acquiring company to avoid having two parts which have similar functionality. However, there are many challenges associated with using an “alternate part in an existing design, even when the alternate is believed to be a better part,” said Calabria.

The alternate part is not a drop-in replacement, he said. “There’s always evaluation, testing, reliability studies and process documentation that need to be performed to determine whether that



**Consolidation of low demand product lines allows the OCM to dedicate lines to high-volume, high-profit parts**

*Steve Calabria, founder and CEO of PC Components*

part can be used,” said Calabria. He added in most cases a component engineer would prefer a buyer “locate the part that was designed-in, rather than to use an alternate.”

COVID-19 has had an impact on component obsolescence, according to Todd Snow, vice president of purchasing for independent distributor Smith, based in Houston. “While pre-Covid saw many manufacturers starting to focus their attention to the newer products, the manufacturing capacity and customer reluctance to transition away from the legacy designs was not as prevalent as it is now,” he said.

### Focus on higher margin parts

Snow said restrictions caused by the pandemic and limited work schedules resulted in many manufacturers prioritizing their manufacturing efforts on the newer technologies and product releases because those parts are more profitable. “Legacy products, which may not have all of the improved features and functions of new product releases, do not provide the same margins as the newer ‘sexier’ products,” said Snow.

He added there is an increase in product change notices from multiple component manufacturers. “This has been seen across multiple commodities including memory and discretes.”

While more mature parts are being discontinued, demand for EOL parts is rising, said Snow. “Smith is seeing increases in demand from our customers in many industry segments and EOL parts are proving to be a challenge for many customers,” he said.

In such cases buyers often turn to independent distributors or authorized distributors that specialize

in obsolete parts. One such authorized distributor is Rochester Electronics, based in Newburyport, Mass. Rochester is authorized for more than 70 semiconductor manufacturers. It is an original manufacturer stocking distributor and has more than 15 billion devices in stock that include 200,000 part numbers.

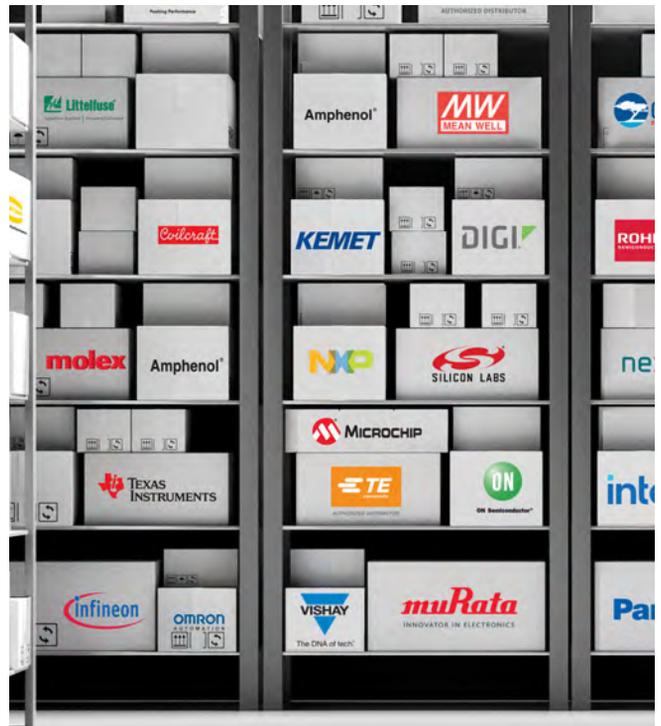
Rochester has the world’s most extensive range of end-of-life (EOL) semiconductors and broadest range of active semiconductors, according to the distributor. Besides stocking obsolete parts, Rochester, which was founded in 1981, is also a licensed semiconductor manufacturer. It has made over 20,000 device types. With over 12 billion die in stock, Rochester can manufacture over 70,000 device types. Rochester’s manufacturing services including design, wafer processing, assembly, test and IP archiving.

### Focus on obsolescence

Another authorized distributor that specializes in end-of-life parts is Flip Electronics, based in Roswell, Georgia. Flip’s business is similar to Rochester. “We focus on obsolescence 100 per cent,” said Jeff Ittel, executive vice president. “We take an authorized approach to focus on end-of-life and obsolescence inventory,” said Ittel. “Our approach is to partner with some suppliers and work closely with them,” he said.

Flip’s business group understands what capabilities a supplier may have concerning a part going end-of-life and know “what the supplier could produce, what extra die and finished goods they have. We buy that in bulk from them,” said Ittel.

He said Flip searches for obsolete inventory. “We don’t take as much product in on a consignment business as Rochester.



# Mouser has something other sources don't -

## Everything your BOM requires



[mouser.co.uk/available-to-ship](https://www.mouser.co.uk/available-to-ship)

Authorized distributor of semiconductors and electronic components.

We are little bit more proactive,” he said. Flip has an “astute team” that knows what parts buyers are looking for,” said Ittel. “We use that information to try to find product and make buys.”

Many of Flip’s customers are in the defense industry and other industries that have long product lifecycles. “Defense is a big segment for us,” said Ittel. Defense has a lot of old programs that get revived. Contracts are re-upped or awarded,” said Ittel. Many of these programs have 20 to 30-year or even longer lifecycles.

“We have been involved in some programs with the Navy in which about 40 ships had to be retrofitted,” he said. The Navy did not want to do a redesign which might have cost \$40-\$50 million but the retrofitting required some obsolete parts, said Ittel.

Flip also does business with medical OEM buyers. Medical has some of the same challenges as defense. “There are 10 to 20-year lifecycles,” noted Ittel. “It has an approval cycle with the Food and Drug Administration (FDA).

Obsolescence is becoming more of an issue with industrial because the chips used in industrial are used in so many different products and use mature or trailing edge technologies.

#### Little EOL warning

No matter what the industry, managing obsolete parts is a challenge for buyers because often there is little warning before an EOL notice is issued. Some companies try to be proactive in managing obsolescence. Larger companies in an industry that has recurring obsolescence issues such as aerospace, may have committees that include purchasing from all the companies sites. Committee members work to understand the markets

to identify potential obsolescence issues.

Electronics manufacturing services providers Sanmina uses several strategies to mitigate component obsolescence. “We are constantly refining the bill of materials with the OEM customer to ensure that they select components that have a long lifespan whenever possible,” said Pierre Brossier, director, regional supply chain for Sanmina.

Sanmina’s overall strategy for managing EOL parts is to have “more qualified vendors available at the start of a new product design,” he said. If there are multiple approved vendors, risk is reduced because of the flexibility to switch from one vendor to another in some scenarios, said Brossier. However, with microprocessors and other custom specific electronic components, there is only one source and so the “risk is higher for a full product redesign if some parts go EOL,” he said.

He said when Sanmina buyers work on EOL issues, they help an OEM customer find an alternate source for a part that may not have been available at the time of the design. Sanmina will also do a last-time buy for the component.

“We work with the customer to determine the number of components required to last the entire lifetime of the product and then purchase them in volume,” said Brossier. This approach may require some retesting of components “if they have been in storage for some time but it’s very manageable,” he said.

“Another effective solution is to request that a vendor build and store wafers on our behalf, instead of a complete component that is ready to use,” said Brossier. This ensures the highest level of quality when “we are ready to produce

a new component down the road,” said Brossier. However, customers tend to prefer lifetime buy orders for complete components, he said.

#### Obsolescence may worsen

Brossier said the problem of obsolescence parts may become more acute in the future because more products with long lifecycles are being built. “Today, we are seeing more OEMs, such as automakers, develop products that have a longer life span, so there’s a higher probability that some parts will become obsolete over time,” he said.

While Sanmina is a large global EMS provider, obsolescence is also a problem for buyers at smaller companies. Purchasers at smaller OEMs and EMS providers also need to be proactive in managing component obsolescence.

“Buyers need to keep their bills of material fresh, stay on top of it work with distributors that can analyze their bill of materials and give suggestions” about parts that are at risk and offer possible alternatives, said Ittel.

He noted that no one knows when a part is going to go end of life “until you see that EOL notice come out. What we will do is we will look at bills of materials from our customers and try to identify potential problem areas,” said Ittel.

He added when an EOL notice is issued for a part, buyers may make a buy to cover their next year’s production. But supply problems with EOL parts often occur two or three years after an EOL notice is issued.



**“We take an authorized approach to focus on end-of-life and obsolescence inventory”**

Jeff Ittel, executive vice president of Flip Electronics

# 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
<b>CABLE ASSEMBLY &amp; HARNESSING</b>											
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
<b>CIRCUIT PROTECTION</b>											
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
<b>ENCLOSURES</b>											
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
<b>FREQUENCY MANAGEMENT</b>											
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



**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 B.V.**

More than 50,000 connectors



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

**Want to Advertise here?**

Contact Emma at  
emma.poole@electronics-sourcing.com

Or call us on 01892 613400

**Want to Advertise here?**

Contact Emma at  
emma.poole@electronics-sourcing.com

Or call us on 01892 613400

**Want to Advertise here?**

Contact Emma at  
emma.poole@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
<b>HEATSINKS</b>											
Aavid	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	200	N/A	0 €	N/A	50	2,500+	Y
<b>ICs &amp; SEMICONDUCTORS</b>											
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
Infineon	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	8,300	N/A	0 €	N/A	50	2,500+	Y
Intel	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,750	N/A	0 €	N/A	50	2,500+	Y
Maxim Integrated	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	14,050	N/A	0 €	N/A	50	2,500+	Y
Microchip	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	24,200	N/A	0 €	N/A	50	2,500+	Y
Micron Technology	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	600	N/A	0 €	N/A	50	2,500+	Y
Monolithic Power Systems (MPS)	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	850	N/A	0 €	N/A	50	2,500+	Y
Nexperia	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	7,600	N/A	0 €	N/A	50	2,500+	Y
Nordic Semiconductor	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	60	N/A	0 €	N/A	50	2,500+	Y
NXP	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	4,700	N/A	0 €	N/A	50	2,500+	Y
ON Semiconductor	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	18,700	N/A	0 €	N/A	50	2,500+	Y
Power Integrations	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	750	N/A	0 €	N/A	50	2,500+	Y
Qorvo	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	700	N/A	0 €	N/A	50	2,500+	Y
Renesas Electronics	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	5,550	N/A	0 €	N/A	50	2,500+	Y
ROHM Semiconductor	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	6,900	N/A	0 €	N/A	50	2,500+	Y
Semtech	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	350	N/A	0 €	N/A	50	2,500+	Y
Silicon Laboratories	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,200	N/A	0 €	N/A	50	2,500+	Y
Skyworks	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	550	N/A	0 €	N/A	50	2,500+	Y
STMicroelectronics	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	10,050	N/A	0 €	N/A	50	2,500+	Y
Texas Instruments	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	39,050	N/A	0 €	N/A	50	2,500+	Y
Toshiba	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,050	N/A	0 €	N/A	50	2,500+	Y
Vishay	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	10,850	N/A	0 €	N/A	50	2,500+	Y
Xilinx	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,900	N/A	0 €	N/A	50	2,500+	Y
<b>INTERCONNECTION</b>											
3M	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,750	N/A	0 €	N/A	50	2,500+	Y
Amphenol	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	33,200	N/A	0 €	N/A	50	2,500+	Y
Cinch Connectivity Solutions	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	4,250	N/A	0 €	N/A	50	2,500+	Y
FCI / Amphenol	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	7,850	N/A	0 €	N/A	50	2,500+	Y
HARTING	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	6,800	N/A	0 €	N/A	50	2,500+	Y
Harwin	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,950	N/A	0 €	N/A	50	2,500+	Y
Hirose Electric	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	7,850	N/A	0 €	N/A	50	2,500+	Y
Intelliconnect (Europe) Ltd		01245 347145	www.intelliconnect.co.uk	N/A	N/A	N/A	N/A	100%	5	30	
JAE Electronics	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,450	N/A	0 €	N/A	50	2,500+	Y
Molex	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	23,600	N/A	0 €	N/A	50	2,500+	Y
Phoenix Contact	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	17,150	N/A	0 €	N/A	50	2,500+	Y
Radiall	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,350	N/A	0 €	N/A	50	2,500+	Y
Samtec	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	16,300	N/A	0 €	N/A	50	2,500+	Y
Souriau	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	3,300	N/A	0 €	N/A	50	2,500+	Y
TE Connectivity	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	41,850	N/A	0 €	N/A	50	2,500+	Y
Wurth Elektronik	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,650	N/A	0 €	N/A	50	2,500+	Y
<b>MEDICAL CERTIFIED</b>											
Review Display Systems		01959 563 345	www.review-displays.co.uk				£100				

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
<b>OBSOLESCENCE / HARD TO FIND</b>											
	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
<b>OPTO ELECTRONICS</b>											
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
<b>PASSIVES</b>											
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
<b>PASSIVES ALTERNATIVES</b>											
BEC Distribution Ltd		01844 275824	www.bec.co.uk		5,000	N/A	£0	100%	3	5	Y
<b>POWER &amp; BATTERIES</b>											
FRIWO Gerätebau GmbH	Haredata Electronics	01423 796240	www.haredata.co.uk	Y	250 - 500	€1M	£250	100%	7	14	Y
Jauch Quartz		01276 605900	www.jauch.com			£500,000	0	95	15	130	Y
Mean Well	Ecopac (UK) Power Ltd	01844 204420	www.ecopacpower.co.uk	Y	6,000	£2M	£0	100%	8	30	Y
Bel Power Solutions	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	600	N/A	0 €	N/A	50	2,500+	Y
CUI Inc.	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,200	N/A	0 €	N/A	50	2,500+	Y
MEAN WELL	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	4,400	N/A	0 €	N/A	50	2,500+	Y
Murata	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1500	N/A	0 €	N/A	50	2,500+	Y
RECOM	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	3,150	N/A	0 €	N/A	50	2,500+	Y
TDK-Lambda	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,900	N/A	0 €	N/A	50	2,500+	Y
TRACO Power	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	4,000	N/A	0 €	N/A	50	2,500+	Y
Vicor	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,300	N/A	0 €	N/A	50	2,500+	Y
XP Power	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,200	N/A	0 €	N/A	50	2,500+	Y
<b>SENSORS</b>											
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
<b>SWITCHES &amp; KEYBOARDS</b>											
Apem	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,850	N/A	0 €	N/A	50	2,500+	Y
C&K Switches	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	5,550	N/A	0 €	N/A	50	2,500+	Y
E-Switch	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	2,350	N/A	0 €	N/A	50	2,500+	Y
EAO	Mouser Electronics	01494-427500	www.mouser.co.uk	Y	1,800	N/A	0 €	N/A	50	2,500+	Y
EAO Ltd	EAO Ltd	01444 236000	www.eao.co.uk	N	5,000	£500,000	£150	100%	6	22	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
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
<b>TERMINAL BLOCKS</b>											
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
<b>THERMAL MANAGEMENT</b>											
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
<b>TRANSFORMERS &amp; INDUCTORS</b>											
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
<b>WIRELESS SOLUTIONS</b>											
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	Y	Y	Y
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, Space 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
<b>C-CLASS COMPONENTS</b>													
Essentra Components	0845 758 5070	www.essentracomponents.co.uk	£283.3m	UK	2500		UL / CE / IATF	N	Y	Y	Y	N	Y

# PCB Buyers' Guide

Manufacturer	Telephone	Website	Service Provided (i.e. Prototype, Manufacture &/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	+44(0)1423 321100	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
Anglia Components	BC	Oxley Group	09
Best Windings Limited	34	Pektron	15
CML Innovative Technologies LTD	16	Phoenix Systems UK Ltd	15
Corintech	17	Rebound Electronics	26
Digi-Key Electronics	FC, IFC, 19	Review Display Systems	27
ECIA (Trusted Parts)	5	ROHM Semiconductor	15
Electronic Technicians Ltd	14	ROLEC Enclosures	23
FermionX	10	Schurter Electronic Components	27
Hammond Manufacturing	24	Solid State Supplies	21
Lascar Electronics	20	Stego	25
Mouser Electronics	29	Tate Circuits	14
Nemco	17	Tioga Electronic Assembly	11
NOTE Group	13		



AHEAD OF WHAT'S POSSIBLE™

ADI Power by Linear™

# Transform your future

Leveraging advanced breakthrough technologies for a smarter world.

A/D Converters

D/A Converters

Amplifiers

Switches & Multiplexers

**Power Management** .....

Optical Comms & Sensing

Processors & DSP

RF & Microwave

Sensors & MEMS

Interface & Isolation

Clock & Timing

Industrial Ethernet



View products with your Smartphone

THANK YOU

Discover our extensive portfolio

# angliaLive

[www.anglia-live.com/adi](http://www.anglia-live.com/adi)

