

ELECTRONICS

OCTOBER 2020

Sourcing

UK & IRELAND

***HARD TO FIND
ELECTRONIC
COMPONENTS:
FOUND THEM***

***CHOOSING A
PCB SUPPLIER***

page 36

***COMBINING
A WEALTH OF
EXPERIENCE***

page 09

***HOLDING
THEIR OWN***

page 16

**TURN
THE PAGE
ON YOUR
PROCUREMENT
PROCESS**

AN MMG PUBLISHING TITLE



LOOK INSIDE ▶

YOUR DIGITAL TRANSFORMATION BEGINS HERE



[DIGIKEY.COM/DIGITALSOLUTIONS](https://www.digikey.com/digitalsolutions)

Digi-Key is a franchised distributor for all supplier partners. New products added daily. Digi-Key and Digi-Key Electronics are registered trademarks of Digi-Key Electronics in the U.S. and other countries. © 2020 Digi-Key Electronics, 701 Brooks Ave. South, Thief River Falls, MN 56701, USA

 ECIA MEMBER
Supporting The Authorized Channel



On the cover – October 2020

Hard to find electronic components: found them

Editor's Word



Contents

04

News

Mezzanine strips ready to ship

12

Security

End-to-end supply chain protection

20

Passives

Passive components make the grade

31

Harsh Environments

Cable assemblies and durable connectors unite

38

Buyers' Guide

All the facts and figures to help you buy

Contact

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

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
New Business Manager: Jack Pollard
jack.pollard@electronics-sourcing.co.uk

DESIGN

Graphic Designer: Josh Hilton
josh.hilton@electronics-sourcing.co.uk

CIRCULATION

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

PUBLISHER

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

Issue 184, Vol.17 No.10

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
© 2020 MMG Publishing Ltd



I have become my own story

I wonder what percentage of the global population is waiting for a return to 'normal'? I fear they are in for a long wait. My guess is that we are in what I'm coining as the 'great upheaval'. Personally, my buying patterns, processes and channels have changed and changed forever.

For example, one of the things I'm filling my spare time with is the restoration of vintage bicycles from the 1970s.

To achieve this, I need to buy parts. My previous trusted retail suppliers have either closed their shops or, when I do visit those that remain open, their shelves are empty. Thus, I have switched to a set of broadline, catalogue, long-tail, specialist and independent distributors. I communicate with them all digitally and purchase electronically. Just the sort of contemporary supply chain this magazine has been promoting over recent years.

Here are some of my consumer-oriented examples. Broadlines are providing branded consumables such as Loctite Super Lube synthetic grease. Long-tails are providing obscure, used or new-old-stock (NoS) parts such as Sturmley Archer locking washers. Specialists are providing novel LED bulbs and holders to work with 6V dyno-hubs. I could go on.

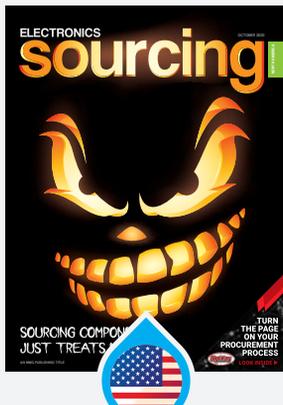
Don't wait for normal to return. Instead, talk to the companies featured and advertising in this magazine to build a digital-first, highly automated, blended supply chain which can reach every corner of your factory, from product prototyping to reclamation.

Jon Barnett

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

View current editions online

www.electronics-sourcing.co.uk



Buying into voice commands and motion recognition

Mouser is now stocking Panasonic's PAN1740A series RF module. The device features a baseband processor and radio transceivers for Bluetooth 5.0 Low Energy connectivity. The module supports up to eight connections and features reduced boot time, providing a suitable solution for remote control units that demand support for motion and gesture recognition and voice commands.

The module integrates an audio unit to provide a simple interface for: external codecs over PCM/I²S; MEMS microphones over PDM; and a sample rate converter unit. Featuring a programmable Arm Cortex-M0 CPU, the module can be used as a standalone application processor or data pump in hosted systems. Drawing just 4.9mA in transmit/receive mode, the module uses coin cell batteries. Measuring 9.0 by 9.5 by 1.8mm, it offers a link budget of 93dBm.

The transceiver is certified with the Bluetooth 5.0 standard, plus EU CE RED, FCC and IC. The module features dedicated hardware for the link layer implementation of Bluetooth Low Energy and supports custom profiles and all Bluetooth SIG profiles.

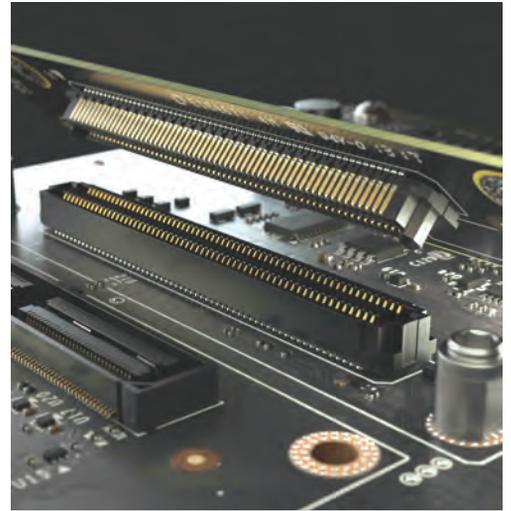
www.mouser.com

Positioned to deliver

Digi-Key has partnered with Septentrio, a specialist in high-precision GNSS positioning solutions. The company's mosaic-X5 is designed to offer customers secure, reliable, high-accuracy positioning in a compact and low-power form factor.

Mosaic-X5 features multi-frequency, multi-constellation technology and tracks signals from all Global Navigation Satellite System (GNSS) constellations. The company states such signal diversity, coupled with anti-jamming technology, lets mosaic-X5 deliver centimetre-level positioning even in challenging industrial environments. Applications include robotics, automation and telematics.

Septentrio's head of product management, Francois Freulon, said: "With its small form factor and low-power design, mosaic-X5 brings



Fast, slim mezzanine strips ready to ship

RS Components is now stocking the AcceleRate HD range of ultra-dense micro interconnects from Samtec. Engineered to save space, these mezzanine strips feature high-speed Edge Rate contacts and open-pin-field design for greater flexibility and ease of integration. They suit applications demanding fast, clean signalling, from broadcast video to optical systems.

AcceleRate HD comes with up to 240 I/Os (four rows with 10 to 60 positions each). Measuring 5mm high by 5mm wide, the solution saves space. Solder ball technology simplifies processing and self-aligning, reducing installation time. Various stack heights (7 to 16mm) and mount options (right-angle and cable in development) are offered.

Regarding flexibility, it comes in an open pin-field design enabling more grounding and routing options. The ADM6 surface mount header delivers 56Gbps PAM4 performance and is compatible with both the UMPT and UMPS series, allowing flexible, two-piece power/signal solutions.

uk.rs-online.com

high-performance positioning to volume applications. Having Digi-Key as a distributor enables us to scale and reach out to find new markets and applications where secure high accuracy positioning is required."

Digi-Key's vice president of global supplier management, David Stein, added: "Demand for high-accuracy GNSS receivers with secure and robust positioning is growing strongly, as they continue to be implemented into new applications and devices. Digi-Key offers customers an easy path to order, develop and deploy with the latest technologies available, including Septentrio's robust and precise GNSS devices, which have the latest anti-jamming and anti-spoofing technology."

www.digikey.co.uk

Innovation, selection and service in perfect harmony

Millions of products
limitless design options



AUTHORIZED DISTRIBUTOR



Available to ship today
mouser.co.uk/te-selection

In Brief

Expanded custom power supply portfolio

TT Electronics is expanding the development and manufacturing of custom power supplies into the UK to better support and serve the company's aerospace and defence partners. The range of custom power supplies and power conversion systems suits harsh environment, mission-critical applications. www.ttelectronics.com

Women in Electronics announces European chapter

Women in Electronics is going global with chapter expansions into Europe. WE founder and president, Jackie Mattox, said: "Our team looks forward to working with our new European members and encouraging women and men across the globe to work together to find inspiration, strength and empowerment through community." www.womeninelectronics.com

Powerful new website

Components Bureau has announced a new website. Focused on its power offering, the site features own brand transformers and power supplies. The site is equipped with filter options and datasheets for the power supply range, providing options to search by brand, market sector, format type, number of outputs and cooling methods. www.componentsbureau.com

Sealed and delivered

EMKA's new 2020/2021 enclosure hardware catalogue and supplement cover its range of locking technologies for cabinets and enclosures including locks, handles, hinges, swing handles and gaskets. New hinges include designs for flush and protruding doors. A New gasket sealing sections in EPDM seal an enclosure or cabinet against dust and water. www.emkablog.co.uk



Improved enclosure is fast to assemble

Improved Unibase aluminium instrument enclosures from Metcase are quicker to assemble thanks to redesigned chassis profiles and a new assembly tool. These enclosures suit applications including measuring and control, switchboxes, modems, medical and laboratory products.

The enclosure's extruded chassis profiles hold blue slide-in threaded nut holders in vertical alignment, making it easier to locate top and base cover screws. The assembly tool pushes the blue threaded nut holders into the right horizontal position in the profiles. This aligns them with the top and base cover assembly screws. Four screws on each side speed up assembly times.

Unibase is designed to offer easy access to PCBs and components. Wraparound U-shaped top/base covers and the front/rear panels can be quickly removed. PCBs slide in/out of guide rails. The front panel is recessed to protect controls. Front and rear panels and four push-in non-slip rubber feet are supplied.

Ten standard sizes range from 130 by 180 by 50mm to 474 by 300 by 134.5mm. Prices start at £44. Accessories include the assembly tool and alternative cover/panel fixings screws.

www.metcase.co.uk

Ready supply of tough converters

Relec Electronics has announced the availability of Cincon's CQB75W8 and CHB150W8 DC-DC converters which offer an 8:1 input range and suit demanding industrial and military applications.

The quarter and half-brick converters have an input range of 9 to 75VDC which suits common battery and bus voltages and 12, 24, 36 and 48V systems. The series suits distributed power architectures, telecommunications, battery operated equipment and industrial applications, plus demanding railway environments.

Both products can withstand a 100V input surge for 100ms. EMC filter components allow use in military systems required to meet RTCA DO-160E, DEF STAN 6-15 part 6, Mil-STD-1275D and Mil-STD-704A.

Showcasing opto-sensors for touch-free life

Anglia is offering Omron touch sensors to reduce contact and shared surfaces as facilities adapt to coronavirus countermeasures. Omron's B5W LCR sensors, W7ED capacitive touch sensors and D6T non-contact temperature sensors enable future generations of automated devices to improve safety and help prevent the spread of disease.

Anglia's technical director, David Pearson, commented: "With social distancing set to become a new norm, there are opportunities for sensing technologies to provide extra protection. Anglia FAEs are trained to support this portfolio of Omron solutions which draws on the company's expertise in presence, proximity and touch sensing. In addition to typical applications such as security and energy management, these sensors are ideal for detection of raised body surface temperature, a key symptom of Coronavirus."

Light convergent reflective sensors offer a wide sensing range to allow object shifting and are particularly well suited to detecting challenging objects such as those that are reflective, transparent or diffuse. Applications include door openers, dispensers, taps and flushers.

Capacitive touch sensors combine the simplicity of a mechanical switch with the advantages of touch control. Applications include lift controls.

Thermal infrared sensors can be added to an access-control system to automatically check the surface temperature of a visitor on arrival, protecting the occupants and warning the individual, who may not know they are infected.

www.anglia-live.com



Qualifications include: EN45545-2 fire and smoke; EN 50155 (EN 61373) shock and vibration for railway use; UL62368-1 2nd edition reinforced insulation; CB test certificate IEC62368-1 and EN50155/EN50121-3-2 with external circuits.

Efficiency is up to 90 per cent, while operating temperature range -40 to 105°C.

www.relec.co.uk

Cords Lost at Sea?

Let Interpower®
Navigate Your Cords
Past Global Slowdowns

With 1-Week Lead-Times and Same Day Shipping on Interpower North American and International cords and cord sets, Interpower manufactures and ships cords when and where you need them. Our U.S.A.-made cords soar past temporary quarantines and restrictions with FAST shipping. Our power cords are customisable—lengths, colours, labels, packaging—to your specifications. All Interpower cords are tested in design and production phases.

With no minimum order requirements, and compliant with North American and International standards, Interpower helps you design for global markets. We provide the end user with the correct connections to the local mains power supply which helps reduce production schedule bottlenecks. Whether 1 cord or 5,000, Interpower provides customised solutions. Interpower remains unaffected by COVID-19 shipping delays—your cords won't get lost at sea.



Let Interpower Components Ltd. Connect You to Global Power:

- 1-Week Manufacturing Lead-Times
- Same Day Shipping on In-stock Products
- No MOQ or Dollar Requirements
- Blanket and Scheduled Orders Available
- Value-Added Options Available
- Free Technical Support



Order Online! www.interpower.com

Business Hours: 8:30 a.m.–5 p.m. GMT





Electronica 2020 to be held digitally

Due to travel restrictions, Electronica will be a virtual event this year. The digital format will provide people with additional ways to interact and network. A large portion of the conference and supporting program will also be available digitally.

NXP Semiconductors' CEO and chairman of the Electronica Advisory Board, Kurt Sievers added: "After re-evaluating the situation, I consider the decision of Messe München to be very appropriate and responsible. We are pleased that, with Electronica virtual, a concept is now offered for 2020 that allows exhibitors to reach their international customers, even in the continuing difficult pandemic period. Via this digital platform, exhibitors can present their innovations, learn about industry trends and efficiently network with customers and suppliers."

Head of components, mobility & systems at the German Electrical and Electronic Manufacturers' Association, Christoph Stoppok said: "The electronics industry and the solutions it provides are one of the major driving forces behind digitalisation. Let's put the industry's ingenuity to use and get together this year at a virtual fair. This is exactly the right time to foster a dialogue in the industry and generate economic momentum once again."

www.electronica.de

UK made connectors and accessories meet MIL-DTL-26482

Weald Electronics' LMH range of bayonet coupling connectors is designed to meet the requirements of MIL-DTL-26482 Series 1 and Patt 105. It is manufactured to IECQ-CECC spec BS/CECC 75201-003 and BS 9522 F0017. As a result, the connectors suit military and demanding industrial applications.

The multi-pin circular connectors can be supplied in nine shell sizes and 25 shell styles. Standard connectors can be supplied with two to 61 contacts. Shells are manufactured from aluminium alloy and feature an olive drab chromate conversion over a zinc cobalt, RoHS compliant plating finish. Other finishes available include cadmium, black zinc nickel and electroless nickel.

Bonded solder contacts provide a through-connector seal even when unmated and each connector is leak-tested at 1bar during final assembly.

Lane Electronics is the sole source for Weald Electronics connectors and accessories.

www.fclane.com

Expanding range of FPGA solutions

Rutronik UK is now stocking the Gowin Semiconductor range which includes FPGA solutions for industrial, communications, medical, consumer and automotive markets.

Rutronik's senior marketing manager digital, Adrian Elms, said: "We are very pleased to be working with Gowin. The innovative portfolio of FPGA products, particularly for the IoT, significantly enhances our range of system solutions offerings."

Gowin's director of EMEA sales, Mike Furnival, added: "We are delighted to have such a well-established and renowned distributor as Rutronik to help us further grow our fast-developing business across not just EMEA but also North, Central and South America. I believe their solution-based selling, technical expertise and excellent geographic coverage will be a great complement to our existing network of representative sales and niche and bespoke distributors."

www.rutronik.com



Volex Power Cords Quality without compromise

- › The latest generation V-Novus Hybrid cord sets
- › New slimline design with full insertion indicators
- › Automated production line to ensure consistent quality
- › Fully compliant to regional safety approvals and standards

+44 (0)1256 472000 sales@gtk.co.uk www.gtk.co.uk

Combining a wealth of experience

Easby Group MD, Nigel Copely explains how recently formed Easby Group Holdings pools the unique strengths of Easby Electronics, Delta Impact and Freeway Electronics

Easby Group Holdings is being formed to bring together the key strengths of Easby Electronics, Delta Impact and Freeway Electronics: a milestone in the development of the Rebound Group.

Easby Group MD, Nigel Copely, said: "With Easby celebrating its 40th anniversary, Delta's 32-years of trading and Freeway's 17-years of trading, it just makes sense to combine the wealth of experience within these three companies and bring them together as a group.

"This new Group brings the

size, strength and experience across the three businesses that will place us well in the market, offering a unique and strong customer proposition.

"The Rebound Group's vision has been to grow Easby, Delta and Freeway, with each becoming a more significant business. The management of Easby, Delta and Freeway are thrilled at the opportunities which this merger will create, bringing these businesses together will immediately give us a strong platform in the UK and across Europe.

"Covid has brought uncertainty to the industry and to our market, so

creating an increase in the number and range of opportunities from our customers, old and new, in both the UK and mainland Europe. Customers are looking for local support which the new Easby Group is of the size and ability to provide."

Easby and Freeway will drive growth, using their core competencies: franchised line card, focused technologies and demand creation. Delta will focus on its core competencies in kitting, with the aim of becoming the kitting house of choice.

www.easby.com



Easby Group MD, Nigel Copely

Rebound Electronics
Flexible Component Solutions

Rebound Group

Delta Impact Easby Electronics Rebound Electronics

Sales +44 (0)1635 555999 | enquiries@reboundeu.com | www.reboundeu.com

CERTIFIED AS 9139 Rev. 9 COMPANY
ASSOCIATION ANSI/ESD-S20.20
ISO 13485:2016 ISO 9001:2015
ACS

Rebound Electronics UK
Rivergate House, Newbury Business Park
London Rd, Newbury, RG14 2PZ

Long-term storage of electronic devices

In this article, Retronix introduces a GEIA-STD-0003A compliant long-term storage service designed to be smooth, cost-effective and efficient

Companies spend a lot of money storing devices for future use. Reasons for long-term storage include: obsolescence issues; devices on extended lead-times; application specific components which are not available off-the-shelf; and parts which influence the build schedule etc.

Services can be defined by the customer or by Retronix to suit each case. The company can offer advice on the steps that would be required for each device type and work with customers to create a specification for each device. That specification can then be applied to the

bespoke Retronix Factory Management System to ensure these specifications are called up for use on any future orders for the relevant devices.

Retronix will have a pre-arranged agreement which makes the process smoother,

more cost-effective and more efficient. All while conforming to GEIA-STD-0003A.

www.retronix.com

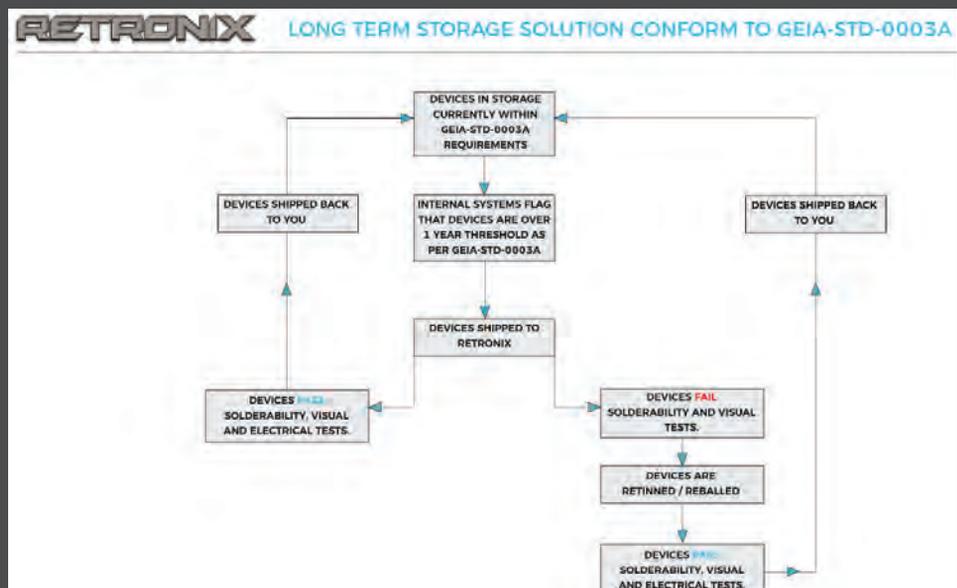
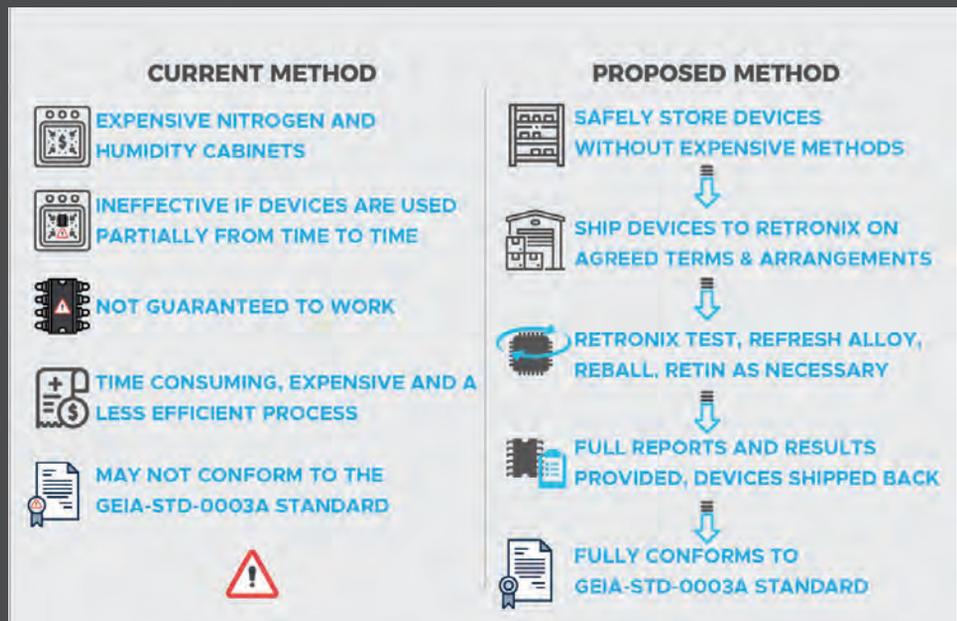
The risks of long-term storage are well detailed in GEIA-STD-0003A and listed as: tin whiskers; intermetallics; dopant migration; and plating diffusion. This is the reasoning behind the controls put into place and the reason for the set timeline of one-year and recommended inspection and testing of parts after this time.

However, are storage methods effective? Is there a better solution?

Companies will re-seal and vacuum pack trays of devices. Some go even further by storing in humidity or nitrogen cabinets. Here lies the problem: these measures are not guaranteed to work. Maintaining perfect storage conditions at all times is expensive, especially if the devices are partially used from time-to-time.

What is a better option?

The better option is not to spend money on expensive storage methods but to put devices safely on a shelf and, when they are required, Retronix can carry out a range of services. Retronix can do a sample solderability test to find out if the parts are useable. If not, the alloy can be refreshed to 'as new' condition in terms of solderability. The parts are then baked and repacked to reset the clock on the MSL level.



RETRONIX



EXPERT
ADVICE

TECHNOLOGY SOLUTIONS



SUPPORT



KNOWLEDGE &
EXPERIENCE

SUITE OF HIGH RELIABILITY SERVICES

- 1) ROBOTIC HOT SOLDER DIP
 - 1.A) ALLOY REFRESH / ALLOY CONVERSION
 - 1.B) TIN WHISKER MITIGATION
 - 1.C) GOLD EMBRITTLEMENT SOLUTIONS
 - 2) LASER REBALLING
 - 2.A) APPLICATION SPECIFIC BALLING
 - 3) IC TESTS
 - 3.A) VISUAL INSPECTION
 - 3.B) XRF TEST
 - 3.C) 3D XRAY INSPECTION
 - 3.D) SOLDERABILITY TEST
 - 3.E) ELECTRICAL TESTING
 - 3.F) KEY FUNCTIONAL TESTING
 - 3.G) FLASH MEMORY TEST
 - 3.H) DECAPSULATION
 - 3.I) HEATED SOLVENT TEST
 - 3.J) IONIC TESTING
 - 4) UPSCALING
 - 5) OBSOLESCENCE SOLUTIONS
 - 5.A) SAFE COMPONENT RECOVERY
 - 5.B) CIRCULAR ECONOMY SOLUTION
 - 6) PCB SERVICES
 - 6.A) PCB REWORK
 - 6.B) PCB REPAIR
 - 7) IC REWORK
 - 7.A) SPECIALISED REWORK
 - 8) PCB MODELLING
-AND MORE.**

WWW.RETRONIX.COM

A trustworthy solution for end-to-end supply chain protection

Lattice explains how its SupplyGuard service preserves trust throughout unprotected supply chains by protecting against counterfeiting, overbuilding and trojan insertion

Lattice has launched its Sentry solutions stack and SupplyGuard supply chain protection service. Sentry stack comprises customizable embedded software, reference designs, IP and development tools to implement secure systems compliant with NIST Platform Firmware Resiliency (PFR) Guidelines (NIST SP-800-193). SupplyGuard extends this protection throughout the supply chain by delivering factory-locked devices protected from attacks like cloning and malware insertion. Application areas include communications, datacentre, industrial, automotive, aerospace and client computing.

The security paradigm is changing and firmware is an increasingly popular attack vector. The National Vulnerability Database reported that between 2016 and 2019 the number of firmware vulnerabilities grew over 700 per cent. Protecting systems against unauthorised firmware access

requires dynamic, persistent, real-time hardware platform security for all connected devices. This includes securing component firmware from unauthorised access.

Lattice's VP of security business, Eric Sivertson, said: "To provide them with peace of mind in a constantly changing and increasingly risky supply chain environment, Lattice developed our SupplyGuard service to help our customers securely provision their devices while lowering their overall costs. With Sentry and SupplyGuard, Lattice delivers comprehensive, truly parallel, nanosecond reactive, next-generation security to enable dynamic trust for our customers and the users of their products."

The Sentry stack provides a pre-verified, NIST-compliant PFR implementation that enforces strict, real-time access controls to all system firmware during and after system boot. If corrupt

firmware is detected, Sentry can automatically rollback to a previously known good state version of the firmware so secure system operation continues without interruption.

Compliance with latest NIST SP-800-193 standard and CAVP certifications, the stack enables implementation of a hardware RoT through its support for the cryptographically-sound Lattice MachXO3D family of FPGAs.

SupplyGuard is a subscribed service that offers OEMs and ODMs peace of mind by tracking locked Lattice FPGAs through their entire lifecycle, from the point of manufacture, through transport through the global supply chain, system integration and assembly, initial configuration, and deployment.

The service ensures only authorised manufacturers can build an OEM's design, regardless of their location. It

provides OEMs with a secure key infrastructure to prevent the activation of their IP on unauthorised components to stop product cloning and overbuilding.

SupplyGuard secures devices against the download and installation of trojans, malware, or other unauthorised software to protect platforms and systems against equipment hijacking or other cyberattacks. The service can be customised to meet the specific security and supply chain needs of OEMs in different industries. Lattice states the service lowers the operating costs associated with implementing a secure manufacturing ecosystem.

www.latticesemi.com

Lattice SupplyGuard Service for Supply Chain Resilience
Enabled by Platform Firmware Resiliency (PFR) with End-to-End Supply Chain Protection

LATTICE SUPPLYGUARD: SERVICE FOR SUPPLY CHAIN RESILIENCE

LATTICE SupplyGuard

SupplyGuard Service provides resilience from attacks throughout supply chain

The advertisement features a large blue padlock icon on the left with the Lattice SupplyGuard logo. The background is a dark, industrial scene with a crane lifting a container at a port, overlaid with a digital grid and binary code.

ASTUTE

OVER
30 YEARS
— INVESTED INTO —
GLOBAL SUPPLY CHAIN SOLUTIONS

- S** Safe-Supply: Quality driven component sourcing services.
- E** E-Design: Engineering support for the high reliability sector.
- a** ACAP: Market leading counterfeit avoidance program.
- 3PL** Astute 3PL: Smart Supply Chain Solutions.

— **DON'T RISK COUNTERFEIT** —

— **WHEN LIFE IS ON THE LINE** —

Crisis and disaster spell opportunity for counterfeiters. To be conscious of quality is to care. Speak to Astute about mitigating the risk of counterfeit material entering your supply chain.

acap
ASTUTE COUNTERFEIT
AVOIDANCE PROGRAMME

Streamline your purchasing process

MMG Publishing, publisher of *Electronics Sourcing*, has announced *Component Sourcing*, a new service designed to streamline the purchasing process.

Free to use, the service lets purchasers quickly and easily request component pricing and availability from manufacturers and distributors who support *Electronics Sourcing* globally. Requests are sent instantly, with responses going straight to your inbox.

Faced with the impact of the pandemic, Electronic Sourcing readers have

contacted MMG requesting help sourcing components due to workloads and stock problems with current, hard-to-find and obsolete components. This service is designed to help alleviate these issues and improve the efficiency of the purchasing process.

To use the service go to www.component-sourcing.com and upload your BoM. Alternatively enter the part number, quantity and preferred manufacturer.

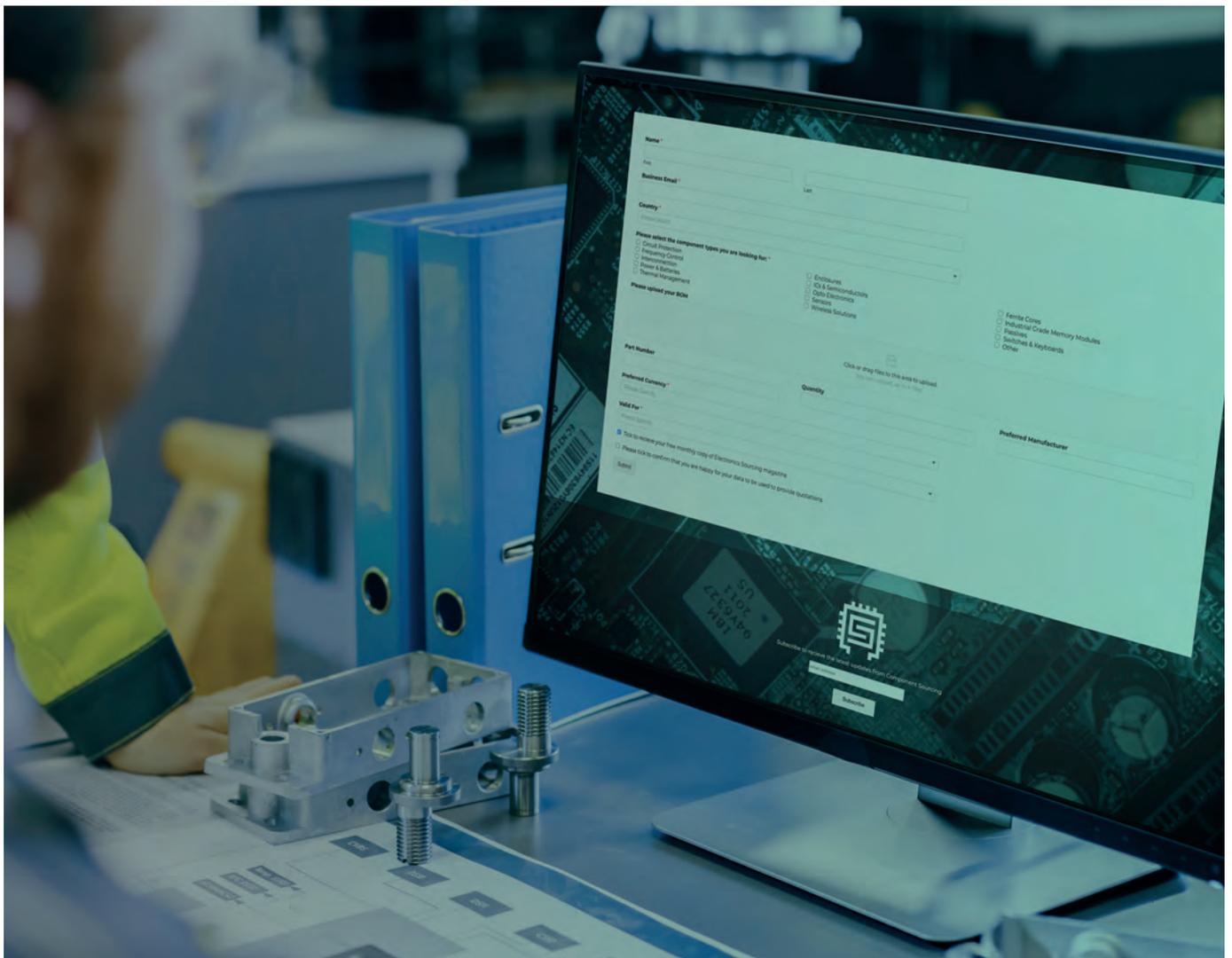
As part of MMG Publishing's ongoing investment we appreciate feedback to

help improve our services and your user experience. Please use the following link to provide your feedback: www.surveygizmo.com/s3/5800820/Component-Sourcing-Feedback

component-sourcing.com



Component Sourcing lets purchasers quickly and easily request component pricing and availability from manufacturers and distributors who support *Electronics Sourcing* globally



THE FLEXIBILITY OF A DISTRIBUTOR

We have partnered with a technology leading component manufacturer, who directly complements our Design focus. For which we can offer the same comprehensive service and support, as with our own Timing and Battery products.



KEY PRODUCTS



Custom Transformers

Planar Transformers

Automotive Components

EMC Components

True SMD LAN Transformers

Wireless charging solutions

Power Inductors

SUPERWORLD ELECTRONICS

» *Your one stop shop for magnetics*

- > EXCLUSIVE UK partner
- > Established 25 years
- > Turnover in excess of \$150m
- > HQ in Singapore
- > 9 manufacturing sites
- > ISO9001:2015, IATF16949

Jauch Quartz UK & Ireland



Frequency control



Battery technology

PHONE
+44 (0) 1276 605900

EMAIL
sales@jauch.com

WEB
www.jauch.com

EA'S ALL-IN-ONE SOLUTION FOR POWER ELECTRONICS

EA-PSB 10000: bidirectional, regenerative and autoranging output, 30kW in a 4U, 19" Rack-Mount Chassis and up to 2,000Vdc

Product highlights:

- Bidirectional, Regenerative and Autoranging output with
 - Up to 95% efficient in Source and Sink modes
 - Zero deadtime between Source and Sink
- Digitally controlled and regulated (V, I, P, R)
- 5" TFT Touch Screen Display

Our systems are used in many industries and applications, including manufacturing, research and development.



Tel. +49 (0) 21 62 / 37 85 - 0 · ea1974@elektroautomatik.com · www.elektroautomatik.com/ese

Holding their own

Memory Protection Devices' president, Thomas Blaha, explains how prioritizing application requirements optimizes battery holder selection

When designing power management solutions involving AA batteries, engineers often focus on the battery rather than the holder. Often overlooked, the holder plays an important role ensuring system ruggedness and reliability.

Like most products, battery holders are designed to contradictory requirements. Ideally, they need to be small and light, yet survive shock and vibration while securing large, heavy batteries.

Quality battery holders can meet these requirements, but compromises invariably arise. Manufacturers must work from a prioritized list of features. For example, if the primary requirement is to hold the battery securely, then a secure screw-on cover may be necessary. An application requiring easy field replacement may require a looser fit

with finger notches or an easily disengaged latching mechanism. This may involve trade-offs such as added size, weight and cost.

Battery holders can enhance a product's robustness. Access doors can employ ribs to secure multiple batteries that could shift position and lose electrical connection. Such ribs have negligible impact on cost but can dramatically enhance ruggedness.

To provide high retention and shock resistance (typical in PCs and consumer electronics with a PCB mounted battery) it makes sense to pay slightly more for a robust solution to reduce the cost of support calls, product returns and dissatisfied consumers.

Another important decision involves termination. Battery holders can be secured with

printed circuit pins, solder lugs, male/female snap fasteners, wire leads, SMT bump plates or customized fasteners. Each offers a unique combination of cost, ease of assembly, space and ruggedness, requiring careful consideration.

The electronics marketplace is saturated with poorly manufactured knock-offs and it is increasingly difficult to differentiate products of superior quality from inferior imitations. Buyers need to perform thorough due diligence to ensure optimum battery holders are specified. This review process should require detailed and verifiable answers to the following questions:

- Does the battery holder meet UL2069 standards for proper battery retention?
- Does the battery holder meet EIA-540J0AA and/or



The BK-6049 AA-Cell holder with cover



The BA1AAPC AA-Cell holder



CML Innovative Technologies Ltd.

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

Tel: +44 (0) 1284 714700

email: uksales@cml-it.com

www.cml-it.com



PUSH BUTTON SOLUTIONS



CUSTOM BUILD



CONTRACT ASSEMBLY



PANEL MOUNT INDICATOR

EIA-540JAB specifications for vibration, mechanical shock, contact resistance and solderability?

- Is the product an intrinsically safe apparatus as per ANSI/UL standards?
- Are superior grade materials being utilized? Plastic, contact, assembly materials, plating specifications, wire and encasement all should be reviewed.

Even if two competing battery holders appear the same, there can be subtle design differences that result in radically different performance. Relying on outside independent certification standards such as UL2069 will help ensure your selection does not just look like it will do the job but will actually perform in the real world. Similarly, carefully evaluating the quality of raw materials and manufacturing techniques will help ensure that your battery holder holds up to the rigors of the electronic assembly process.

Multi-million-dollar product recalls have been caused by incorrect selection of battery holders, so this additional

verification will pay off in the long run. Properly selected, a battery holder will provide a highly reliable and cost-effective long-term power management solution.

memoryprotectiondevices.com



The BK-6089 AA-Cell holder with cover



Properly selected, a battery holder provides a reliable, cost effective power management solution

120W – 550W AC POWER SUPPLIES WITH THERMAL BASEPLATE FOR INDUSTRIAL, HOUSEHOLD & MEDICAL APPLICATIONS

LOWER YOUR SUPPLY CHAIN RISK USING RECOM'S GLOBAL DESIGN & MANUFACTURING INFRASTRUCTURE

AC/DC CONVERTERS SUPPORT FANLESS OPERATION:

- Universal AC input range (80 to 264VAC)
- Wide operating temperature range (-40°C to +80°C)
- Efficiency up to 92%
- Standby power consumption <0.5W*
- EMI: EN55032 class B
- Single output range from 12 – 56VDC
- 12V fan output on board**
- IEC/UL62368, IEC/UL60950, CB Report, EN-60335-1**
- 2MOPP certified, BF ready**
- Low profile

*RACM550-G: main output OFF | **RACM230-G & RACM550-G only



2"x4"

- 120W: convection cooled
- 160W: contact cooled
- 230W: forced air cooled



3"x5"

- 250W: convection cooled
- 300W: contact cooled
- 550W: forced air cooled

5V standby AUX- output up to 5W

Power supply questions answered

Puls answer keys questions on power supply availability, pricing, specification and more

Q What are the current lead times for purchasing power supplies?

Lead times vary depending on manufacturing location,

local Covid-19 issues, logistics and quantities required. Puls has committed to holding a considerable amount of UK stock for one to two-day delivery. Products not in UK stock can

be supplied from our European warehouse in seven to 10-days. A selection of UK distributors also keeps stock, which Puls UK can access. UK buffer stock, supported by next day delivery,

can be arranged for customers with high demands.

Q How are you forecasting 2021?

Brexit and Covid-19 will influence price and availability for 2021. Puls has doubled its UK stock, including special and slow running parts, to supply 90 per cent of demand from the UK warehouse in one to two-days. Brexit customs rules will determine price changes due to customs declarations.

Q What solutions does Puls offer for obsolescence management?

Puls will continue producing power supplies as long as there is demand. Only in the case of obsolete components or a change of international 'norm' or approval (with high cost consequences) will Puls make a product obsolete. Customers receive a minimum of 12-months' notice and will be offered downward compatible replacement solutions.

Q What are the golden rules for sourcing power supplies?

Ensure the supply exactly meets the load and environmental conditions of the end-product's working environment. Confirm operating temperatures and load fluctuations are accurately known. This avoids the tendency of ultra-conservative design engineers to over specify which adds cost and size, while increasing energy waste.

Factor-in: man or machine assembly; hot-swap in the field; N+1 redundancy; and buffer power. Knowing the complete system requirement optimises the power supply, cabinet size, cooling requirements and cost of ownership.

www.pulspower.com

PULS

Reliable. Compact. Cost-oriented.
 DIN-Rail Power Supplies



36W

60W / 90W

120W

240W

480W

Basic functionality with high PULS quality

- Extraordinary Efficiency: 95.2% (PIC240.241D)
- High reliability: MTBF 1.72 million hours (PIC120.241C)
- Space saving design: 36mm width for 90W (PIM90)

PULSPower.COM

Non-isolated DC/DC regulator suits transceiver applications

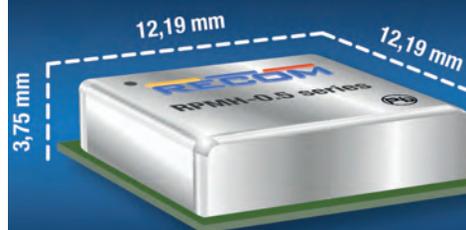
Rutronik has added the new RPMH-0.5 series of 0.5A non-isolated DC/DC switching regulators from Recom to its offering. They feature an input range from 4.3 to 65V, five trimmable output options and a standard DOSA-compatible low profile LGA package.

The five trimmable fixed outputs are: 3.3, 5, 12, 15 and 24V. Operating temperature range is -40 to 95°C ambient with full load and convection cooling only. Efficiency is up to 89 per cent and the full 500mA output current can be delivered across the entire input voltage range. Low load

efficiency, combined with quiescent current down to 16µA, suits the series to applications with sleep modes such as microcontrollers and transceivers.

Regarding radiated EMI the series features a six-sided shielding for Class B EMI compliance with a simple, low cost line inductor. Additional features include full protection (UVLO, SCP, OCP), power sequencing, soft start, on/off control, remote sensing and a power good signal.

www.rutronik.com



Small batteries for big responsibilities

GS Yuasa Battery Sales UK has announced the new YU-Lite range of nickel cadmium (NiCd), nickel metal hydride (NiMH) and lithium batteries.

Designed for emergency lighting, wireless security, fire and other industrial applications, the YU-Lite range is engineered for applications where long life and dependability are critical.

NiCd and NiMH ranges are rechargeable, maintenance free and feature a service life of up to four years in emergency lighting applications. Primary and secondary cell types and single and multiple pack configuration options are available for both the NiCd and NiMH battery types, allowing for greater design flexibility. Custom solutions are available on request.

The lithium range comprises professional specification primary cells for industrial and consumer applications. Sizes include CR2 and CR132A, with additional types expected soon.

Marketing manager, James Douglas, said: "We're pleased to be introducing an updated offering to the market in the form of the recently launched YU-Lite range. It's been specifically developed to include all the most popular configuration options and offer design flexibility with fully customisable options available."

www.yuasa.co.uk

Powell®

WHATEVER YOUR PROBLEM.... POWELL ELECTRONICS IS THE SOLUTION!

YOU WANT RELIABLE CONNECTORS AND ELECTRO-MECHANICAL PRODUCTS?

Powell is franchised for the world's leading manufacturers including:

- Glenair
- Amphenol
- Conesys
- Lemo
- Harwin
- Quell
- Plus many others

YOU WANT PARTS QUICKLY?

We stock over 7 Million different part numbers, and build over 2 Million connectors each year

NEED COMPETITIVE PRICING?

Powell routinely benchmarks its pricing to ensure we remain in line with market conditions

DO YOU REQUIRE TECHNICAL HELP?

Powell has experts in every field including Cable, Connectors, Fibre Optics, Switches and EMC



Powell®

Register today at www.powell.com/eurpromo for our November promotion which includes a discount for new customers on your first order. For existing customers register and for each order placed in November a chance to win an iPhone 11.

For Quotes/Enquiries - eusales@powell.com
 Technical Assistance - eusupport@powell.com
www.powell.com
 +353 1 553 0204

Passive components make the grade

Specifying high reliability electronic components can feel overwhelming at first glance. DMTL walks buyers through the levels

Commercial grade: Starting with commercial grade, components are manufactured to datasheet specifications only. A large amount of flexibility surrounds the design, materials, processes and testing.

AEC-Q200: Moving to automotive grade, AEC-Q200 is a stress test qualification for passive components, defined by the Automotive Electronics Council (AEC). For a manufacturer to state their passive electronic component is AEC-Q200 qualified, the product must be tested, and the results logged, as outlined in the qualification document, resulting in a grading between Grade 0 to 4. Unless changes are made to either the product or process no further testing is required to supply AEC-Q200 qualified passive electronic components.

COTS-Plus: A COTS-Plus component is designed and manufactured to commercial standards. The production batch is then up-screened, typically with testing in 'accordance' to a particular MIL-PRF specification with the ability to specify reliability grading, surge current and group testing where applicable. It may also include known methods specific to the manufacturer resulting in increased reliability.

IECQ-CECC: For IECQ-CECC components, qualification is granted within the IECQ-CECC system when the manufacturer can demonstrate an electronic component or range of components meets the specification. CECC parts can

only be sold and released by authorised distributors which the manufacturers appoint. A listing as a franchised source for the manufacturer is not enough to supply CECC released products.

MIL-PRF: For a manufacturer to offer MIL-PRF approved product, it must be listed on the QPL (Qualified Product List), which requires approval of the manufacturer's QA program and extensive documentation to prove each part will be manufactured identically. Thus, the design is strictly controlled and certain changes must be qualified and submitted to the Defense Logistics Agency for approval. Lot testing is mandatory for the manufacturer to maintain qualification.

DLA Land and Maritime, DESC and DSCC drawings: Drawings are intended for use when military QPL components are not available or will not adequately perform the required function of the application. They also help reduce document duplication. To list as an approved source against the drawing, it is normally stipulated the manufacturer is listed on the QPL or has agreed on an inspection program to the referenced MIL-PRF and is detailed in the scope of the drawing.

ESCC QPL: European Space Components Coordination, Qualified Parts List makes available space components which have been evaluated, qualified and maintained to the standards used in European member states space programs. This allows passive electronic components to be purchased to a detailed specification. This strictly

controls the design, process control, inspection and documentation.

EPPL: The European Preferred Part List provides users with component availability suitable for use in space missions but which are not fully space qualified and do not appear on ESCC QPL.

In summary, as reliability of passive electronic components increases so does cost, while range and availability decreases. This can create major challenges at every stage of the program.

DMTL works with trusted manufacturers who offer products qualified to various levels. The company works with these manufacturers to ensure the correct product is selected and supplied with the necessary paperwork, while also ensuring availability and cost requirements are adhered to throughout the program.

www.dmtl.co.uk



© 2020 Rochester Electronics, LLC. All Rights Reserved.

WE KEEP THINGS MOVING.

As an authorised distributor, Rochester Electronics provides the world's most extensive range of end-of-life (EOL) and broadest range of active semiconductors to keep the medical, defense and infrastructure industries moving worldwide.



 **Rochester
Electronics®**
www.rocelec.com

Authorised Distribution | Licensed Manufacturing | Manufacturing Services

Unit 2 Fenice Court, Eaton Socon, St Neots • Cambridgeshire PE19 8EW • United Kingdom
+44.1480.408400 / emeasales@rocelec.com / www.rocelec.com

Supercapacitor technology comes of age

TTI's supplier marketing manager, Pat Denton, reviews the development of supercapacitors and how they're poised to change the ways electronics are designed

While supercapacitors, or electric double layer capacitors (EDLCs), have been around for a while, they are just now gaining a wider acceptance. Reasons for this delayed acceptance include more suppliers, lower price and more packaging options. Also, suppliers have improved component specifications to include higher voltages and wider operating temperatures.

Supercaps, also called UltraCaps or GoldCaps, offer a much higher capacitance value. Think farads rather than pico or microfarad but with lower voltage limits.

Single cell supercaps range from 2.5 to 3V. Single cell packaging includes: cylindrical radial, 13mm button cell, larger snap-in and screw-terminal packages and surface-mount v-chip. Large-can, single cell supercapacitors are available in an unbelievable 4,000F.

Lighter and more capable
Supercaps developments bridge the gap between electrolytic capacitors and rechargeable batteries. New developments are pushing the crossover further, with single cell hybrid supercaps now available up to 3.8V. Manufacturers can put two or more cells in series to create supercapacitor modules offering 5V to over 200V.

Supercap modules can be as big as a truck battery or a full computer server rack, with almost 100 individual cells in each. Supercapacitors also deliver weight savings: while visiting a customer recently, I was pleasantly

surprised at how little a module containing 16 large, snap-in supercaps weighed. Regarding temperature, many supercapacitors offer an operating temperature range of -40 to 85°C, far better than batteries.

Longer lifespan

Perhaps supercaps' biggest advantage is they can be charged/discharged many more times than a battery. Where a battery may be rated for 500 to 1,000 charge cycles, a supercapacitor can deliver 20,000 charge/discharge cycles. Also, supercaps charge in seconds or minutes, versus hours for batteries.

Longer lifespan also delivers maintenance savings. Case in point, real-time clock back-up is the number one supercaps application. In many cases, the supercapacitor lasts over a decade, effectively the life of the product.

On a larger scale, manufacturers have made modules with the form factor of car and large truck batteries. These modules can start a truck, boat or generator, after which a lead-acid battery takes over. Supercaps extend lead-acid battery life and offer plenty of starting power, even in sub-zero temperatures.

Aiding electrification

In one final application example, there is an opportunity to install supercaps at bus stops. Power from those modules could assist with power-heavy tasks, such as opening and closing doors, further preserving the vehicle's

drive batteries. Meanwhile, thanks to the fast-charging capability, those capacitors will be recharged while the bus is driving to the next stop.

As electrification comes to other types of vehicles, more applications for auxiliary supercapacitors can be found. For example, garbage trucks could use supercap modules to run their compactor arms instead of revving their engines to generate the extra power.

ttiinc.com



Pat Denton, technical marketing/sales manager at **TTI, Inc**



Supercaps, also called UltraCaps or GoldCaps, offer a much higher capacitance value

An active approach to passive components

AVX' vice president sales Americas, Bob Gourdeau, walks readers through a range of subjects from cost management to 5G technology

Q How is AVX guaranteeing product supply during current market conditions?

AVX has multiple manufacturing locations, with multiple shifts running around the clock. In addition, the company uses monthly and quarterly forecasting to ensure it stays ahead on production and capital investments, like the recent expansion to the Malaysia facility.

Q How does the organization remain cost competitive?

AVX focuses on investing in the right type of capacity, in the right regions. Sales representatives keep our SGA at industry lows, affording the company a professional sales force to ensure it remains competitive.

Q How does AVX compete with broad line manufacturers when purchases are looking for vendor reduction?

AVX specializes in its core technologies and continues to expand them. The company acquired Ethertronics to provide antennas solutions and integrated American Technical Ceramics to provide their sales channel a complete line of RF components. Magnetics, diodes, circuit protection and connectors are also offered. With the acquisition of TT Electronics' AB Elektronik Division, AVX reinforced its position in automotive mechatronics which is growing exponentially.

Q How is AVX managing recent regulatory and tariff changes?

AVX has a diversified manufacturing strategy, with multiple locations for different products. The company is always looking for lowest cost,

lowest risk options for front-end and back-end processes while optimizing the supply chain.

Q Regarding price and availability, should buyers be focusing on reduced case size MLCC?

Reduced case size MLCCs are preferred since there is more capacity available and prices can be lower. However, it is important to understand the electrical and thermal characteristics of the larger parts to ensure there is no degradation on performance by reducing case sizes.

Q How is AVX positioned to meet HEV/EV requirements for DC Link and snubber capacitors at competitive cost points?

Our development team has been involved in this industry since the beginning and our segmented films provide reliable capacitors. We also have invested heavily in the Czech Republic for a cost effective, skilled work force.

Q How are lead times being managed during the pandemic?

Lead time varies with demand, market conditions, economies and, more recently, the pandemic. Manufacturers are working hard to maintain consistent lead times. Distribution offers a valuable service by maintaining stock and managing supply chains.

Q How is AVX deploying technology to meet 5G and IoT needs?

AVX listens to leaders in these industries and analyzes their needs. Then a strategy is made to deploy products to meet these demanding applications.

www.avx.com

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



AN AGILE, RESPONSIVE, RELIABLE CONTRACT MANUFACTURER BUILDING ON YOUR DESIGN

Visit our website to see our full capabilities and videos of our main processes

www.wps.co.uk
01424 722222

enquire@wps.co.uk



Exclusively sponsored by



Domino effect on manufacturing



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

John Denslinger explores a decade of falling dominoes, each impacting the supply chain and driving manufacturers to explore significant changes to their global strategies

Global strategies

By John Denslinger

A domino effect is produced when one event sets off a chain of similar events. This is easily understandable if you visualise a falling row of dominoes. Its clear global manufacturing did not escape the domino effect. For more than two decades, manufacturers and their supply partners enjoyed relative stability in their current locations, but a series of events may be threatening that baseline. There are solutions, but first the dominoes.

Perhaps the first domino to fall was the oil shock of 2008 which actually continued through 2014. China had deservedly earned the title 'factory of the world' and was heavily relied upon to supply the American market. When oil prices skyrocketed, fuel costs soared. The shock was sudden and substantial. Margins were pinched yet companies opted not to shift production elsewhere.

A few years later, a newly elected administration under President Trump sought to renegotiate long-standing multi-lateral trade treaties and completely exit TPP discussions. Instead, bi-lateral trade deals were signed with South Korea, Japan, Singapore, China (Phase 1) and others. In the Americas, USMCA replaced NAFTA. On the surface, those actions were good for US balance of trade and domestic job creation. For the manufacturer it was one more domino to fall, but somewhat muted as large company lobbyists could influence beneficial terms.

During this same period, trade wars broke out triggered by US tariffs on a variety of goods and critical raw materials. Perhaps it was a necessary catalyst to trade deals, but for the manufacturer it added a new level of unpredictability. Threats of retaliation by China, the EU bloc and our NAFTA trading partners compounded the risk. To this day, the tariff battle remains unresolved. Unfortunately, there is no tariff-free haven. Another domino down.

Next are the geopolitical tensions that have intensified more recently. Saber-rattling in the South China Sea, North Korea, Russia and Middle

East seems commonplace and dangerous. Economic disruption is only one misstep away. And then there is the stalled Brexit negotiations about to take the UK and EU over a cliff. Manufacturers are right to worry about supply continuity in such contentious environments. No option here but to hope clear thinking prevails. Domino down.

The last domino in the chain of events is Covid-19. According to a UN Statistics report, *The World's Manufacturing Output*, US manufacturing output is pegged at \$2.3T ranking substantially behind China's \$3.9T. The interesting note to me is that the US also spent \$2.3T to date on economic stimulus programs in response to coronavirus per the International Monetary Fund. That means we, as a country, spent the equivalent of our total manufacturing output. That is an incredible amount and the recovery far from certain. The last domino just fell.

There are options and solutions. In a February 2020 article *A Manufacturing Strategy Built for Trade Instability* BCG suggested: 'companies should adopt a regional approach to their manufacturing and supply chain footprints rather than locating all of their production in a handful of low-cost countries'. However, if low cost is preferred over regionalisation, companies can study BCG's global manufacturing cost competitiveness index (it tracks factory wages, productivity growth, exchange rates and energy costs) which identified 16 countries competitive with China. The US-China Business Council lists Mexico and Thailand as the most popular destination for those shifting production out of China. Of course, you may not have a choice at all if the Defense Production Act is invoked in your industry.

No location is devoid of risk. Study your options and plan ahead. More dominoes will surely fall.

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



INTRODUCING



TrustedParts.com

Genuine electronic components from
only authorized sources.

Enter a component part number



100%

AUTHORIZED
SOURCES

24M+

UNIQUE PART
NUMBERS

4K+

LEADING
MANUFACTURERS

BOM

MANAGEMENT
TOOLS

ALWAYS REAL-TIME PRICING AND AVAILABILITY

Search authorized distributors at



TrustedParts.com

Impact of pandemic on component supply chains

Lansdale reviews the impact of Covid-19 on JiT production lines and what some organizations are doing to mitigate problems

It is not a good time to practice just-in-time manufacturing. With Covid-19 causing a worldwide pandemic, previously only imagined in sci-fi movies, supply chains can be instantly interrupted by a single production line worker testing positive or a critical supplier going bankrupt.

Since the introduction of JiT and lean manufacturing in the 1980s, most American manufacturers have embraced the idea of minimizing in-process inventory by having product delivered to the production line exactly when required. Once fully implemented, this process had positive effects within factories, forcing operations to balance workloads to reduce inventory building up between operations. This also had the effect

of improving lead times, cycle time, product quality, production throughput and disaster recovery, ultimately reducing costs. The most important factor in its success was dependable material suppliers ensuring production lines had the material they needed, when they needed it. Any delay stops the entire production line, as there is no inventory buffer to draw down.

The pandemic is affecting the material supply chain. Most electronics businesses are considered essential and allowed to stay open. However, they are still impacted by labor shortages and their suppliers' increased lead/cycle times. Some companies have found it necessary to shut down due to low sales and cash flow problems, in spite of government support. Travel restrictions can make

it difficult to get critical services such as equipment maintenance or government/ISO quality audits. These problems will be with us until a vaccine is developed and distributed widely enough to control community spread. Thus, manufacturers must constantly reevaluate their supply chain support.

A large defense contractor recently modified its purchasing policies to allow its suppliers to deliver all open purchase orders early. They are willing to store inventory for years, if necessary, to ensure it is available when their production line needs it. Before this change, they had a disciplined delivery requirement that only allowed delivery within days of the scheduled date. Clearly, they must have recognized the pandemic's impact on their suppliers and

decided to increase inventory of important material.

The health of the defense industry supply chain is a manufacturer's highest risk, especially during a pandemic. Many of their suppliers are smaller businesses that have supported maintenance and new builds of older designs that are still in service from the 1980s and 1990s. The volumes are too low for the defense contractors to have second sources to protect them from the loss of a supplier. Therefore, defense contractors should carefully monitor their suppliers and consider volume buys to cover themselves for the next few years as we deal with the pandemic's effects and aftereffects.

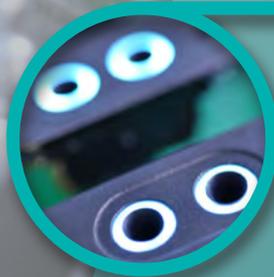
www.lansdale.com





Electromechanical

- PCB Assemblies
- Cable Harnesses
- Ultrasonic Welding
- Box Builds
- IPC Certified
- Turnkey Solutions



Inspection and Test

- Tailored to Customer Requirements
- First Article Inspection Reports
- On-Site Metrology Lab
- ESS and EMI Chambers
- Design and Manufacture of Bespoke Test Equipment



Logistics

- Dedicated Logistics Team
- Proven and Reliable On-Time Delivery
- Free Issue Kits or Material Sourcing
- Global Despatch and Export Control
- Full Material Traceability and Inventory Management



Design & Development

- In House Creative Designers
- Experience with Leading Aerospace Companies
- From Visions into Concepts and Functional Models
- Dedicated Mechanical and Electronic Engineers
- Prototype to Product Using the Latest Technology

Strategic sourcing advice: lessons from the pandemic

Digi-Key's senior director, global assigned accounts, Tom Treichel, argues that during the pandemic inventory and on-time delivery are differentiators and partnerships are key

The Covid-19 pandemic has taken a toll on supply chains and procurement professionals around the world. So, what have we learned? Long-time Digi-Key customer and SVI's vice president of supply chain and North American operations, Wayne Ellis, said: "The most expensive supplier to work with is the one that can't meet my delivery dates."

SVI is a leading EMS service provider based in Thailand with regional and global operations across South East

Asia, Europe and the US.

A 33-year veteran in electronic components sourcing, Ellis has experienced it all including a flood and factory fire within three years. Now, the COVID-19 pandemic proved to be one of his toughest challenges.

Ellis said: "In the past, we have experienced disruptions in supply due to natural disasters, strikes or other geopolitical issues. We have also experienced shortages

due to increases in demand. Never have we experienced both, to this extent, at the same time. Military and medical supply chains were filled first, leaving other customers to scramble for the little remaining goods." Most manufacturers have since rebounded, for the most part, but some lead times remain stretched. As automotive and consumer manufacturing come back online, Ellis expects some lead times to stretch into Q4.

During the early days of the



SVI is based in Thailand with operations across South East Asia, Europe and the US

DG12

Compact connector with circuit breaker and filter

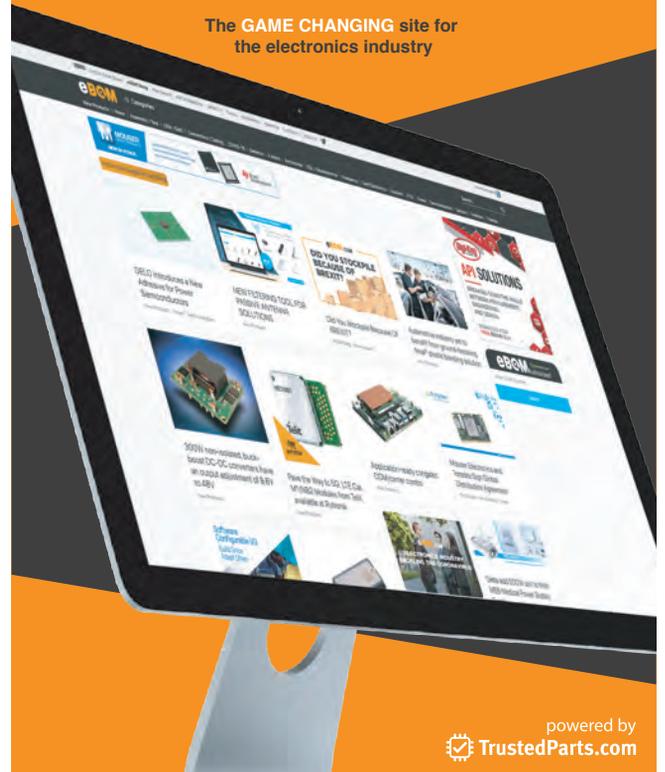
- IP67 protection
- Recessed rocker switch
- Various mounting options
- V-Lock cord retaining

sales.uk@schurter.com
+44 1296 319 000
uk.schurter.com

SCHURTER
ELECTRONIC COMPONENTS

eBOM.com

The GAME CHANGING site for the electronics industry



powered by
TrustedParts.com

DISCOVER | SOURCE | COMPARE | BUY

pandemic, SVI's medical customers saw significant increases in demand and SVI sprang into action working closely with their distributor partners.

Ellis said: "We worked with customers to provide letters stating the end use of the product, then contacted distributors, and in some cases, had regular three-way calls with the manufacturers and distributors to review the demand upsides and negotiate for increased supply to ship to us. I am happy to say that we have been able to meet demand with the tremendous support of our partners, and as a result, have helped to save lives."

Some SVI customers dictate certain parts are purchased from specific suppliers, making sourcing a complex, sophisticated puzzle. Thus, Ellis and his team work with nearly 1,000 active suppliers.

The SVI team uses a 'total cost of ownership' model for selecting suppliers, looking at: payment terms, freight terms, minimum order quantities, etc. Recently they have removed lead time out of the cost of ownership model and made lead time

a qualifier. Why? If parts do not arrive on time, and a line sits idle, costs can exceed \$1,000 per hour. This is why Ellis tells his team to choose dependable delivery and flexibility over lowest price.

Working with any distributor is a true partnership and one of the ingredients to building partnerships is information sharing. Sharing forecasts and telling suppliers your true needs is critical. Allow suppliers to build a model around your needs. According to Ellis, many sourcing professionals tend to tell suppliers what they need to do, but suppliers are the experts in supply chain strategy, so he recommends listening and accepting their help to meet needs. For example, SVI has a vendor-managed inventory program where they provide suppliers with forecasts and their supplier partners ship parts according to the forecasts.

Digi-Key partners with SVI and Ellis has relied on Digi-Key for more than 20 years. Ellis credits Digi-Key's model (deep, rich inventory available for overnight shipping) along with what he calls the 'best website on the planet', top-notch service, support and training,

for being a reliable, trusted supply chain partner. Ellis' team also uses Digi-Key's APIs and supply chain programs to streamline sourcing and reduce costs.

As Ellis noted, pricing is part of strategic sourcing, but serviceability is critical. The ability to support the quoted or awarded price on that part, as well as deliver on time, is key. To get a true understanding of a distributor's serviceability, we recommend looking at historical factors and asking:

- Is this a stocking part of the supplier?
- What is the lead time?
- What is the lead time historically? If they say six weeks, does it arrive in six weeks?
- What is the overall on-time delivery performance?
- Do they ship the correct parts?

Develop a scorecard for each distributor to track these factors and determine how partners are performing.

www.digikey.co.uk



Working with any distributor is a true partnership and one of the ingredients to building partnerships is information sharing

Digi-Key product distribution center expansion



Buying batteries for hazardous environments

Cell Pack Solutions discusses battery handling, applications in hazardous environments and calculating expected life

Some batteries are, themselves, classified as hazardous as readers will discover if they ship them. Lithium batteries can come under different regulations depending on the lithium metal content of each cell in the battery pack for primary non rechargeable cells and the Watt-hour rating for rechargeable batteries. Couriers will not accept batteries unless they have Transport Certificates and are packaged and labelled to IATA Guidelines.

Long before transportation issues, designers must choose the best battery for the environmental conditions their equipment will experience. This may be a legal requirement such as ATEX Directive 2014/34/EU which covers equipment and protective systems intended for use in potentially explosive atmospheres including those used on fixed offshore platforms, petrochemical plants, mines and flour mills etc. A potentially explosive atmosphere exists when a mixture of air, gases, vapours, mists or dusts combine in a way that can ignite.

In other applications equipment might be expected to work at extremely hot temperatures. For example, the temperature behind a dashboard on a sunny day could easily exceed 70 C. On the other hand, extreme Artic conditions could see temperatures of -50 C. Batteries are essentially 'chemicals in a container' and the speed of reaction is defined by ambient temperature: the colder, the slower.

Battery manufacturers offer tools to calculate estimated battery life. For example, Cell Pack Solutions worked with battery manufacturer Tadiran during the design-in of lithium batteries in domestic gas meters. Predictions using microcalorimetric methods demonstrated a life expectancy of 12-years. Tadiran can justifiably declare it has products that will work on 40 year predicted life based on real-time data.

Batteries can be one of the most expensive, yet neglected, items on a BoM. Cell Pack Solutions is often asked to create complex designs because

criteria were disclosed late in the development phase. Considering all mechanical, electrical and environmental aspects and then deriving the best solution to meet those demands results in best value for money.

cellpacksolutions.co.uk



Cell Pack Solutions' MD, Eddie Czestochowski



From the deepest depths to outer space...

...we supply specialised sensors and components suitable for the most extreme environments

- Pressure and temperature transducers capable of up to 35,000 PSIA
- Operating temperatures from below -40°C to over +200°C
- Space and automotive approved products available

T: 01342 330 470 sales@rhointcomponents.com www.rhointcomponents.com





Cable assemblies and durable connectors unite

Harwin has expanded its Archer Control board-to-board industrial connector portfolio to meet cable-to-board requirements. The company has introduced off-the-shelf IDC cable assembly options to accompany the existing discrete connector components.

On each assembly, a ribbon cable is fitted with female connectors at either end. Cable lengths of 150 or 300mm are available off-the-shelf, with other lengths available on request. The IDC design offers a low profile, flexible solution which fits tight spaces. The horizontal cable exit orientation saves headroom above the connector.

The assemblies support existing contact counts in this connector family (12, 16, 20, 26, 32, 40, 50, 68 and 80). The contact areas have a gold flash finish. A latching mechanism assures cable retention, resisting vibration and accidental disconnection. Data rate is up to 3Gbits/s.

Archer Control connectors suit industrial drives, factory automation systems, IIoT, robotics and rugged handheld equipment. They are designed to handle vibrations, mechanical shocks, high humidity levels and extreme temperatures.

www.harwin.com

Capacitors handle 20g vibration

TDK is offering two new series of Epcos power capacitors for AC filtering in three-phase delta connection applications. The B32375 series is designed for the low to medium power range and covers a capacitance spectrum from 3 x 5 to 3 x 50µF with rated voltages from 250 to 600VRMS. Can diameters are 50 or 63.5mm, while heights vary between 128 and 275mm depending on capacity and voltage.

The B32376 series is designed for high power with a capacitance range from 3 x 10 to 3 x 400µF with rated voltages from 250 to 1000VRMS. Can diameters are 116 or 136mm and heights vary between 200 and 275 mm. Screw terminals improve installation, and versions are available with vibration resistance of 20g.

An improved safety device (in accordance with IEC-61071) eliminates the need for soldering, resulting in long service life up to 100,000 hours at a continuous hot-spot operating temperature of 85°C and 200,000 hours at 70°C.

Applications include traction and renewable energy.

www.tdk-electronics.tdk.com

IoT in harsh environments



Mouser is stocking Laird Connectivity's BL653 series modules. Featuring configurable interfaces and extended industrial temperature rating, the BL653 provides Bluetooth 5.1 connectivity and support for NFC and 802.15.4 communication (Thread and Zigbee). Usage includes Internet of Things applications in industrial and harsh environments.

Stated benefits of the modules include longer range, multi-wireless capabilities and an extended temperature range up to 105°C. Powered by the Nordic nRF52833 SoC, the modules offer

output power of up to +8dBm and sensitivity of -95dBm in 1Mbps.

Bluetooth 5.1 features include: direction finding with angle of arrival (AoA) and angle of departure (AoD); plus long-range (Coded PHY) and 2M PHY support for data rates of 2Mbps, 1Mbps and 125Kbps.

The BL653 includes modular FCC, IC, CE, RCM, MIC and Bluetooth SIG approvals, which extend to an OEM's design with no new testing.

www.mouser.com



WE CONNECT TECHNOLOGY

+44 (0) 1403 790 661 fclane.com sales@fclane.com



CONNECTORS AND ACCESSORIES AVAILABLE FOR IMMEDIATE DESPATCH OR RAPID ASSEMBLY










Save space and energy in tough environments

Micronel explains how its waterproof, metal-bodied DC blowers can save space and energy compared to bulky side channel blowers

Micronel ruggedized miniature DC blowers are designed to suit harsh environments in industrial and process control pressure or suction/vacuum applications. The U100HL model features: a tough aluminium IP67 housing; brushless motor with integrated electronic driver; M16 connector and G $\frac{3}{4}$ in pipe threads for 32mm tight hose connections.

The blower can generate over 120mBar (12,000 pascals) pressure and 900lit/min (54m 3 /h) free blowing air flow. Dimensions are 107

by 107 by 118mm. Power consumption is 180W. Micronel states the 24v motor uses a fraction of the power of larger, bulkier side channel blowers or compressed air systems. The built-in driver circuit allows plug-n-run capability. Accessories include air knives, filters and anti-vibration mountings.

Micronel specialise in high performance blowers and fans for industries including: medical, electronics cooling, personal protection, packaging, gas analysis, laboratory, transportation and process control.

The company offers standard ultra-slim fans, axial fans and high-performance high pressure radial blowers from UK stock. Technical design support for modified products and client specific designs is also available.

www.micronel.co.uk



Micronel's U100HL rugged high pressure/suction DC blower

UNIQUE FANS AND BLOWERS FOR INDUSTRIAL APPLICATIONS

FROM COOLING TO AIR MOVING



NEW U100HL RANGE OF IP67 METAL BODIED RUGGED DC BLOWERS

Can generate over 120 mBar (12,000 pascals) of pressure

Free blowing air flow over 900 litres per minute

Very compact small size package of 107 x 107 x 118 mm

Energy and space saving alternative to bulky and power hungry side channel blowers

Thermal: what purchasers need to know

Digi-Key's manager applications engineering and tech support, Dany Haikin, guides readers through the world of thermal management

Thermal management is the unsung hero of electronics, keeping devices cool and working properly. For purchasing professionals, identifying different types of thermal products, understanding of how they work and recognising considerations for lead times can help them source the best solution.

Designing a thermal solution is not something purchasing professionals can typically do alone. Engineers should be involved because it requires a different approach than sourcing standard electronic components.

One way to divide different types of thermal products is by active cooling and passive cooling. Active cooling uses power to provide cooling, like a fan or Peltier. Cooling technologies which don't require power include grease, putty or thermal pads.

Space

The most important consideration is how much space is available? For example, computers with large enclosures have plenty of space for a fan.

Faced with applications like wearables or mobile phones, space is a critical consideration. Big thermal solutions won't work. Instead we need to utilise thermal pads, gels or grease. These are the types of solutions that can be used to mitigate space constraints. It's also important to note the types of components and modules

which generate heat, such as wireless RF modules and power supplies.

Heat dissipation

Heat generated by a component must be dissipated outside of the application. It's not enough to absorb the heat, it needs to be transferred to something else, either the case, another area or into the air.

Thermal management is all about taking heat out of the component and dissipating it in other places. If heat is absorbed by the component, rather than being removed, it will, in the best case, slow down performance and in the worst case, destroy the part.

In applications where space is available, heat sinks can be used. A heat sink is a metal or ceramic sink which is placed on the component. Heat sinks have fins or ribs which transfer heat from the component to air. The heatsink must be mounted tightly to the component. The component's surface might seem smooth but is actually not. The surface between the heat sink and component needs to be filled with an intermediate material such as a flexible pad, gel or grease. Some heat sinks are supplied with the intermediate pad integrated to the base.

Timing

Just as important as the solution you choose, is when you choose it. The two most important technical parameters for a thermal pad, which is a popular solution,

is how much heat they can dissipate and how fast they can do it. That is something which needs to be calculated before or during the design process. It then needs to be tested in the actual application, which is where engineers should be involved.

The next major parameter to consider is how flexible the pad needs to be. At this point, it's also important to consider whether the application should use a pad or a gel. A gel can be either a grease or putty. One problem with grease is that maintenance can become problematic, dirty and messy if a greased component needs to be reworked or repaired. Also, in the long-term grease is not very reliable because sometimes it can lose its shape and doesn't spread equally across the component's surface. On the other hand, grease is much cheaper than other solutions.

A pad is better in most cases but it should be cut to fit the component's shape. The custom nature of using a pad solution means it can cost more. Purchasing professionals should take all of these variables into account, plus the quality and additional time it takes the manufacturer to cut the pads.

For lead times, most manufacturers will quote a standard time scale of something like five to six-weeks, plus maybe one to two additional weeks for pre-cutting. Some manufacturers might quote up to 12-weeks



Fan



A heat sink is a metal or ceramic sink which is placed on the component

because the material used is a combination of many raw materials and is thus dependent on other manufacturers. Thus, external issues can delay lead times.

For example, the Japanese earthquake which occurred some years ago ruined many of the glue factories. Glue is a key component of pads, so lead times extended to 16-weeks or longer. With Covid-19, some factories closed. However, due to its stock holding, Digi-Key's lead time remained unaffected and the influence of the pandemic has been minimal. Ultimately, it depends on the application and how things compete on price.

Traceability

For thermal management, component traceability is also an important consideration. Digi-Key only buys directly from manufacturers to ensure authenticity. This also helps buyers quickly isolate any potential issues with prototypes and get to the source of the problem faster.

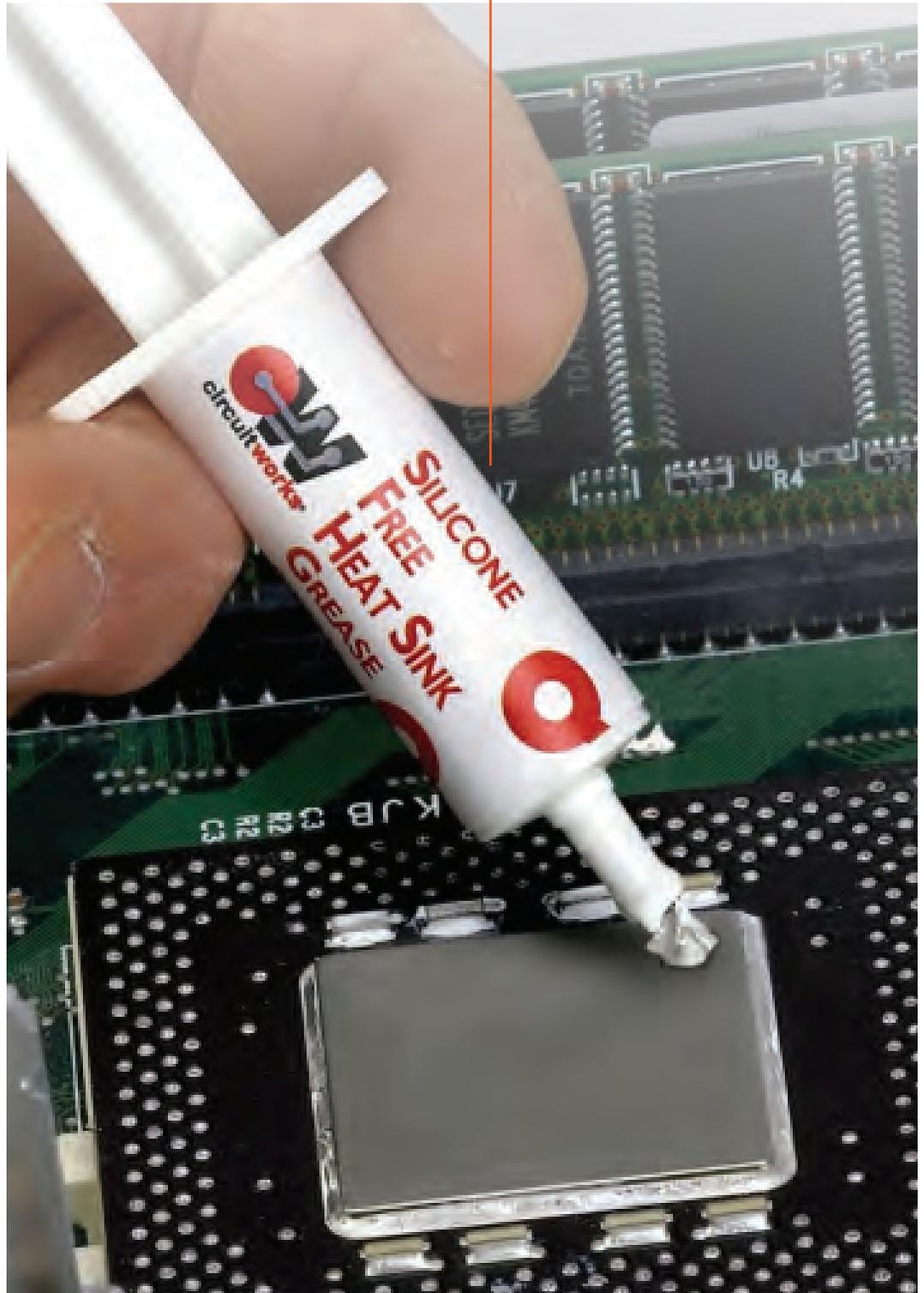
Another reason traceability is important with thermal management is shelf life. With specialty thermal pads, grease or putties, it is important the distributor is paying attention to shelf life. Different pads, manufacturers and chemistries all have different shelf lives: sometimes it can be one-year, sometimes it can be five-years, others can be indefinite. Regardless, it must be taken into account by sourcing professionals during the purchasing process.

While sourcing thermal management solutions can be more complex than typical electronic components, it can be a really rewarding experience, providing new pathways for the engineering and purchasing teams to work together. Digi-Key offers thousands of different thermal management parts from stock for immediate shipment from more than 65 quality, name-brand

manufacturers. As always, Digi-Key and its in-house team of engineers are available to provide 24/7 customer support for purchasing professionals who are making decisions on thermal management solutions.

www.digikey.com

Grease





SIMPLY INNOVATIVE. BETTER FOR SURE.

PLUG AND PLAY!

SMART SENSOR CSS 014.

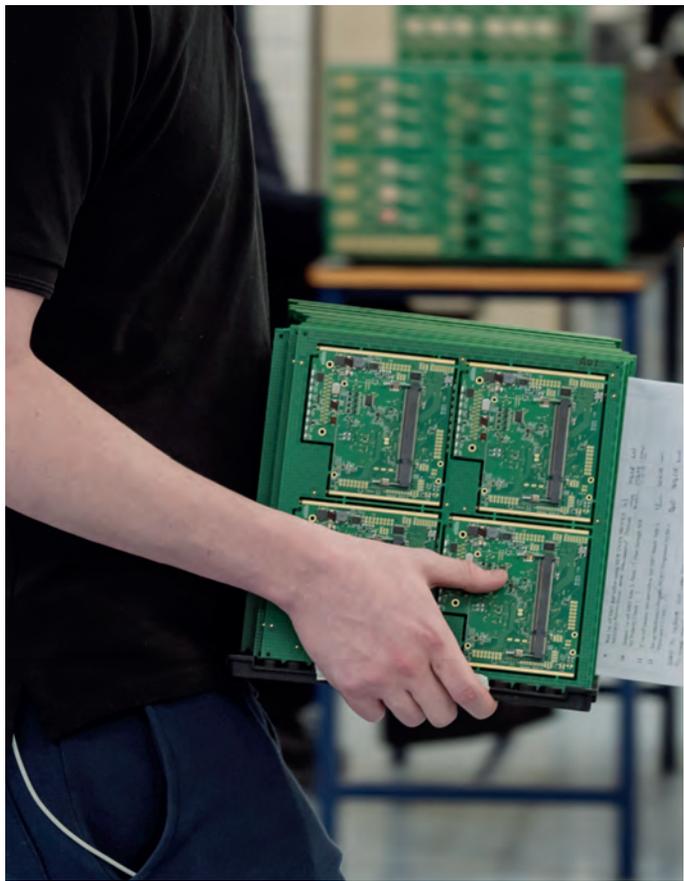
STEGO's new Smart Sensor is a plug-in solution for Condition Monitoring. The CSS 014 detects ambient temperature and humidity in switch panels. Thus lifting climatisation in enclosures to the next level: Predictive maintenance and remote monitoring allow for immediate response to unwanted and harmful changes in your application. See for yourself.

Also available with
 **IO-Link**
interface

NEW:
SMART
SENSOR
CSS 014

 WWW.STEGO.CO.UK





Choosing a PCB supplier

FermionX' MD, Dan Crothers, explains what to look for when selecting a new PCB supplier

For industries with a high degree of regulatory oversight, reliability and attention to detail are paramount. Take your manufacturing operations to a supplier who maintains the highest system standards and process controls. Check their accreditations and those of their partner factories. Ideally, look for a minimum of ISO9001 and UL 94-V0.

Clear communication and a can-do attitude are cornerstones of a good supplier-customer relationship. Spending time establishing rules and boundaries for your partnership early on can pay dividends in the long run. Make sure you have regular catch-ups and know what's happening with orders.

Also how well does the manufacturer know its suppliers? Are products traceable back to source if there are issues? All suppliers should regularly assess their vendors both local and international.

In summary, work with a company who understands and is invested in your business. A good relationship can save time and money, boosting your bottom line and allowing you to focus on the important things, like growing your business.

If in doubt, speak to your network and ask for recommendations. Word of mouth and referrals are useful starting points.

www.fermionx.com

Check the supplier has the technical capabilities to deliver your product on time and on budget. Strong supply chain management is crucial, especially during times of uncertainty and disruption. Look for reassurance there will be minimal component shortages during production. Location can influence lead times. National suppliers may be more expensive but more reliable in the short-term. Look for companies which can source PCBs and materials from various global locations to maintain supply throughout the year.



FermionX' MD, Dan Crothers



CONTACT US
+44(0)1903 524 600

OUR CUSTOMERS RELY ON US TO...

BUILD THEIR PRODUCTS ON TIME AND IN BUDGET

MAXIMISE THEIR PRODUCT QUALITY AND RELIABILITY

WE ARE DEDICATED TO KEEPING THE UK ELECTRONIC MANUFACTURING INDUSTRY MOVING

WE ARE OPEN FOR BUSINESS
Talk to us today to discuss your CEM needs

www.fermionx.com
e:sales@fermionx.com

Ramping up PCB output and quality

Trackwise explains how recent investments in production equipment underpin support for greater volume and enhanced quality

Trackwise has strengthened its production capability and capacity by investing in new equipment including a roll-to-roll direct imaging system and roll-to-roll flexible circuit laser drilling system.

Situated in the manufacturer's Class 7 cleanroom, the direct imaging system can process features down to 25µm, while increasing throughput. The system handles a much wider range of photo-imageable materials, and increases Trackwise's capability and capacity for length-unlimited FPC manufacturing.

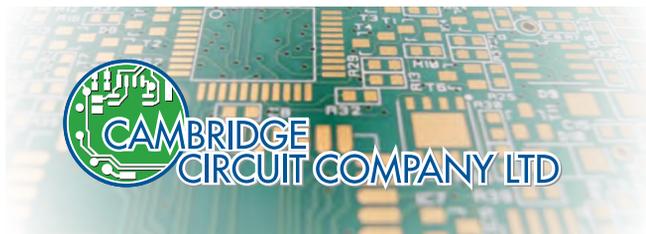
The diode-pumped UV laser can process extremely thin

and sensitive FPCs at high throughput, maintaining processing accuracies of ±20µm over the entire panel area. A web handler compensates for continual acceleration and deceleration during production, avoiding wrinkling and stretching issues.

The company's proprietary Improved Harness Technology (IHT) is designed to enable the fabrication of ultra-thin FPCs with very fine traces at any potential length. FPCs offer an alternative to conventional cable harnesses, with substantial weight and space savings, plus better heat dissipation and reliability.

Trackwise's CEO, Philip Johnston, said: "The ongoing capital investment we are making into state-of-the-art equipment and cleanroom resources underlines our clear commitment to gaining greater traction for our IHT and high-precision printed antenna solutions. Through these activities, we are now much better positioned to serve future market opportunities as they arise, supporting greater volume demands, as well as providing enhanced levels of quality."

www.trackwise.co.uk



We're a UK-based PCB manufacturer providing a cost-effective, quality, responsive and reliable service.

Using extensive PCB manufacturing knowledge and experience, we offer:

- In-house production of Multilayer, Flex and Flex-Rigid, PTH, and Single-sided
- Efficient mass-volume production from our trusted strategic overseas partner
 - Prototypes a speciality
 - 24HR to 5 Day standard turnaround
- An assembly service via our UK-based assembly partners.

Want to know more?

To find out how we can help you get in touch:
sales@cambridge-circuit.co.uk | Tel: 01223 423 100
www.cambridge-circuit.co.uk

@CamCircPCB Like us Follow us



TATE

49 years in PCB industry

**GLOBAL
PCB SUPPLIER**

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

TATECIRCUITS.COM

Buyers' Guide

Manufacturer	Distributor	Telephone	Website	Franchised Distributor	No. of Lines for Principal	Stock Value for Principal	Minimum Order Value	% Lead Free for Principal Range	No. of Technical Support Staff	Total No. of Staff	Buffer Stock Facility
CABLE ASSEMBLY & HARNESSING											
FTDI	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	100	N/A	0 €	N/A	50	1,500+	Y
Molex	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	300	N/A	0 €	97%	50	1,500+	Y
CIRCUIT PROTECTION											
Bourns	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	5,000	N/A	0 €	58%	50	1,500+	Y
EPCOS/TKD	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	5,000	N/A	0 €	58%	50	1,500+	Y
Littelfuse	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	35,000	N/A	0 €	67%	50	1,500+	Y
ENCLOSURES											
Bud	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	2,500	N/A	0 €	80%	50	1,500+	Y
Hammond	Switch Electronics	01482 862255	switchelectronics.co.uk	Y	500	N/A	£0	70%	2	6	Y
Hammond	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	12,500	N/A	0 €	100%	50	1,500+	Y
Metcase Enclosures	OKW Enclosures	01489 583858	www.metcase.co.uk	N	288	£40,000	£0	N/A	5	22	Y
OKW Enclosures Ltd	OKW Enclosures	01489 583858	www.okw.co.uk	N	1,955	£40,000	£0	N/A	5	22	Y
Rolec Enclosures	OKW Enclosures	01489 583858	www.rolec-enclosures.co.uk	Y	935	£40,000	£0	N/A	5	22	Y
Teko Enclosures	OKW Enclosures	01489 583858	www.teko.co.uk	Y	1,860	£40,000	£0	N/A	5	22	Y
FREQUENCY MANAGEMENT											
AEL Crystals Ltd	AEL Crystals Ltd	01293 789200	www.aelcrystals.co.uk	N	N/A	£200,000	£50	100%	3	15	Y
ABRACON	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	1,000	N/A	0 €	91%	50	1,500+	Y
ECS	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	500	N/A	0 €	99%	50	1,500+	Y
Epson	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	500	N/A	0 €	59%	50	1,500+	Y
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
Jauch Quartz	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	500	£250,000	0	100%	15	130	Y
HEATSINKS											
Aavid	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	700	N/A	0 €	67%	50	1,500+	Y

Services Sourcing

CEM



Contract Electronics Manufacturing
Repairs • Prototypes • Box-Build
Cable Assembly • Fast turn-rounds
Small and Large Runs • Design
Hand and Machine Soldering
Telephone 020 8241 6959
info@justelex.com
www.justelex.com
Just ask!



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



device programming & reeling specialists



I.C. PROGRAMMING & LASER MARKING SERVICES
Tel: 00 44 (0)1582 412323
Email: sales@actioncircuits.com
www.actioncircuits.com



The Interconnection Specialist

For Connectors and Cable Assemblies including:
Waterproof, Circular, BGA
Sockets and Adaptors,
Modular, Coax, SATA, Custom,
PCB connectors and Network
Tel 01732 765100
interconnect@selwyn.co.uk
www.selwyn.co.uk



More than 50,000 connectors



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

TAPE REELING



device programming & reeling specialists



SMD TAPING & REELING SERVICES
Tel: 00 44 (0)1582 412323
Email: sales@actioncircuits.com
www.actioncircuits.com



Custom Battery Pack Design & Assembly
3000+ Unique Designs
Full Technical Support
Independent UK Operation
Leading Cell Manufacturers
0191 496 9999
info@cellpacksolutions.co.uk
cellpacksolutions.co.uk

Want to Advertise here?

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

Or call us on 01892 613400

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
ICs & SEMICONDUCTORS											
Altera	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	1,600	N/A	0 €	60%	50	1,500+	Y
Analog Devices Inc.	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	9,500	N/A	0 €	83%	50	1,500+	Y
Atmel	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	1,700	N/A	0 €	58%	50	1,500+	Y
Avago Technologies	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	400	N/A	0 €	84%	50	1,500+	Y
Broadcom	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	100	N/A	0 €	69%	50	1,500+	Y
Cirrus Logic	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	300	N/A	0 €	80%	50	1,500+	Y
Cypress Semiconductor	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	1,400	N/A	0 €	63%	50	1,500+	Y
Diodes Incorporated	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	1,600	N/A	0 €	98%	50	1,500+	Y
Exar	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	1,100	N/A	0 €	95%	50	1,500+	Y
Fairchild Semiconductor	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	2,500	N/A	0 €	90%	50	1,500+	Y
Freescale Semiconductor	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	2,500	N/A	0 €	42%	50	1,500+	Y
FTDI	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	100	N/A	0 €	97%	50	1,500+	Y
IDT (Integrated Device Technology)	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	2,100	N/A	0 €	97%	50	1,500+	Y
Infineon	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	800	N/A	0 €	66%	50	1,500+	Y
Intel	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	500	N/A	0 €	78%	50	1,500+	Y
International Rectifier	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	600	N/A	0 €	87%	50	1,500+	Y
Intersil	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	1,900	N/A	0 €	50%	50	1,500+	Y
ISSI	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	700	N/A	0 €	98%	50	1,500+	Y
Lattice	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	700	N/A	0 €	69%	50	1,500+	Y
Maxim Integrated	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	11,200	N/A	0 €	67%	50	1,500+	Y
Microchip	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	12,600	N/A	0 €	91%	50	1,500+	Y
Microsemi	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	400	N/A	0 €	90%	50	1,500+	Y
Monolithic Power Systems (MPS)	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	600	N/A	0 €	40%	50	1,500+	Y
NXP	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	3,900	N/A	0 €	91%	50	1,500+	Y
ON Semiconductor	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	5,100	N/A	0 €	87%	50	1,500+	Y
Power Integrations	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	600	N/A	0 €	59%	50	1,500+	Y
Qorvo	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	300	N/A	0 €	90%	50	1,500+	Y
ROHM Semiconductor	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	1,400	N/A	0 €	55%	50	1,500+	Y
Silicon Laboratories	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	1,500	N/A	0 €	96%	50	1,500+	Y
Skyworks	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	300	N/A	0 €	91%	50	1,500+	Y
Spansion Inc.	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	600	N/A	0 €	93%	50	1,500+	Y
STMicroelectronics	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	4,500	N/A	0 €	99%	50	1,500+	Y
Texas Instruments	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	36,900	N/A	0 €	41%	50	1,500+	Y
Toshiba	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	500	N/A	0 €	100%	50	1,500+	Y
INDUSTRIAL GRADE MEMORY MODULES											
ATP, Innodisk, APRO Kingston	Simms International Plc	01622 852 848	www.simms.co.uk	N	1000+	N/A	N/A	N/A	3	N/A	Y
INTERCONNECTION											
3M	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	3,100	N/A	0 €	16%	50	1,500+	Y
Amphenol	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	25,600	N/A	0 €	53%	50	1,500+	Y
Anderson Power Products	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	800	N/A	0 €	50%	50	1,500+	Y
Cinch Connectivity Solutions	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	1,900	N/A	0 €	82%	50	1,500+	Y
Delphi Connection Systems	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	3,300	N/A	0 €	67%	50	1,500+	Y
FCI	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	4,300	N/A	0 €	94%	50	1,500+	Y
Glenair	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	1,900	N/A	0 €	76%	50	1,500+	Y
HARTING	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	4,700	N/A	0 €	31%	50	1,500+	Y
Harwin	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	2,200	N/A	0 €	79%	50	1,500+	Y
Hellermann Tyton	Lane Electronics	01403 790661	www.fclane.com	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y
Hirose Electric	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	6,100	N/A	0 €	99%	50	1,500+	Y
Huber+Suhner	Lane Electronics	01403 790661	www.fclane.com	Y	766	£116,000	£0	100%	6	38	Y
ITW McMurdo	Lane Electronics	01403 790661	www.fclane.com	Y	866	£219,000	£0	100%	6	38	Y
JAE Electronics	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	1,200	N/A	0 €	32%	50	1,500+	Y
Kycon	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	700	N/A	0 €	99%	50	1,500+	Y
LEMO	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	2,900	N/A	0 €	65%	50	1,500+	Y
Molex	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	16,900	N/A	0 €	75%	50	1,500+	Y
Neutrik	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	1,000	N/A	0 €	86%	50	1,500+	Y
Phoenix Contact	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	12,000	N/A	0 €	99%	50	1,500+	Y
Polamco	Lane Electronics	01403 790661	www.fclane.com	Y	218	£146,000	£0	100%	6	38	Y
Positronic	Lane Electronics	01403 790661	www.fclane.com	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y
Souriau	Lane Electronics	01403 790661	www.fclane.com	Y	1,929	£806,000	£0	100%	6	38	Y
Switchcraft	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	2,200	N/A	0 €	69%	50	1,500+	Y
TE Connectivity	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	30,900	N/A	0 €	40%	50	1,500+	Y

Manufacturer	Distributor	Telephone	Website	Franchised Distributor	No. of Lines for Principal	Stock Value for Principal	Minimum Order Value	% Lead Free for Principal Range	No. of Technical Support Staff	Total No. of Staff	Buffer Stock Facility
OBSOLESCENCE / HARD TO FIND											
	Cyclops Electronics	01904 415 415	www.cyclops-electronics.com	N/A	177,232	£5M	£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
	SeSemi Electronics LTD	01264 731009	www.sesemi.co.uk	Y	2800	N/A	£100	N/A	3	12	Y
OPTO ELECTRONICS											
Avago Technologies	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	8,200	N/A	0 €	89%	50	1,500+	Y
Cree, Inc.	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	22,500	N/A	0 €	74%	50	1,500+	Y
Dialight	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	9,800	N/A	0 €	99%	50	1,500+	Y
Kingbright	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	3,100	N/A	0 €	100%	50	1,500+	Y
Lumileds	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	1,100	N/A	0 €	99%	50	1,500+	Y
Newhaven Display	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	700	N/A	0 €	65%	50	1,500+	Y
Osram Opto Semiconductor	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	2,800	N/A	0 €	99%	50	1,500+	Y
VCC	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	5,000	N/A	0 €	92%	50	1,500+	Y
Vishay	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	3,100	N/A	0 €	99%	50	1,500+	Y
PASSIVES											
AVX	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	70,700	N/A	0 €	58%	50	1,500+	Y
Bourns	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	49,500	N/A	0 €	98%	50	1,500+	Y
Coilcraft	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	10,400	N/A	0 €	98%	50	1,500+	Y
Cornell Dubilier	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	33,000	N/A	0 €	65%	50	1,500+	Y
EPCOS / TDK	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	31,000	N/A	0 €	74%	50	1,500+	Y
Fair-Rite	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	1,000	N/A	0 €	94%	50	1,500+	Y
Kemet	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	135,800	N/A	0 €	93%	50	1,500+	Y
KOA Speer	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	107,900	N/A	0 €	82%	50	1,500+	Y
Laird Technologies	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	1,800	N/A	0 €	50%	50	1,500+	Y
Murata	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	67,300	N/A	0 €	99%	50	1,500+	Y
Nichicon	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	21,600	N/A	0 €	47%	50	1,500+	Y
Ohmite	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	17,300	N/A	0 €	99%	50	1,500+	Y
Panasonic	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	67,900	N/A	0 €	69%	50	1,500+	Y
Taiyo Yuden	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	6,400	N/A	0 €	82%	50	1,500+	Y
TDK	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	25,300	N/A	0 €	85%	50	1,500+	Y
TT Electronics	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	32,800	N/A	0 €	55%	50	1,500+	Y
United Chemi-Con (UCC)	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	13,900	N/A	0 €	99%	50	1,500+	Y
Vishay	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	119,800	N/A	0 €	76%	50	1,500+	Y
Würth Electronics	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	4,500	N/A	0 €	63%	50	1,500+	Y
Yageo	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	45,300	N/A	0 €	99%	50	1,500+	Y
POWER & BATTERIES											
FRIVO Gerätebau GmbH	Haredata Electronics	01423 796240	www.haredata.co.uk	Y	250 - 500	€1M	€250	100%	7	14	Y
Jauch Quartz		01276 605900	www.jauch.com			£500,000	0	95	15	130	Y
Mean Well	Ecopac (UK) Power Ltd	01844 204420	www.ecopacpower.co.uk	Y	6,000	£2M	£0	100%	8	30	Y
Bel Power Solutions	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	1,400	N/A	0 €	94%	50	1,500+	Y
Cincon	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	5,500	N/A	0 €	60%	50	1,500+	Y
Cosel	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	11,800	N/A	0 €	99%	50	1,500+	Y
CUI Inc.	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	3,900	N/A	0 €	100%	50	1,500+	Y
Mean Well	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	4,500	N/A	0 €	75%	50	1,500+	Y
Murata	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	5,200	N/A	0 €	93%	50	1,500+	Y
RECOM	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	23,300	N/A	0 €	92%	50	1,500+	Y
Schaffner	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	900	N/A	0 €	98%	50	1,500+	Y
SL Power	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	2,100	N/A	0 €	87%	50	1,500+	Y
TDK-Lambda	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	4,600	N/A	0 €	99%	50	1,500+	Y
TRACO Power	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	3,400	N/A	0 €	95%	50	1,500+	Y
SENSORS											
All Sensors	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	2,300	N/A	0 €	70%	50	1,500+	Y
ams	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	400	N/A	0 €	77%	50	1,500+	Y
Analog Devices Inc.	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	500	N/A	0 €	78%	50	1,500+	Y
Bosch	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	100	N/A	0 €	94%	50	1,500+	Y
Freemove Semiconductor	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	1,000	N/A	0 €	66%	50	1,500+	Y
Honeywell	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	15,500	N/A	0 €	80%	50	1,500+	Y
Maxim Integrated	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	900	N/A	0 €	N/A	50	1,500+	Y
Melexis	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	700	N/A	0 €	N/A	50	1,500+	Y
Omron	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	5,700	N/A	0 €	N/A	50	1,500+	Y
Sensirion	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	100	N/A	0 €	N/A	50	1,500+	Y
TE Connectivity	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	1,100	N/A	0 €	N/A	50	1,500+	Y

Buyers' Guide

Manufacturer	Distributor	Telephone	Website	Franchised Distributor	No. of Lines for Principal	Stock Value for Principal	Minimum Order Value	% Lead Free for Principal Range	No. of Technical Support Staff	Total No. of Staff	Buffer Stock Facility
SWITCHES & KEYBOARDS											
ALPS	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	400	N/A	0 €	70%	50	1,500+	Y
Apem	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	700	N/A	0 €	96%	50	1,500+	Y
C&K Components	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	1,500	N/A	0 €	84%	50	1,500+	Y
Carling Technologies	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	300	N/A	0 €	87%	50	1,500+	Y
CHERRY	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	200	N/A	0 €	77%	50	1,500+	Y
E-Switch	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	700	N/A	0 €	94%	50	1,500+	Y
EAO Ltd	EAO Ltd	01444 236000	www.eao.co.uk	N	5,000	£500,000	£150	100%	6	22	Y
Grayhill	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	400	N/A	0 €	84%	50	1,500+	Y
Honeywell	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	700	N/A	0 €	98%	50	1,500+	Y
NKK Switches	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	1,100	N/A	0 €	94%	50	1,500+	Y
Omron	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	900	N/A	0 €	68%	50	1,500+	Y
TE Connectivity	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	400	N/A	0 €	98%	50	1,500+	Y
TERMINAL BLOCKS											
Marathon Special Products	Global Supply Services	01904 436 488	www.global-supply-services.com	Y	8,000	£800,000	£100	100%	3	11	Y
THERMAL MANAGEMENT											
ADDA	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	800	N/A	0 €	59%	50	1,500+	Y
Delta Electronics	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	500	N/A	0 €	28%	50	1,500+	Y
ebm-papst	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	2,200	N/A	0 €	99%	50	1,500+	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	0049 (0)89 520 462 110	www.mouser.com	Y	2,900	N/A	0 €		50	1,500+	Y
Sunon	G.English Electronics Ltd	0208 855 0991	www.gelec.co.uk	Y	3,500	£1,000,000+	£0	100%	10	28	Y
Sunon	Thermaco Ltd	01684 566163	www.thermaco.co.uk	Y	3,500	£230,000	£100	100%	6	12	Y
TRANSFORMERS & INDUCTORS											
Best Windings	Best Windings	0044 (0)1394 448424	www.bestwindings.co.uk	N	300	N/A	£100	N/A	2	24	Y
WIRELESS SOLUTIONS											
Anaren	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	100	N/A	0 €	86%	50	1,500+	Y
B&B Electronics	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	100	N/A	0 €	87%	50	1,500+	Y
Bluegiga Technologies	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	100	N/A	0 €	93%	50	1,500+	Y
Digi International	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	200	N/A	0 €	92%	50	1,500+	Y
Laird Technologies	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	100	N/A	0 €	76%	50	1,500+	Y
Linx Technologies	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	100	N/A	0 €	99%	50	1,500+	Y
Microchip	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	100	N/A	0 €	85%	50	1,500+	Y
Murata	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	100	N/A	0 €	100%	50	1,500+	Y
Panasonic	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	100	N/A	0 €	91%	50	1,500+	Y
Redpine Signals	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	100	N/A	0 €	94%	50	1,500+	Y
RF Digital	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	100	N/A	0 €	100%	50	1,500+	Y
Texas Instruments	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	100	N/A	0 €	75%	50	1,500+	Y
Wi2Wi	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	Y	100	N/A	0 €	36%	50	1,500+	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	100	7	AS9100 Rev D, ISO9001:2015, ISO 140001:2015, UL, CCC, IPC-610-G Class 3	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	£11m	UK & Far East	72	3	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
Electrica Limited	0161 343 7575	www.electrica.co.uk	£2.4m	Cheshire	26	3	BSI ISO 9001:2015, IPC-A-610 to Class 3, IPC-J-STD-001, Cert IPC Trainer, UL	Y	Y	Y	Y	Y	Y
Electronic Technicians Ltd	01202 897722	www.etl.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	£2m	M	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	1,300	20	ISO9100, ISO14001, ISO13485, AS9100, ISO45001 & IATF16949	Y	Y	Y	Y	Y	Y
Industrial Electronic Wiring Ltd.	+44(0)1793 694033	www.iwew.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	SCOTLAND	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
Speedboard part of NOTE	01753 746700	www.speedboard.co.uk	£115m	UK/EU/China	1,050	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, TÜV, UL	Y	Y	Y	Y	Y	Y
Protronix EMS	01582 418490	www.protronix.co.uk	£2.5m	Luton	10	2	ISO9001:2015, IPC-A610 Class 3	Y	Y	Y	Y	Y	Y
Season Electronics Limited	02392 452222	www.seasongroup.com	£5m/£100m	Havant, UK, USA, Mexico, China, Malaysia	65/1800	2/18	(AS9100 & ISO9001 in UK) (TS16949 & ISO13485 at sister sites)	Y	Y	Y	Y	Y	Y
Simtek EMS Ltd	01843 233120	www.simtekms.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	01332 360884	www.tioga.co.uk	£16m	Derby	130	6	ISO 9001, ISO 13485, ISO14001, IPC 610, 620, 7711/7721	Y	Y	Y	Y	Y	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

C-CLASS COMPONENTS

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 (ie. Board Manufacture &/or Repair)	Location	Approvals	Volume: Small, Medium, Large	Double-sided	Multi-layer 4-10/20-20-30	Metal PCBs	Flexi / Flexi-Rigid	Obsolescence Solutions	Modifications	Prototyping
ABL Circuits Ltd	01462 894312	www.ablcircuits.co.uk	M	SE	ISO9000: 2015	SML	Y	4-10	Y	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	Y	Y	Y	Y
DK-Daleba Printed Circuits	01992 510000	www.dk-daleba.co.uk	B/M/R	UK, Europe, Asia, USA	UL, ISO9001:2008, TS16949:2009	SML	Y	4-30	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	Y	Y	Y	Y
GSPK Circuits Ltd	+44(0)1423 321100	www.gspkcircuits.ltd.uk	M/R	UK, Europe, Asia	ISO 9001:2015, IATF 16949:2016, EN (AS) 9100	SML	Y	4-34	Y	Y	Y	Y	Y
LEF Circuits	0116 2891122	www.lefcircuits.co.uk	M/R	M	ISO 9001:2015, IPC-A-610	SML	Y	4-30	Y	F/R	Y	Y	Y
Stevenage Circuits Ltd	01438 761811	www.stevenagecircuits.co.uk	M/B	UK/China	ISO 9001:2008, ISO 14001, EN9100:2009, UL, IOSCAR	SML	Y	4-44+	Y	F, F/R	Y	Y	Y
Tate Circuit Industries Ltd	01889 583627	www.tatecircuits.com	B	UK/China	ISO 9001:2015, UL	SML	Y	4-20	Y	Y	Y	Y	Y

Advert Index

Advert	Page	Advert	Page
Anglia	BC	Jauch Quartz UK Ltd	15
Astute	13	Micronel	32
Best Windings	41	Mouser Electronics	5
Cambridge Circuits	37	Powell Electronics	19
CML	16	PULS UK	18
Digi-Key Electronics	FC, IFC & 24	Rebound Electronics	9
eBOM.com	28	Recom	17
ECIA (Trusted Parts)	25	Retronix	11
Elektro-Automatik	15	Rhopoint	30
Farnell	IBC	Rochester	21
FC Lane	31	Schurter UK	28
Fermionx	36	Stego UK Ltd	35
GTK	8	Tate Circuits	37
IFPL	27	Wilson Process Systems	23
Interpower	7		

Ready for Tomorrow



A global distributor that provides a high quality service to make sure you are Ready for Tomorrow!

Inventory increased by **25%**

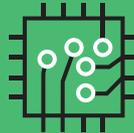
Our biggest ever range

SBCs



Inventory increased by **64%**

Semiconductors



Inventory increased by **6%**

Passives



Inventory increased by **12%**

EMECH



Inventory increased by **202%**

Interconnect



Inventory increased by **16%**

Test and Tools



Inventory increased by **18%**

uk.farnell.com/ready4tomorrow



Cutting-edge connector technologies

with an abundance of variations

EnerBee **SignalBee**

SnapBee

FunctionMAX



With access to over 50,000 products including wire-to-board, board-to-board, FFC/FPC and circular, we have the UK's most comprehensive inventory of HIROSE connectors

- No minimum order quantity
- Competitive pricing
- FREE samples
- FREE delivery

Discover our extensive portfolio

angliaLive

www.anglia-live.com



View products with
your Smartphone