

ELECTRONICS

SEPTEMBER 2017

sourcing

UK & IRELAND

BEST OF BRITISH

ALSO INSIDE: Obsolescence • Resistors • Semiconductors • CEM • Show Preview

AN MMG PUBLISHING TITLE

Access to
6 Million
Products Online

DIGIKEY.CO.UK

Digi-Key
ELECTRONICS

DIGI-KEY RATED #1:

Top Rated Distributor for Breadth of Product

Source: Distributor Evaluation Survey, *Electronic Specifier*, March 17, 2017

*Electronic
Specifier*

**FREE
SHIPPING**
ON ORDERS OVER
£33 OR \$50 USD

0800 587 0991 • 0800 904 7786

DIGIKEY.CO.UK



6 MILLION+ PRODUCTS ONLINE | 650+ INDUSTRY-LEADING SUPPLIERS | 100% FRANCHISED DISTRIBUTOR

*A shipping charge of £12.00 will be billed on all orders of less than £33.00. A shipping charge of \$18.00 USD will be billed on all orders of less than \$50.00 USD. All orders are shipped via UPS, Federal Express, or DHL for delivery within 1-3 days (dependent on final destination). No handling fees. All prices are in British pound sterling or United States dollar. 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. © 2017 Digi-Key Electronics, 701 Brooks Ave. South, Thief River Falls, MN 56701, USA



On the cover – September 2017

Best of British
page 20

Editor's Word



Contents

06

News

Looking for little connectors?

10

Obsolescence

Take steps to manage obsolescence

20

Best of British

Building the 'Best of British' brand

47

DSEI Preview

Charging into defence

60

Buyers' Guide

All the facts and figures to help you buy

Ponziageddon!

When the stresses of the working day reach a peak, I sometimes calm myself down with a game of Googlewack. This involves making up words which search engines find difficult, if not impossible to locate on the internet. Well I hit gold with my latest invention: Ponziageddon. What is Ponziageddon I hear you ask?

Well, I think I've finally sussed how 'never ending' global growth works: it's a giant Ponzi scheme and if it were to fail the world would be plunged into Ponziageddon. In my opinion, this particular Ponzi scheme is fuelled by three things: population growth; education and technology. Here lies the problem.

From what I understand, population growth via birth rate ceased in 2002. What we see as population growth today is due to the people who are already alive, living longer. Assuming that extending people's lives is governed by the law of diminishing returns, global population will soon start to decrease.

Likewise, global GDP is also increasing as education plays its role in improving the productivity of individuals. However, I guess education also suffers at the hands of diminishing returns. If people spend all their time learning they will never get anything else done.

That leaves technology. I'd like to think that even after several thousand years of effort we are just scraping the surface of what technology could do for the human race long term. At this point of time, 'electronics' has a role to play before it is superseded by something better. So, for now, I'm delighted to be one small cog in a huge technological machine keeping Ponziageddon at bay.

Jon Barrett

ELECTRONICS
sourcing **mmg**
PUBLISHING LIMITED

Contact

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

ADVERTISING
Area Sales Executive: Emma Poole
emma.poole@electronics-sourcing.co.uk
Director of Sales: Charlotte Morgan
charlotte.morgan@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

DESIGN
Graphic Designer: Jeremy Roberts
jeremy.roberts@electronics-sourcing.co.uk

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

Issue 147, Vol13 No.9

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
Printed by: Pensord Press Ltd
Electronics Sourcing is printed on
sustainably sourced paper stock
ISSN 2043-9504
© 2017 MMG Publishing Ltd



ELECTRONICS
SOURCING
IS INDEPENDENTLY
ABC AUDITED
2005/2016



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 - ©shutterstock.com/SrsPvl

Big gets Bigger

to meet market demand



Victoria Kickham is a freelance writer specializing in manufacturing, distribution and supply chain issues

Suppliers broaden reach, strengthen specialties to meet growing demand for communication/IoT solutions

Expansion and Investment • By Victoria Kickham

Explosive demand for communication capabilities in everything from factory equipment to consumer vehicles continues to fuel expansion fires at some of the industry's largest distributors.

This summer's acquisition of semiconductor distributor Symmetry Electronics by IP&E specialist TTI is one of the latest cases in point and underscores the growth occurring in the electronic components distribution market. Symmetry specializes in wireless, cellular, Bluetooth, embedded and video technology.

TTI's senior vice president, Americas, Michael Knight, said: "We're going to build out a semiconductor specialist that runs parallel to the IP&E specialist that is TTI. We think that the market is missing that."

With no overlapping product lines, the two companies can support each other: similar to the way TTI works with its subsidiary Sager Power Systems. The plan is to offer the market a specialist in each area that has the support of a much larger organization behind it. TTI also is a sister company to catalog distributor Mouser Electronics. Adding a semiconductor specialist focused on communications and IoT aims to meet today's growing demand for a wider range of electronic components solutions.

Knight added: "A core part of this is IoT. Customers are putting communication functions into everything they're building: wireless, through the cloud, through the Internet. There's a lot going on there."

Tobey Gonnerman, executive vice president at independent electronic components distributor Fusion Worldwide agreed: "The expansion we're seeing is an example of how the distribution space for electronic components continues to grow exponentially. For

instance, the semiconductor market is on an upward path. The pace of technology, the evolution, continues to accelerate; it's becoming a more and more digital world, so you're seeing semiconductor demand and distribution needs across a wider range of customers and industries."

Fusion is addressing growth via staffing, having implemented an aggressive hiring campaign over the last 12 to 18 months. Expanding with more offices is also on the agenda. Gonnerman added: "We will potentially open some new offices in strategic locations—but we will do that very carefully."

Facility expansion is another route some suppliers are taking to address growing demand: and another example of how the big continue to get bigger. Minnesota-based global catalog house Digi-Key announced a \$300 million facility expansion project earlier this year. The company will build a one million square-foot distribution center adjacent to its Thief River Falls headquarters. The project is expected to create more than 1,000 new jobs and generate nearly \$200 million in additional revenue for the state of Minnesota once it's up and running, according to Digi-Key.

TTI recently completed a new building project as well, unveiling a new multi-level distribution center in Fort Worth that should be fully operational by the end of the year. The company is working on an expansion to its main distribution center in Germany as well, which also should be complete this year. The projects follow a similar expansion to the company's Asia distribution center last year.

Such investments require confidence and a long-term view of both the industry and your business, Knight and others agree.



Nancy appreciates a calm, uncomplicated purchasing process. That's why she orders from Mouser, the semiconductor and electronic component selection leader with the top brands engineers know and trust. All available in prototype to production quantities and ready to ship same day.

No coincidence, Nancy is working a lot fewer overtime hours.



**MOUSER
ELECTRONICS**

Authorised Distributor

ORDER WITH CONFIDENCE

Call 01494 467490 or visit mouser.co.uk

View current editions online

www.electronics-sourcing.co.uk



Looking for little connectors?

Now available in Europe from TTI, Weidmüller's Omnimate Power range of PCB terminals and plug-in connectors are designed specifically for power electronics devices. The connectors boast a small footprint and are available with power ratings up to 600V and 54A. They are compatible with cables ranging from 4mm² up to 16mm² and are said to be easy to handle, saving valuable assembly time and cost. Products in the range are designed for applications such as drive controllers and regulators, photovoltaic inverters, power supplies and cooling devices.
www.ttieurope.com



Passives partnership goes global

Rutronik is now a global AVX distribution partner, thereby enhancing access to AVX's entire product range. The company offers passive components for all applications including ceramic and tantalum capacitors, film capacitors, varistors, filters as well as crystal based frequency control devices and radio frequency components. AVX also manufactures electronic connectors and interconnect systems.

Senior vice president of sales at AVX, Pete Venuto, said: "Rutronik is one of our longest and most important distribution partners and has proven to have the expertise, commitment and market awareness needed to drive our business forward."
www.rutronik.com

Ultra-thin sheet cuts heat in small spaces

RS Components has introduced a new customisable thermal interface material from Panasonic. The soft pyrolytic graphite sheet is ideal for thermal management in applications where space is limited and can provide supplemental heatsinking in enclosed or confined areas.

Measuring only 200µm thick, the soft-PGS sheets are synthetically made and boast high thermal conductivity. Sheets are manufactured from a highly oriented graphite polymer film, creating a material that is flexible and can be easily cut to shape. The material is also said to offer excellent heat resistance and reliability, which can help deliver a longer service life and ensure higher performance for various components such as power modules. As soft-PGS can be compressed by 40 per cent, it is ideal for reducing the thermal resistance between a heatsink and an IGBT module.

A selection of material sizes are available. RS also offers small pack sizes and manufacturer pack quantities to meet design and pre-production requirements.
www.rs-online.com



Sourcing corrosion resistant connectors

Mouser Electronics is now stocking Amphenol-Gray zinc nickel metal connectors from Amphenol Industrial. Part of the Amphenol-Gray commercial sub-miniature connector series, these RoHS-compliant connectors feature zinc-over-electroless-nickel shell plating to withstand harsh environments.

The connectors are fully scoop proof with high-density contact arrangements designed to obtain metal-to-metal coupling for superior electromagnetic interference shielding. The connectors also boast self-locking, quick-disconnect threaded coupling, as well as locksmith keying with five keyway polarisation.

Ideal for electric vehicle, industrial and power generation applications, the connectors feature a corrosion-resistant plating rated for 500 hours of salt spray. An improved interfacial seal design also prevents electrolytic erosion of contacts.

www.mouser.com

microchip DIRECT



BUY DIRECT
at
microchipDIRECT.com

microchipDIRECT offers access to the world's largest inventory of Microchip products and the most comprehensive online resource for pricing and support directly from Microchip Technology. We invite you as a valued Microchip customer to experience our service 24 hours a day, 7 days per week.

Visit www.microchipDIRECT.com and enjoy the confidence and convenience of buying from microchipDIRECT and take advantage of the following features:

- ▶ Direct stock from factory
- ▶ Direct customer service
- ▶ Secure ordering
- ▶ Volume pricing
- ▶ Credit lines
- ▶ Long-term orders and scheduling
- ▶ Programming and value add services
- ▶ Ability to adjust open orders
- ▶ Ship to your sites globally
- ▶ Online order status and notifications



microchip
DIRECT
www.microchipdirect.com

 MICROCHIP

www.microchipDIRECT.com

In Brief

Faster IoT access

Avnet Abacus has extended its distribution agreement with Panasonic to include radio frequency and wireless module products designed to facilitate faster design-in of wireless connectivity in IoT-based projects. Customers will gain access to the full portfolio of Panasonic RF modules covering the latest communication protocols with ready-to-use modules for Bluetooth, Bluetooth Low Energy and Wi-Fi. www.avnet-abacus.eu

Industrial connector expansion

Farnell element14 has extended its Alpha Connect offering from Alpha Wire with the addition of 700 lines, all available within five working days. Buyers can now access over 1,030 products. They provide an end-to-end solution for connecting sensors and actuators on the factory floor, ensuring reliable communication in industrial environments. www.element14.com

Line card ready for download

JPR Electronics' 2017 line card is now available to download featuring nearly 70 manufacturers of: cables, connectors, semiconductors, sensors, keyboards, switches, relays, wound components, power supplies, enclosures, cases, motors, fans and tools. JPR can supply any quantity, from a single item to production volumes, fulfil a complete bill of materials or provide a just-in-time kitting service. www.jprelec.co.uk

Perfectly positioned for transceiver sales

Indoor positioning specialist, Decawave, has gained broadline distribution coverage thanks to a new franchise agreement with Future Electronics.

Under the agreement, Future will stock Decawave's DW1000 wireless transceiver, an IEEE802.15.4-2011 ultra-wideband-compliant device, and the DWM1000 module, based on the transceiver. Customers can also order the EVK1000 and Trek1000 evaluation kits from stock.

To date, position data in applications with limited access to satellite positioning signals is calculated by triangulating Wi-Fi or Bluetooth signals. Unfortunately, precision is limited to more than 1m and the software is complex. Future Electronics therefore expects interest in the DW1000 and DWM1000, which provide an indoor positioning solution with raw positioning output accurate to $\pm 10\text{cm}$ in three dimensions.

Fabricated in a standard CMOS process, the DW1000 and DWM1000 are said to be attractively priced. Low power consumption also makes the Decawave solution suitable for wearable and internet of things devices and in portable and battery-powered products. www.futureelectronics.com



Investing in distribution infrastructure

Jauch Quartz has invested in new Surrey-based premises dedicated to its UK and Ireland business.

Managing director, Nicholas Ribton, said: "This new facility will enable us to support the growing product and logistics requirements of an ever more demanding and diverse customer base we now service."

Three times the size of its previous UK locations the 900m² warehouse space offers over 40 pallet spaces and 200 plus bay locations. Bespoke, SAP based, automated WMS, with full batch traceability, supports additional local stockholding capacity and is complemented by a dedicated battery application and test lab. www.jauch.co.uk

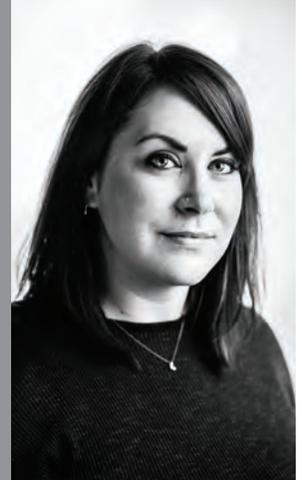
Advertorial

Fresh face sends a clear message

As CCL celebrates its 20th anniversary, it does so with a fresh face. After recruiting its new marketing manager, Lauren Costello-Fox, the company has made further investment, focussing on its current evolution with new look branding.

The changes come as the company marks 20 years as a service provider to the electronics industry. For the past two decades, CCL has offered an unrivalled solution to original equipment manufacturer and electronic manufacturing service providers, enabling them to get a financial return on excess component inventory that they hold.

CCL's new streamlined logo highlights the message that CCL is an integrated part of its customers' business. Reflecting the way that CCL has matured, and to continue the brand evolution, CCL will also switch over to a new URL – www.oemXS.co.uk – sending a clear and more direct message to industry on what the company offers. www.oemXS.co.uk



CCL
YOUR EXCESS INVENTORY PARTNER



www.oemXS.co.uk



Challenge our Quotes team today

- Price stability
- Rapid response
- Competitive pricing on large quantities
- Inventory management

Not in the catalogue? Above our end column? Not a problem! We welcome the chance to beat your current prices by quoting you on volume orders, sourcing items from our suppliers' extended ranges or those not available in our product catalogue. We will hold quotes for 30 days, protecting you against future price rises. Contact our dedicated quotes team today to save money on large quantities. Alternatively using our online quotation service could not be easier.

www.rapidonline.com/Quotation • Quotes@rapidonline.com • 01206 751166

CAMDENBOSS
ELECTRONICS & ENCLOSURES

FACOM

finder

**HAMMOND
MANUFACTURING**

Kingbright

**Schneider
Electric**

TE
CONNECTIVITY

VTX vigortronix

Rapid
electronics

helping you make it
www.rapidonline.com

Rapid Electronics part of the **CONRAD** Group

Take steps to manage obsolescence

When buyers encounter obsolescence issues, there are six main options available to resolve the problem. Here Winslow Adaptics explores what can be done

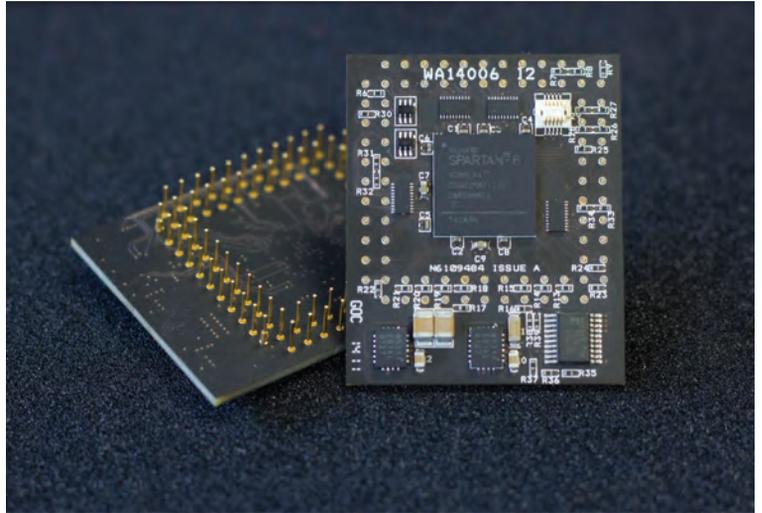
Bridge buy

If you have registered to receive end-of-life notifications from franchised distributors or component manufacturers you will be informed of the final purchase and shipment dates. This allows you to plan a last time buy, which is great if you can establish when your project end of life will be and how many components you are likely to need. It is also important to ensure a proper storage facility and test regime is set up and funded to care for the buys. Naturally, bridge buys

are easier if the equipment has ceased production and you are in the maintenance phase, not still actively promoting the unit.

Grey market

The global grey market consists of surplus stock held at OEMs, CEMs and remaining stock at franchised distributors in other territories. This is a legitimate place to source components if you remember that many component manufacturers will not provide technical support to components purchased outside of the



regional franchise network.

Components may have no traceability, will not be

▶ continued on page 12

An ASIC has been reconfigured as an FPGA creating a sustainable solution for the medical industry



RHOPOINT

SOURCING

Specialists in sourcing hard to find, long lead time, end of life & obsolete components.

- Active, passive and electromechanical components
- Genuine components sourced ● Full transparency
- All parts subject to in depth visual inspection
- Up to 12 month product guarantee ● Scheduled ordering
- Excess stock management ● Full test house facilities available



Visit us on
STAND K6
18-19 Oct
Ricoh Arena,
Coventry

Working with a global network of manufacturers, franchised distributors, independent brokers & stocking distributors as well as having access to OEM/CEM's excess stock holdings to source the products you need.

www.rhopointsourcing.com
sales@rhopointsourcing.com
T: +44 (0) 1342 330495




Certificate No.
FS617614
BS EN ISO 9001:2008



Unlocking obsolete passives



The specialist approach to sourcing obsolete passives

It takes the combination of expert product knowledge, some creative thinking and the willingness to invest the time to find an alternative to an obsolete capacitor or resistor.

How Charcroft finds an alternative to an obsolete capacitor or resistor

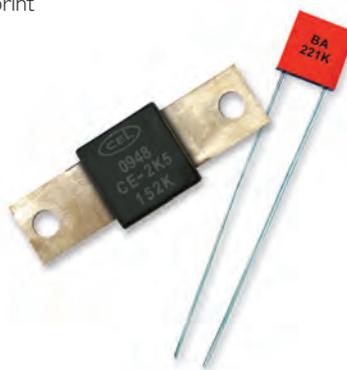
- Identify the product description from a part number, or the part number from a product description
- Confirm the specification using a library of legacy catalogues
- Check for the original part under a different manufacturer
- Look for existing alternatives with other manufacturers
- Liaise with customer engineers to determine key electrical specifications
- Search manufacturer inventories for original parts with tighter specifications
- Manufacture a custom assembly to meet the original footprint

Contact Debbie now to solve your obsolete passives challenge

Call 01591 610408

Click debbie.rowland@charcroft.com

Chat Online at www.charcroft.com



Alpha • Arcotronics • BHC • BI Technologies • Eurofarad • Evox Rifa • Firadec • IRC • Microspire • Novacap Ohmite
Powertron • Sfernice • Sic Saftco • State-of-the-Art • Syfer • Temex • Vishay • Welwyn

charcroft
ELECTRONICS

www.charcroft.com

Email: request@charcroft.com Tel: 01591 610408

Passives, power, interconnect, emech and more

Knowledge of yesterday ■ Looking after today ■ Supporting tomorrow.



Debbie Rowland

Director

debbie.rowland@charcroft.com



Roger Tall

Passives, Hi-rel Semis & Opto Specialis
roger.tall@charcroft.com

Obsolescence

supported by the manufacturer, have no evidence of storage conditions and may even be counterfeit. The risks can be significantly reduced however, by developing supplier relationships so that, although no formal paperwork is present, the source and condition of the components can be trusted and the components will be warranted. Testing is highly recommended to reveal whether the component is working to its specification, which just leaves the question of reliability. Is it better to use a component which may fail in a shorter time than no component at all?

Adapt

If the component has become obsolete but is still available in another package, then adapt is the best solution. You will be using the same die at the same speed and characteristics and provided the adapter is made of

the same material as the board onto which it will be mounted, then all other environmental considerations will be consistent with the use of the original device.

Reconfigure

I consider reconfigure as adapt plus. For example, when the only available component operates at a different voltage, or the memory device is larger than the original, then reconfiguration is a legitimate solution. This will be designed to the fit of the original and, with the addition of a few components, the function and form can be maintained.

Emulate

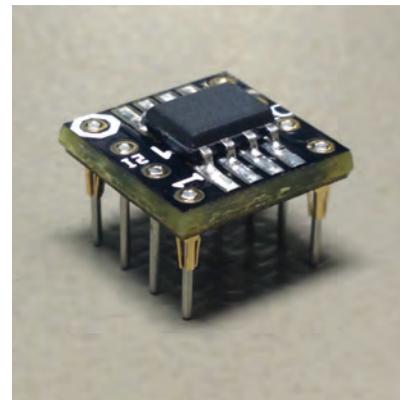
If reconfigure was adapt plus, then emulation is reconfigure plus. Here a form, fit and function solution will be established using a suite of different components. This solution is becoming more common

with the rise in 'intelligent' components becoming obsolete. Fortunately, due to the age of these components, they are often not intelligent by today's capability and are easily emulated using modern configurable devices. Depending on system complexity and environment, this type of solution certainly saves on the cost of re-design.

Re-design

Unplanned re-design can be a costly exercise hastened by unexpected looming deadlines. Knowing the value of your options and their associated risk and surety provides the tools to assess the short and long term commercial impact as you move into the next phase of your product lifecycle.

www.winslowadaptics.com



Adapting available components provides a robust and rapid solution

Is it better to use a component which may fail in a shorter time than no component at all?

Advertorial

Dealing with obsolescence

Obsolescence is one of the biggest issues facing the electronic industry, especially within the long life project fields like military, oil and gas, rail, aerospace and nuclear.

There is much for these kinds of industries to fear from obsolescence as re design can be a lengthy and expensive process that can also isolate their loyal customer base by requiring upgrades. So, what is driving the obsolescence problem...? Basically it's a natural occurrence, things do progress, things get left behind in all forms of industry.

Each industry has its challenges as we had with RoHS for example. It's how these problems are managed that makes the difference, there are options that will individually suit certain companies more

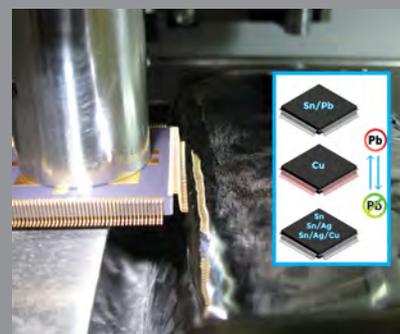
than others, among these are:

Redesign – Redesigning to “stay ahead of the game” is the obvious and safest option, but, this really is not practical for lots of sectors trying to maintain a loyal customer base by supplying and supporting long life products.

Planning – there are multiple software options now to pre-empt future obsolescence problems by highlighting parts that are end of life, single source or listed as at risk. But, this again only helps with new designs, not the support of long life products.

Up rating, component salvaging, alloy conversion

– This is where Retronix can help by taking commercial rated parts and testing them to the industrial specification to then supply the uprated parts back as industrial specification. We can safely salvage obsolete components from existing PCBs, test the parts, recondition the legs and re reel if required. Another service that Retronix offer to help with obsolescence issues is to alloy convert parts, so if you require a Pb part but this is now an obsolete part, we can convert the ROHS compliant part and make this a Pb part.



RETRONIX

www.retronix.com



YOUR SOURCE FOR GLOBAL FRANCHISE DISTRIBUTION

In addition to our supply chain services, cost-saving programs, and inventory solutions, **America II provides a wide range of franchise lines** for industries ranging from telecommunications, industrial and lighting to healthcare, automotive and military.

44-1462-707070

www.americaii.eu

A2Efranchise@americaii.com



AMERICA II
EUROPE LTD

The power of distribution

Standard logic market to bounce back

Strong demand and an increase in average prices are helping drive the standard logic market

By James Carbone

Buyers can expect average prices for standard logic to increase in the second half of the year as demand increases from several key customer segments.

As a result of robust demand and higher prices, 2017 will be a bounce-back year for standard logic after sales revenue fell 25.8 per cent in 2016, according to Semico Research.

"The standard logic market had been kind of declining," said Jim Feldhan, president of Semico. "In 2015 it was almost \$2 billion, but fell to \$1.5 billion in 2016." However, in 2017, "there's been a pretty good turnaround. The standard logic market is on a trajectory to grow 11 per cent and reach \$1.6 billion in 2017," said Feldhan. Unit shipments in 2017 are expected to increase 7.4 per cent, "which will be the best year in the last four years for unit shipments," he said.

Standard logic includes OR, AND, NOR, NAND gates, buffers, drivers, transceivers, multiplexers, backplane logic, universal bus products, flip-flop, latch and register chips among others.

One reason for the turnaround is the overall recovery of the semiconductor industry and tightening of inventories compared to last year. Many manufacturers worked off their standard logic inventories and need to re-stock.

More price increases

Modest price increases are also contributing to market growth. Last year the average price for a standard logic product was 8.2 cents, according to Semico. Through May of this year, the average price for three months of the year was 8.4 cents; 7.8 cents for another month and 7.9 for the other for an overall average of 8.3 cents. While it is not a significant increase, "we think the price will increase for the remainder of the year," said Feldhan. He noted the average price for standard logic so far in 2017 is lower than it was two years ago when it was 11 cents.

Recovery of the standard logic market is welcome news to Texas Instruments, which has a broad product portfolio of logic chips used across multiple markets and applications.

"Logic is used in almost every product that people interact with on a daily basis," said Matt Kurtz, product line manager, logic at Texas Instruments. "With such a diverse business, we don't see any one 'hot spot,' but instead have seen strength across all the different markets, regions and customers we serve, he said.

Besides existing customers, TI continually sees "new customers and new applications that use TI logic products," including personal electronics devices, automotive systems and Internet of Things "which help make devices more efficient" Kurtz said.

Another standard logic manufacturer that is seeing growth in its standard logic business is ON Semiconductor. Guy Rahamim, product line manager for the logic and switch business unit at ON, said the chipmaker was posting "significant growth in the standard logic part of our portfolio." He said growth in demand was due to the overall standard logic market expanding and because of ON's alignment with key customers.

More growth in second half ON saw increasing unit demand for its products in the first half of the year and expects more demand growth in the second half. "We traditionally see stronger demand in Q3 and most of Q4, with several key smartphone customers having big launches in the second half of the year," said Rahamim. "We see no signs of the market softening and we expect to see a traditionally stronger second half vs. first half."

He said demand is strong for ON's MiniGate and High Speed Logic products.

Rahamim said demand is robust from the automotive segment, particularly Advanced Driver Assistance Systems (ADAS). Automotive has "always been a strong area for ON Semiconductor and we are seeing significant growth as we capture share as the automotive market continues to perform and as more electronics are being integrated into cars," he said.

However, standard logic demand from smartphone and computer

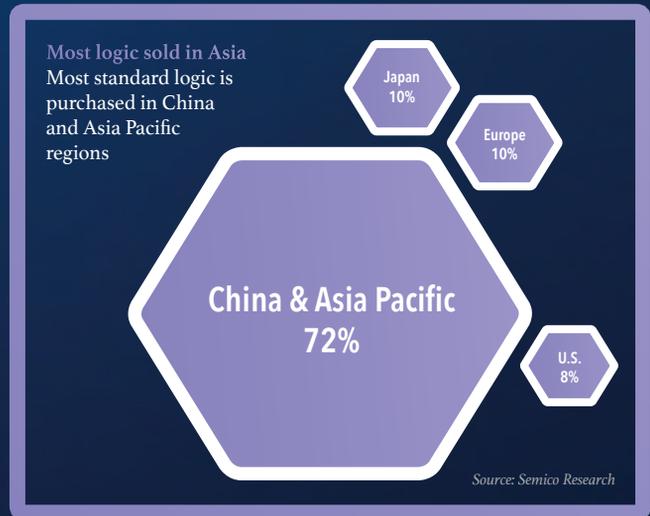
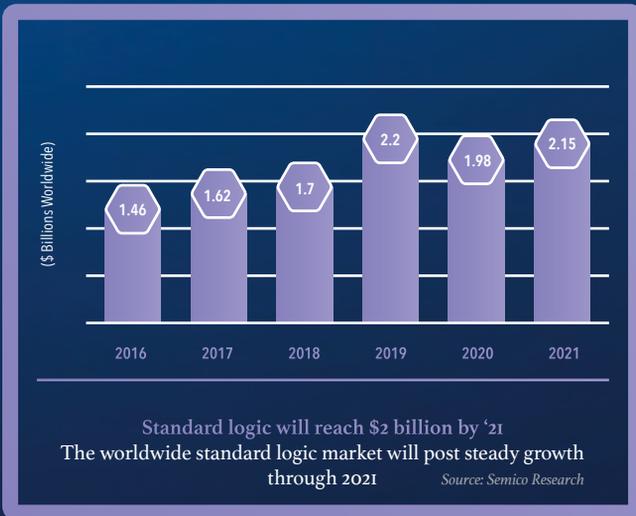
By The Numbers

Source: Semico Research

\$1.46 billion *The size of the global standard logic market in 2016*

11% *The rate of sales growth for the 2017 standard logic market compared to 2016*

8.3 cents *The average price of a standard logic chip in the first five months of 2017*



segments has been sluggish. Those segments have reached their saturation point and the number of systems sold is trending flat or down, said Rahamim.

“The number of standard logic devices per system is also less than in the past so sales of standard logic devices are lower in these segments,” he said. “However, due to increased functionality we are seeing significant growth of our high-performance products like voltage translators and analog switches,” Rahamim said.

Industrial Internet of Things (IIoT) is also helping drive sales of standard logic as more products and equipment are connected to the Internet.

Smaller packages wanted
While standard logic is used in many electronics systems and products and is being designed in new ones, there is not a lot of innovation with standard logic, said Feldhan. He noted that standard logic products are based on mature semiconductor technology.

“There are many standard logic families that have been around for 30 years such as TTL and the 7400 families,” he said. “The only innovation has been in packaging.”

Feldhan noted there is more demand for logic in very small packages from smart phones and wearable electronics. “You will find standard logic in multichip packages.”

In fact, integration of standard logic with other chips into system on a chip (SoC) products is an ongoing trend and is impacting the standard logic market. Kurtz said logic integration tends to occur when end-equipment begins to mature or there is a single standard that OEMs use which allows dedicated chips to be integrated with several chips including logic.

“But at the same time, logic parts are generally the first devices needed when something becomes electronically ‘smart’ in all the various ways we see across markets and end equipment,” said Kurtz.

More logic opportunities
As a result, “there are always new opportunities for logic devices in next generation end equipment to offset the integration happening on older more mature end equipment,” said Kurtz. He added TI focuses on making sure the chipmaker releases new logic products that have the “right performance and packages for the next smart application.”

Rahamim said it is very common for SoCs to integrate a logic device or “even one of our high-performance products like a voltage translator.” SoC reduces the overall cost of a system and drives higher functionality which increases demand for the product and drives more sales, according to Rahamim.

He said that the growth in the number of systems sold such as computers, smartphones, TVs, and other consumer electronics equipment has outpaced the growth in standard logic over the last decade.

“That points to fewer logic devices per system, but many more systems

being sold,” said Rahamim. “The one exception to that is in the automotive segment, where the amount of ICs, including standard logic, per system has grown significantly, especially over the last 5 to 10 years,” he said.

ON recently acquired Fairchild Semiconductor and the acquisition should help ON compete as the number of standard logic chips per system shrinks because of integration.

“Acquiring Fairchild has given us a much better perspective of the overall market,” said Rahamim. He noted that ON has had a wide reach with its logic portfolio, but the acquisition of Fairchild has helped ON penetrate “previously underserved segments like networking and industrial. It also gives us increased scale and allows us to invest more in a bigger portfolio,” said Rahamim.

7.4% The amount standard logic unit shipments will increase in 2017

\$2.15 billion The forecasted size of the worldwide standard logic market in 2021

Cheap as chips?



A chip resistor is cheaper than a grain of rice, yet supply problems still have huge cost implications. Here chief executive officer, Steve Rawlins, explains how Anglia Components helps buyers maintain optimum stock levels

With a chip resistor now cheaper than a grain of rice, the only problem is making sure your bowl is always full. The frustrating thing is that

despite it costing less than 400ths of a penny, it can still cost thousands in lost orders should it not be available in the amount you need, when

you need it. The question for suppliers is how to make sure that increasing demand for these low cost, high volume products can be met.

Chip resistors are now cheaper than a grain of rice



Take control

We have all the parts you need to bring your design, build and maintenance projects to life.

Never get stuck again. Our extensive range of electrical, automation, tools and consumables has got you covered.

Find the right parts at



uk.rs-online.com

Chief executive officer,
Anglia Components,
Steve Rawlins



For Anglia, the key has been helping customers to streamline their operation, providing all the tools required to help them operate at their optimum stock levels. There's no room for over stocks or line stoppages due to lack of components. This means that in today's market place, small, medium and large customers all need to be treated the same way, with access to the expertise that a distributor can provide.

Instant availability

For many customers, inventory needs to be held at a UK warehouse for reliable next day delivery. On some occasions, customers need instant accessibility and want stock of their regularly used components on site. Many entrepreneurial businesses lack the inventory management experience, however, relying instead on distributors to manage this stock to avoid costly excess and expensive line stops due to shortages.

Two initiatives have been introduced by Anglia to support small and medium sized customers with these challenges: Anglia 80/20 and Anglia Sigma. The former offers supply chain flexibility the like of which was previously only available to large volume users through consignment or vendor managed inventory. In this zero-cost initiative, customers receive an agreed level of inventory on their regularly used commodity components, held on their site for instant accessibility. The level of inventory is scaled according to the customer's forecast demand and is only invoiced as it used.

Transparent data

The second development is Anglia Sigma, a free web-based, dashboard that helps customers with quality management. Instead of waiting for daily, weekly or even monthly reports, Sigma allows customers to see a live view of forward, current and historical orders and enquiries. It also allows them to measure delivery performance, billings and purchase orders by product type. This information is available free of charge to customers through an instantly accessible online portal, the aim being to give them complete transparency in their trading relationship with Anglia.

Right now, the UK market is buoyant, with newly published figures from the ECSN showing that its authorised distributor members are seeing an encouraging 18 per cent increase in new orders year against year for May 2017. UK electronic component sales revenue has also increased some 24 per cent year on year. To ensure the market continues

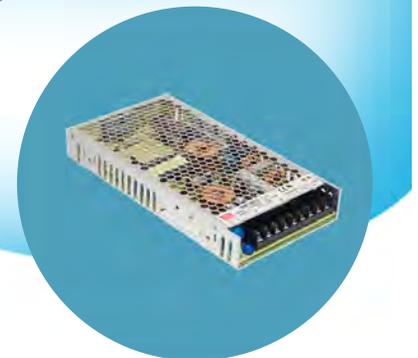
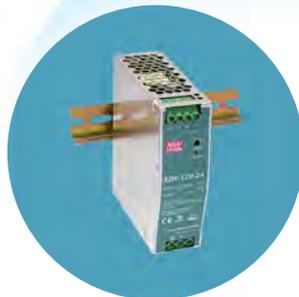
growing, distributors have a responsibility to invest in the UK's vibrant small and medium sized electronics manufacturers, helping them to find a flexible, instantly accessible inventory of commodity components on an invoice at usage basis, thus enabling them to grow.

www.anglia.com

ECOPAC^{UK} POWER LTD

Distributor of **Mean Well** Power Supplies

- External Power Supplies
- Enclosed Power Supply
- Desktop Power Supply
- Din Rail Power Supplies
- Open Frame



Ecopac Power LTD
sales@ecopacpower.co.uk | www.ecopacpower.co.uk
Sales: 01844 20 44 20 | Technical: 01844 20 44 30

Product obsolescence and end-of-life: time to panic?

MicrochipDIRECT global sales manager, Martin Warmington advises purchasers to urge designers to consider end-of-life when specifying a new device

Generally, device manufacturers considered product life cycle during inception and early design. This is highly relevant for consumer items where the next two designs are already drawn up or sketched out, as their business is fast-moving.

For high-end semiconductors, the product life cycle can be similar. However, for general-purpose products (low pin count microcontrollers, memories, op-amps, regulators) product life cycle can be considerably longer, moving towards years or even decades, like the 555 timer. This is because demand for these products continues to be strong due to their uses in multiple end product categories based on their broad general functions.

Original equipment manufacturer (OEM) designers should consider the product life cycle of every part of their design. Even though most manufacturers cannot give definitive dates of life cycles they can give indications of current demand and may offer alternatives. However, end-of-life (EOL) or obsolescence is as certain as 'death and taxes' and therefore product life cycles should always be closely managed. Purchasers should urge their designers to consider this important item when entering a new device into the procurement system.

Once an EOL notice has been published, OEMs have a number of choices:

- Redesign the product to replace the EOL device
- Find drop-in alternatives from the same manufacturer or an alternative source
- Find similar parts from

the same manufacturer or alternative source

- Buy a bulk supply of inventory before the published last-time buy date
- Discover if the manufacturer can hold products in die bank and then package and test parts when needed

If the OEM's design is in the latter stages of life 'maturity or decline' other options may be applicable.

- Use a third party, such as a distributor or EMS to buffer parts for future use
- Use referral sites to discover which distributors have stock
- Find obsolete specialist suppliers

In most cases, if the OEM's end product is not in the mature phase of its own life cycle then customers would be advised to use the first option. All other options allow production to keep running but do not secure continued supply. For example, when I had to source supply for an obsolete part that cost \$0.50 per device during its manufacture, the obsolete vendor sold the part for \$15 each. Don't let engineering put you in this situation.

OEM customers should get as close to the manufacturer as possible to get the most accurate EOL information as the manufacturer will issue a last-time buy date with conditions. If the product is purchased from a distributor there is a third party in the transaction that may not have the latest information and may not be able to issue the last-time buy notice. The best alternative is to obtain information directly from the manufacturer.

Most semiconductor manufacturers have a good product change notification (PCN) procedure in place to advise. Microchip offers such a service at www.microchip.com/pcn. Microchip uses a single sign-on for most of its online client facing services including their direct e-commerce channel, microchipDIRECT where over 90 per cent of Microchip's device portfolio can be purchased.

Microchip has one of the longest product life cycles of any semiconductor manufacturer. For example, the PIC16F877 microcontroller was released to production in 2003 and is still made today due to strong demand. In some markets such as automotive and medical, redesign cost can be considerable, running into tens of thousands of dollars, plus the cost for recertification and testing.

True direct replacements for EOL products are rare as most manufacturers do not generally want to launch a 100 per cent compatible part as that limits the new features they can add. A similar part may exist, but redesign is still the best solution if the product is in the introduction or growth phases of its life.

Manufacturers can help customers find an alternative device from a similar family of parts. This alternative family may not be any newer than the EOL device so the customer should request information regarding longevity of manufacture. Find out why the part is end-of-life and ask whether the replacement part is a good choice and still has 'legs'.



Martin Warmington, global sales manager, microchipDIRECT

Parts go obsolete for many reasons. For example, demand for the part may have declined to a volume that is no longer cost-effective to manufacture. Other reasons are that the materials or machinery used to manufacture the part are no longer available or serviceable. Also, when manufacturers consolidate, similar devices may be made obsolete, with the most profitable parts winning.

One of the knock-on effects of declining product demand is excess stock. Although not an indicator that a product is going end-of-life, it is good for the customer as they may be able to get these parts for a lower cost from the manufacturer. MicrochipDIRECT has a discount page that allows customers to find excess stock or older products at lower prices.

So, no need to panic. Stay close to the manufacturer and do not procrastinate on that redesign. The manufacturers and distributors have resources and are here to help.

www.microchip.com

Tough but elegant

Switches for outdoor applications are exposed to extremes: vandalism, weather, fluctuations in temperature and fine dust. With Metal Line, Schurter aims to provide a solution that combines robust functionality and reliability with aesthetics and elegance.



After all, switches are meant to be touched and our fingers are highly sensitive. We immediately sense the surface texture of a switch and decipher whether it's cheap or high quality. Moreover, the demand for aesthetics in input systems is rapidly increasing.

Metal Line is Schurter's response to these demands. Metal Line includes a variety of switches using various technologies designed specifically to protect against destructive damage for use

in extreme environments. The switches are resistant and meet mechanical shock requirements up to IK07 according to DIN EN 50102. Designed for a lifetime of up to 20 million activations, they can be used in input systems in harsh industrial environments as well as in applications with high user interface. All Metal Line switches feature a metal housing, which not only makes them durable, but also ensures they can withstand tactically and visually demanding applications.

www.schurter.com



With an industry leading reputation for quality, flexibility and reliability we deliver a sustainable Finished Goods Model to meet the demand of your business.

- PCBA
- Product Assembly
- Test

YOUR RELIABLE ELECTRONICS MANUFACTURING SERVICE PROVIDER

We understand that OEMs have a need for their EMS partner to fulfil their requirements in close proximity to them and their end-markets.

- Design
- Development
- New Product Introduction
- Product Realisation
- Product Fulfilment



t: +44 (0)1383 822 911
f: +44 (0)1383 824 740

@: sales.dems@dynamic-ems.com
W: dynamic-ems.com

Dynamic EMS Ltd, Taxi Way, Hillend & Donibristle industrial Estate
Dalgety Bay, KY11 9ET, UK



Messe München
Connecting Global Competence

→ Buy tickets now!



World's Leading Trade Fair for Electronics Development and Production | November 14-17, 2017
Messe München | productronica.com

Contact: Pattern Limited | Tel. +44 20 3375 8230
info@pattern.co.uk



Co-located event



productronica 2017
innovation all along the line



Take the lead on obsolescence

A component with market-leading functionality today can be superseded within a year. Cyclops Electronics' head of marketing, Beverley Scott, looks at the proactive strategies purchasers can take to stay ahead of the problem

Fifty years ago, Gordon Moore predicted that the capabilities of computing and electronics would dramatically increase whilst simultaneously seeing a decrease in cost. This estimate became known as Moore's Law and has been a springboard for innovation for the entire electronics industry, challenging technicians and designers to keep doubling the number of transistors fitted on an integrated circuit.

In fact, Moore's Law is as relevant today as it was when it was first published

in 1965, which is amazing considering the rate at which technology has advanced in the past decade.

A consequence of this constant innovation however, is that the rate of obsolescence and end-of-life notices remains high. A component that has market-leading functionality today could be superseded within a year, setting off a chain of events that impacts both supply chains and production plans.

This causes a problem for everybody involved with the

electronics industry, from designers through to sub-contractors and particularly those working in purchasing departments.

Proactive planning

It goes without saying that it is important for companies to be proactive when it comes to obsolescence because, in the worst-case scenarios, it can reduce both profit and product viability.

Luckily, there are countless tools and strategies that can be utilised to help manage its impact, ranging from sophisticated algorithms



It is important for companies to be proactive when it comes to obsolescence



DIN Rail Terminal Blocks

Ranging from 6-24 poles



Available in 5mm & 5.08mm pitch sizes



Flanged & Non-Flanged options available



Performance Engineered Interconnection and Enclosures Delivered Worldwide

www.camdenboss.com info@camdenboss.com +44 (0)1638 716101





through to tailored purchasing plans and cohesive supply chain management systems. By staying on the front foot, it becomes possible to retain control when a crucial component receives that dreaded end-of-life notice.

Becoming dependent on a solitary approach to purchasing can cause problems. For

example, relying solely on a just-in-time model of procurement could leave businesses vulnerable to a sudden spike in demand at both ends of the manufacturing process.

This is one reason why businesses may want to work

▶▶ *continued on page 22*



Tate Circuit Industries Ltd

**Offshore PCB Manufacture
Supported by
UK Engineers**



Offshore Prices, Excellent Service

We supply low cost, high quality printed circuit boards supported by experienced Tate PCB engineers. We are proud of our reputation for exceptional service.

www.tatecircuits.com
sales@tatecircuits.com Tel: 01543 622 435



01438 346600
www.nemco.co.uk

NEXT-GENERATION Contract Electronics Manufacturing

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



FN 34116 EMS 61061

FN 34116 EMS 61061

0303



with electronic component distributors. Many franchised, and indeed many independent, sources will have access to datasheets, discontinuance notices and specialist personnel that can help people plan their technical changes in advance.

Specialist distribution

If a component within a production schematic has become obsolete and there is no stock through authorised channels, there are several avenues that could be explored. Unfortunately, the majority of these come with associated risks.

It may be decided that an entire redesign is necessary, although this would come at some financial expense.

Alternatively, parts could be reverse engineered or sourced on the open market by an internal purchasing division. Given the fears around safety, product longevity and counterfeiting,

however, one would have to question whether these options would be wise.

As a result, many internal procurement teams turn towards independent distributors that specialise in stocking and sourcing obsolete electronic components.

The leading names in this sector should be able to offer technical advice and support, alongside additional value-added services. A good barometer of an independent distributor would be the level of guarantee that it offers on any purchase made through the company, as well as the stringency of its anti-counterfeiting measures.

Asking questions

Of course, it is important to ask the right questions and look for the appropriate accreditation when enlisting specialist support.

The escalating infusion of

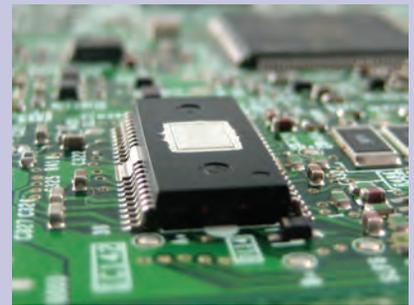
counterfeit parts means that when approaching new suppliers, it is best practice to remain vigilant. If at any point a company refuses to be transparent when it comes to its quality and testing procedures, purchasers would be wise to give that supplier a wide berth. Ask about internal supplier controls, membership to bodies such as the ERAI and what policies the company has in place to aid with counterfeit avoidance.

No doubt, given the rate that technology is changing, every manufacturer is likely to come face to face with obsolescence-related problems at some point. With some careful planning, however, and the right strategic partnerships with distributors that specialise in stocking and sourcing obsolete components, this risk can be mitigated.

www.cyclops-electronics.com



Head of marketing, Cyclops Electronics, Beverley Scott



A good barometer of an independent distributor would be the level of guarantee that it offers on any purchase made

ten reasons to team up with tioga

- State Of The Art Electronic Assembly
- 6 Fully Automated SMD Production Lines
- BGA, µBGA and Chip on Chip (POP) Technology
- EKRA X5 Automatic Screen and Stencil Printer
- Large Board Capability 560 x 600mm
- In house 3D X-Ray Facility
- ISO 9001 / ISO 13485
- Full Turn Key Solution
- Wide Ranging Expertise
- Customer Partnership

www.tioga.co.uk
 telephone +44 (0) 1332 360884
 sales@tioga.co.uk



ME & GERBER, 1986

We love PCBs. We always have.

We are the geeks. The nerds. The passionate. We all think, talk and dream about that little green masterpiece. We call it **Your Key Component**. Because that's what it is. And our mission is to **produce PCBs for demanding customers, on time, with zero defects, and at the lowest total cost.**

We are the NCAB Group. One of the world's leading producers of PCBs. We have been producing PCBs, and only PCBs since 1993.

Call us on +44 01380 736140, e-mail to salesuk@ncabgroup.com or visit www.ncabgroup.com for more info.





Building the 'Best of British' brand

In the competitive post-Brexit era, DJ Assembly aims to stand out by providing a 'Best of British' service to those seeking a UK partner to design, build and test their products

The 'Best of British' tag is often used to signify quality on the national and international stage. In the post-Brexit era, this hallmark will be used to open doors, make trade deals and boost our country's economy. The electronics sector is no different and today, more and more OEMs with global aspirations are looking for a UK partner to help design, build and test their products.

In this competitive market, OEMs are looking for class-leading service. Some will be drawn in by attractive costings, but a basic price point doesn't tell the whole story. So, what should companies be looking for?

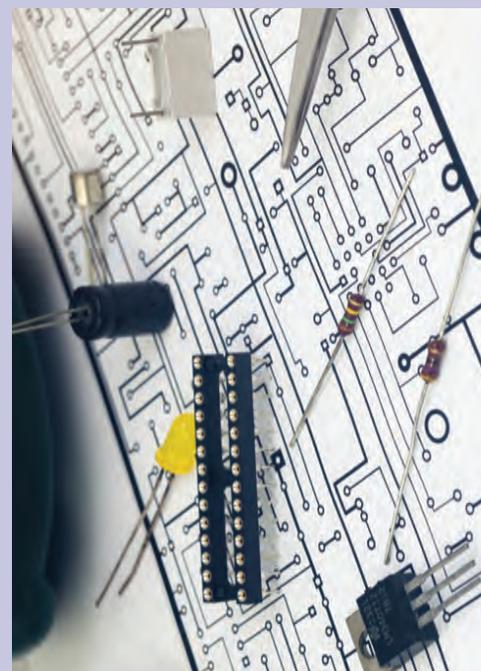
Adding value
Often, the answer lies with value-added services. DJ Assembly, for example, provides a complete and tailored approach to the production process. With over twenty years' experience as a contract electronics manufacturer, we continuously adapt our practices to offer the best when it comes to design work, PCB assemblies and supply chain management.

Our flexibility also enables us to unlock savings for customers. With our stock holding facilities, we can facilitate individual call-off arrangements where deliveries and payments are made on an 'as needed'

basis. This removes the need for customers to tie up capital and frees up valuable funds across their entire supply chain.

Another way in which DJ Assembly provides a Best of British service is through an economically competitive and broad supply chain. With links to the Cyclops Group, we can address issues such as allocation and securing obsolete and long lead time parts. And with IPC-trained staff, customers can rest assured that products are assembled to the highest possible standard, right here in the United Kingdom.

www.djassembly.com



DJ Assembly provides a complete and tailored approach to the production process



www.djassembly.com
web@djassembly.com
01904 436456

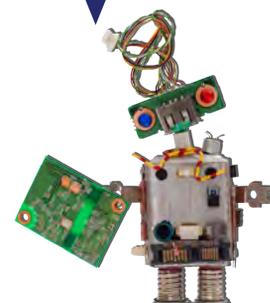
Are PCB Assembly & EMS Services Crucial To Your Business? 5 Reasons to choose DJ...



- Specialists in Low to Medium Volume Production Runs**
 Our flexibility when it comes to production means that we can provide a service that seamlessly fits with your internal schedules and deadlines.
- A Leading UK Contract Electronic Manufacturer**
 All of our work is carried out in the UK, by IPC-trained professionals, so you can be assured of the highest quality work.
- Worldwide Electronic Component Sourcing**
 We have 177,232 line items in stock and our specialist purchasing team has access to a further 100 million lines.
- DJ's Quality Guarantee**
 Feel reassured of the standard of our work, all of which is protected by our Quality Guarantee and is supported by our ISO 9001 certification.
- A Flexible Approach to Production**
 With our stock holding facilities, we can implement a call-off system that can free up valuable resources within your supply chain.



Come visit us at stand D37

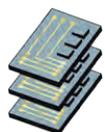


To receive a quotation, get in touch today and find out how working with DJ can benefit your business.



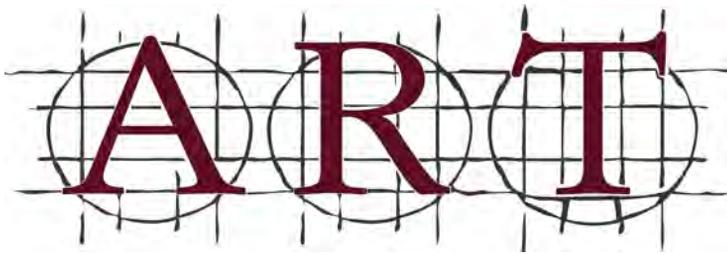
Welcome to your shop floor

- Sustainable electronic manufacturing through partnership
- Delivering complex PCB assembly & turnkey solutions
- Dedicated customer focus teams
- Quality assured & passionate about continuous improvement
- Manufacturer of the year 2016 – Elektra Awards



Speedboard[®]
Assembly Services





Advanced Rework Technology Ltd



Authorized Distributor



PCB Design Certification Center



Member

As an Authorized Training Center, A.R.T Ltd can offer Certified Training to the IPC Standards listed below. A.R.T Ltd are the only training center in the UK able to offer CID PCB Design and IPC-6012 training and Space Addendum training for J-STD-001 and IPC-A-620.



Acceptability of Electronic Assemblies



Requirements for Soldering Electrical and Electronic Assemblies



Repair Rework and Modification of Electronic Assemblies



Requirements and Acceptance for Cable and Wire Harnesses



Qualification and Performance Specification for Rigid PCB's



Acceptability of Printed Boards

www.rework.co.uk

Info@rework.co.uk

+44 (0)1245 237083



Get ready for the flipside

The electronics industry has experienced growth in recent months, but could this negatively impact component availability? Chairman of the Electronic Components Supply Network, Adam Fletcher, asks whether UK buyers are prepared

Procurement professionals will not need me to tell them that the UK and global electronic components industry has experienced welcome growth in the first part of this year. What might surprise them, however, is the news that the market has grown, and continues to grow, significantly faster than forecast and that this growth is having an unwelcome impact on the availability of electronic components.

Many device manufacturers are quoting lead-time availability for the majority of components as eight to 10 weeks. This is longer than we've been experiencing recently, but in truth, is still around the established industry norm. Some components, however, have already gone out to 12 to 16-week lead-times and a very small number of component manufacturers are already quoting lead-times beyond 20 weeks.

Global growth

Compared to the first quarter of 2016, the average growth rate across the European electronic

components supply network in the first quarter of 2017 was 7.9 per cent. Looked at over the entire year, the European average growth was four per cent. The 17 per cent UK growth figure for Q1 '17 should be viewed with caution as it is skewed by the post Brexit decline in the value of Sterling against the US dollar and Euro. When this is factored out, the real underlying growth rate for the UK comes out nearer six per cent, which is, however, still double the forecasted growth.

The US electronic components market fared nearly as well as the UK in Q1. It reported growth in the range of five to six per cent, driven by an improvement in the overall US manufacturing sector. The Japanese electronic components market also experienced growth, albeit at the slightly more modest rate of three to four per cent, thanks to increasing activity and orders in its manufacturing sector. Conversely, Q1 growth in the world's largest electronic components market, Asia-Pacific, was below expectations. Growth in the

range of one to two per cent reflects a continued slow-down in demand in Asia Pacific for consumer goods, particularly for mobile phones and all variants of PCs.

Definitive statistical data for the global electronic components supply network for Q2 '17 is not yet available, but the word from industry leaders and commentators suggests that growth has been broadly similar to the first quarter and there is widespread confidence that this faster growth will extend into the entire second half of the year.



Chairman of the Electronic Components Supply Network, Adam Fletcher

▶ continued on page 28



Compared to the first quarter of 2016, the average growth rate across the European electronic components supply network in the first quarter of 2017 was 7.9 per cent



Standard and factory modified plastic, extruded and die-cast aluminium enclosures.

- machined
- printed
- drilled
- custom colours



+ 44 1256 812812 • sales@hammondmfg.eu • www.hammondmfg.com



Average growth across the European electronic components supply network in Q1 '17 was 7.9 per cent compared to the first quarter of 2016

| | ◆ | ◆ | ◆ |
|----------------|-------|-------|-------|
| Germany | 1.6% | 20.8% | 6.4% |
| UK | 10.4% | 16.6% | 17.3% |
| Italy | 3.1% | 32.8% | 4.2% |
| France | 3.5% | 22.1% | 5.1% |
| Nordic | 8.0% | 9.6% | 9.6% |
| Total | 4.0% | 20.9% | 7.9% |

◆ Growth Q2 16 to Q1 17 compared with Q2 15 to Q1 16
◆ Growth Q1 17 compared with Q4 16 ◆ Growth Q1 17 compared with Q1 16

Source: IDEA Quarterly Trend Statistics Q1 17

► Cyclical demand

Demand in the global electronic components market remains geographically cyclical. Western economies tend to experience growth in the first half of the year, while Eastern economies grow in the third and fourth quarter. The conundrum here is what actually happens in the Far Eastern electronic components markets in Q2: low or flat growth in Asia-Pacific may have a short-term moderating effect on manufacturing capacity, product availability and lead-times times for global procurement, while strong or even modest growth is likely to have the opposite effect.

We shouldn't expect a return to full market stability until manufacturers add capacity back into service, extend their contracting out of some manufacturing services or crucially, add new capacity in order to meet this growing demand.

Unfortunately, I suspect that many organisations have become a little blasé about electronic component availability and lead-times. Surprisingly, analysis of historical supply and demand cycles over the last thirty years or so show that it's often the inexpensive and easily overlooked commodity components that become the most challenging to source when lead-times begin to extend.

Procurement professionals therefore need to act now to alleviate the issue of extending lead times. The first step is to ensure your information is up-to-date, then carefully consider how best to proceed, based on market intelligence and personal experience. Finally, actively engage with your entire supply network to honestly and effectively communicate the needs of your organisation. The truth is, everyone benefits if everyone plays their part in helping to maintain electronic components market flexibility and stability.

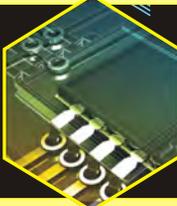
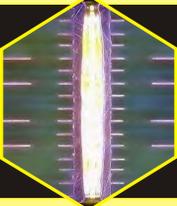
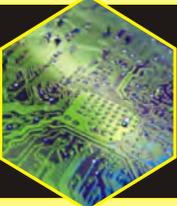
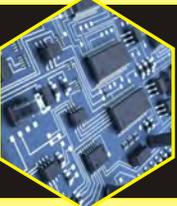
www.ecsn-uk.org



Looking for help in sourcing PCB's???

Use the team at Prestwick to help.





Prestwick Circuits GPS Ltd
 1 Steadman Place
 Riverside Business Park
 Irvine KA11 5DN, UK
 +44 1294 224631
 pcb@prestwickgps.com
 www.prestwickgps.com



Staying one step ahead

When SMS Electronics opened its dedicated product development centre this summer, Electronics Sourcing's Mark Leary caught up with chief operations officer, Graham Shaw, regarding the current electronic component supply chain



SMS's chief operations officer, Graham Shaw



Q What is your biggest headache running this vast manufacturing facility? Is it the machines, equipment, staff or material?

A The most significant challenge and concern we have today is bare printed circuit board allocation and the actual availability of components, which allows our manufacturing to commence as per the manufacturer's schedule. This is key to achieving the milestones set by our original equipment manufacturer customers and to achieving our key performance indicators.

Q Can you provide some examples?

A The current lead-times for many component types are extending at short notice. Some component suppliers are putting stock onto allocation. There is one example that sticks in my mind, where our supplier advised that all the requirements for a particular component should be communicated by 31 July 2017 and that availability for that part would be closed by March 2018. We are working closely with this supplier to understand what allocation of this part we will obtain, while simultaneously liaising with our customer to ensure we have established an effective supply chain.

We are also experiencing significant push outs at very short notice which again causes disruption. This is when the role of the planner or buyer centres on supplier and customer relations to ensure a clear and transparent supply chain is always present.

▶ continued on page 30



BODY-CASE



WEARABLE ENCLOSURES

BODY-CASE is designed for wearable electronic devices. The cases can be worn just like a watch! An optional eyelet can be used for lanyards or key rings. There is also a tough pocket/belt clip.

OKW ENCLOSURES LTD
Tel. 01489 583858 | www.okw.co.uk

Request a free sample today!





build strong and long-lasting supplier relationships. This is a two-way street and it should be mutually beneficial. Make your supplier's life easier by developing tools to assist in the buying process and give them one point of contact within the organisation to which they should direct all support or queries. Next, invest in a software solution that allows you to assess how robust your supply chain is. Transparency and traceability are key to maintaining a healthy pipeline.

Smart Made Simple is a new dedicated in-house product development centre established by SMS Electronics



Q How do you achieve a balance between your client and the supply chain?

A Excellent communication and keeping our customers educated. We need to ensure that they are aware of marketplace conditions and the sourcing environment. SMS therefore provides customers with frequent assessments on how the landscape affects their specific products and to what extent. Our smart software solutions confirm, to the granular level, the components that are affected, allowing us to discuss in real-time, the options customers have to minimise the impact.

Q What processes does SMS have in place to deal with component availability issues?

A For the past 20 years, the SMS purchasing department has built solid relationships with our component suppliers and it is testament to the strength of these relationships that we are continuously kept abreast of supply and demand.

Q What advice would you give other CEM facilities to prevent disruption in their supply chain?

A It's about investment. First, invest time and resources to

Finally, invest in your customer to ensure that they have as much visibility as possible and agree to purchase components based on the supplier lead-times to ensure that there will be no supply chain disruption.

www.smselectronics.com



Invest in a software solution that allows you to assess how robust your supply chain is. Transparency and traceability are key to maintaining a healthy pipeline

SIMTEK
Electronic Manufacturing of life affirming, life enhancing, life protecting and life saving products

Privately owned since 2004, an independent sub-contract manufacturer with full SM, conventional PCB and box build capabilities all to ISO 9001, ISO 13485, J-STD-001, IPC-A-610 & IPC-7711 standards. Specialising in safety critical assemblies for the medical, marine, automotive and industrial environments.

SIMTEK EMS LTD: UNIT 5 OCIVAN WAY • STAR LANE • MARGATE • KENT • CT9 4NN
 TEL: (01843) 233120 www.simtekems.co.uk

metway

Metway Printed Circuit Connectors



- * 3.5, 5, 7 & 10mm pitch
- * 2 - 24 pole lengths
- * Standard screw and rising clamp terminals
- * Single piece moulding or interlocking lengths
- * Standard or low profile
- * Side and top entry
- * Vertical & horizontal header mounting options
- * Mechanical coding available
- * International approvals

Contact us for more information:

sales@metway.co.uk | 01273 431600 | metway.co.uk



... YOUR PARTNER IN CONTRACT ELECTRONIC MANUFACTURE



CABLE ASSEMBLY | LOOMS AND HARNESSES | 3D CAD SERVICE
CABINET AND BOX BUILDING | PCB ASSEMBLIES | TEST AND INSPECTION

A modern UK based contract manufacturer.
Experts in cable assemblies, PCB assemblies & panel build.
All under one roof to give a complete solution.
Sensible pricing aiming to reduce your total cost of ownership.
A total solution to exceed customer needs.

Please contact us for a free quotation



IEW Ltd. • Tel: +44 (0) 1793 694033 • Email: info.iew.co.uk • Visit: www.iew.co.uk
UNIT 10, BIRCH, KEMBREY PARK, SWINDON, WILTSHIRE, SN2 8UU

ESD CLOTHING FOR ALL SEASONS

FULL RANGE INCLUDES

Lab Coats | Lab Jackets | Hi-Vis
Fleeces | Sweatshirts | T-Shirts
Long & Short-sleeved Polo Shirts | Trousers



www.somersetsolders.com

01761 233 230 | sales@somersetsolders.com

Somerset ESD – ESD products from Somerset Solders Ltd



Taking pride in innovation

British manufacturing demonstrates a history of drive and innovation; qualities that will serve the industry well as we head into an era of uncertainty, says commercial director at Texcel Technology, Peter Shawyer

Commercial director at Texcel Technology, Peter Shawyer

I am proud to be British and proud of the British people (except sometimes when I am on holiday), so when the opportunity to contribute to Electronics Sourcing's 'Best of British' feature arose, I was delighted to participate.

Having been involved in the electronics industry for over 30 years, I have visited many manufacturing facilities, mainly in the UK. Overall, I have been impressed with the drive, innovation and focus that British manufacturing companies display. UK businesses have been forced to invest and embrace change to survive and grow in the challenging business environment over the last 20 years. Texcel has had first-hand experience of this: for us to grow and be successful in a competitive industry, we have had to maintain good partnerships with our suppliers and customers, as well as continuously investing in our manufacturing facility and processes.

Threats and opportunities
Over the next few years, the UK manufacturing industry will see substantial changes, and with Brexit looming,

no-one can accurately predict how all those changes will play out. What is clear is that new and different rewards, threats and opportunities will come our way, and to survive and grow we will need to work together, collaborate, share information and help each other.

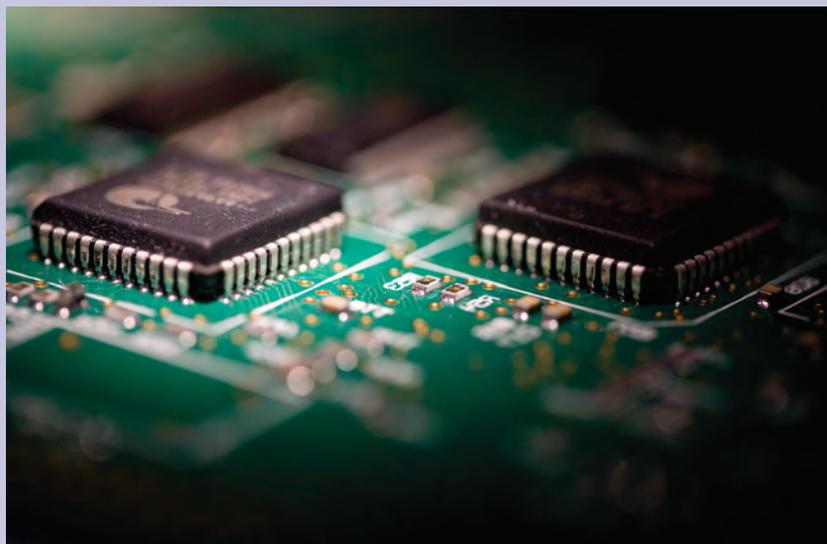
This is the focus at Texcel right now. We continue to build and strengthen the working teams we have with our customers, where we share information and investigate joint opportunities. At the same time, we are working closely with our top tier suppliers, encouraging early involvement in new projects and future forecasts, utilising their expertise to secure continuous availability and competitively priced components.

To support this, the company has invested heavily over the last few years in equipment, a factory upgrade and hiring new staff. We also focus on staff training and reviewing our infrastructure and manufacturing processes to ensure we can support ambitious growth plans.

In summary, my conclusion is that to be a successful British manufacturing company, continuous improvement and collaboration need to be in your DNA.

www.texceltechnology.com

Successful manufacturing companies have continuous improvement and collaboration in their DNA



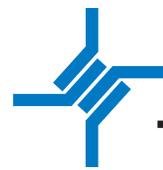
Your Electronic Design & Build Partner
From PCBs to Full Box Build

40 years of UK manufacturing

Call us on 01322 621 700

Texcel Technology Electronic Manufacturing Solutions

www.texceltechnology.com



Telegärtner

UK LIMITED

**The workhorse of the
Electronics Industry**



trojan

- Surface Mount & Through Hole Assembly
- Cable and Electro-mechanical Assembly
- Full Box Build and Test
- Inspection utilising Mirtec AOI
- Design, Prototype & Fast Turnaround
- Small to Medium Batch Production
- Free Issue or Procurement of Parts
- Full Traceability to Military Standards

Tel: 01792 469020

**Email: sales@trojanelectronics.co.uk
www.trojanelectronics.co.uk**

**Trojan Electronics Ltd. Kings Dock, Trojan Close
Crymlyn Burrows, Swansea SA1 8QA**

One-Stop-Shop



**ENGINEERING
DESIGN SHOW
STAND B60**

Telegärtner UK

Supplier Representation

Connectors, cable glands, enclosures, cables, speech & communication products and connecting systems

- Extensive range of high quality circular connectors from M5 to M25 for industrial applications
- Extensive selection of M12 connectors for rail applications
- Comprehensive range of cable glands for industry & explosion protection areas
- High quality communication solutions and radio accessories including microphones, handsets, speaker microphones and loudspeakers for public safety
- Wide range of high quality 12-24 Volt range connecting systems for on-board electrical systems in cars & trucks

www.telegaertner.co.uk/contact

Telegärtner UK Unit 1 - A1(M) Business Centre Tel: +44 1707 636600
151 Dixons Hill Road Fax: +44 1707 636638
Welham Green, Herts. AL9 7JE E-Mail: Sales@telegaertner.co.uk



Focused means flexible

Thanks to their focused approach, independent distributors can be more flexible when solving procurement challenges, says Charcroft Electronics director, Debbie Rowland

The biggest difference between buying from the local branch of a global distributor and an independent UK distributor is flexibility. For a buyer, this flexibility means the independent distributor can be more customer-centric when it comes to solving procurement challenges. It can also give low- to mid-volume OEMs a greater influence on strategic decisions made by their supplier.

Customer-centric inventory
Inventory planning is one of these strategic decisions. The inventory profile for the European hub of a global distributor is typically based on the overall run-rate from all its customers throughout Europe. The emphasis is on the fastest-selling lines that achieve the highest number of stock turns. This means customers who buy more specialised devices, in lower volumes, will have less influence. Lower-volume OEMs are also more likely to face higher minimum-order quantities and longer lead-times, instead of ex-stock availability.

In comparison, customers placing relatively low-

volume orders can have much higher influence on the inventory holding of an independent distributor. This is not only because of the independent's smaller customer-base, it's because the independent distributor usually has a different relationship with its customers.

Charcroft, for example, has been supplying mil-aero OEMs since the 1970s and has developed an encyclopaedic knowledge of each customer's purchasing profile. At the quotation stage, we always consider the customer's projected annual usage so we can achieve the best price for the immediate order. It is then the responsibility of the customer's dedicated salesperson to assess whether the part is likely to be re-ordered. If a subsequent order is likely, the salesperson can ask the purchasing team to buy-in additional inventory. Even a relatively low-volume order can therefore have a direct influence on the inventory holding.

This customer-centric approach not only provides customers with ex-stock

availability for subsequent orders, it also allows customers to minimise their own inventory liability without incurring risk.

Creative procurement solutions

An in-house production facility, and the ability to source and work with third-party suppliers, provide further flexibility to solve even tough procurement challenges.

Some of the more unusual solutions have included producing and applying custom QR-code labels to power supplies to ensure traceability in the field, as well as designing and manufacturing custom passive assemblies. Charcroft has even arranged for the body of a capacitor to be shrink-wrapped in an OEM's corporate colours. Sourcing and liaising with external suppliers, such as metalwork companies, has also delivered custom base-plates for upgrades to legacy devices and helped a defence OEM to protect aluminium housings from corrosion.

As the industry continues to move towards greater



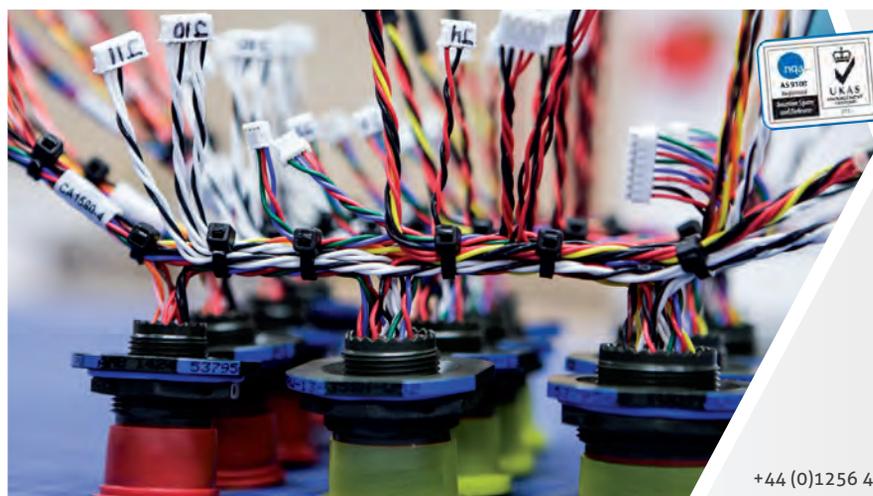
Director, Charcroft Electronics, Debbie Rowland



Custom passive assemblies can be a creative solution

globalisation, Charcroft believes there are still many low- and mid-volume OEMs and CEMs who will benefit from the more flexible and customer-centric partnership offered by an independent UK distributor.

www.charcroft.com



UK Manufacturing Quality without compromise

- > Custom cables and wire looms
- > FastTrack prototypes delivered within 5 days
- > 100% tested for your peace of mind

+44 (0)1256 472000

sales@gtk.co.uk

www.gtk.co.uk



My 9th birthday 1978 Chippenham

We love PCBs. We always have.

We are the geeks. The nerds. The passionate. We all think, talk and dream about that little green masterpiece. We call it **Your Key Component**. Because that's what it is. And our mission is to produce PCBs for demanding customers, on time, with zero defects, and at the lowest total cost.

We are the NCAB Group. One of the world's leading producers of PCBs. We have been producing PCBs, and only PCBs since 1993.

Call us on +44 01380 736140, e-mail to salesuk@ncabgroup.com or visit www.ncabgroup.com for more info.



What's on your wish list?

Business manager at Jaltek,
Stephen Blythe

Business manager at Jaltek, Stephen Blythe, looks at what clients want, and what they need, when investigating potential outsourcing options

Q What advice would you give to those looking to outsource?

A If you're looking to outsource the manufacture of your product to a contract electronics manufacturer, there are several things to look for. Firstly, select a company with which you can build a trusting relationship where you share the same end goal: to design and manufacture the best version of your product possible.

A CEM should gain your trust from the outset with transparent quotes. Always check the company's credit rating, current capital equipment and strategic investment plans. Take references from existing customers and check the CEM has experience and credibility in your area, as well as any relevant approvals. The scale of the company is also important. If you are bringing a new product to market, your product may be lost in a tier one CEM environment.

Q Are the concerns different when changing CEM?

A When moving CEM, it is critical to ensure that you allocate sufficient resource to ensure a smooth transition. Make sure that all data, including parts list, assembly drawings and test equipment, is all at the latest revisions. It's important that there is no intellectual capital that has been developed by your previous CEM that isn't documented.

Q What should be on your wish list when investigating a new CEM?

A There is some crossover here with the points listed above, but for some, locality is vital. This ensures you can be as involved in the manufacture of your product as possible. Another factor that is often over looked is to make sure that the CEM offers additional services above and beyond what you currently require. Don't just focus on today, but think about what you might need tomorrow and going forward. Future proof your choice.

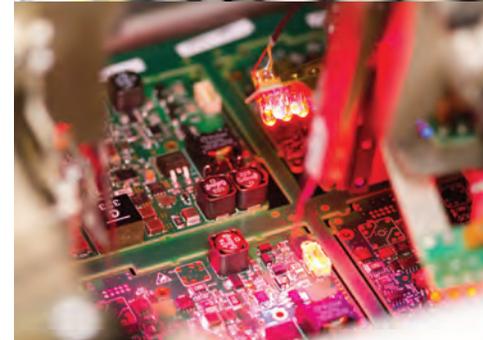
Q How does Jaltek proceed with a potential new client?

A When a prospect approaches Jaltek, the first thing we do is spend time understanding requirements by asking an extensive list of questions. We don't want to waste anyone's time, so if we don't think we're a good fit, we will say. We then provide a full, transparent quotation that includes assembly pricing and materials. Our aim is to add value right from the start by providing accurate and diligent costs. We will also talk through the manufacturing process and all our capabilities so potential clients can check that we meet their demands.

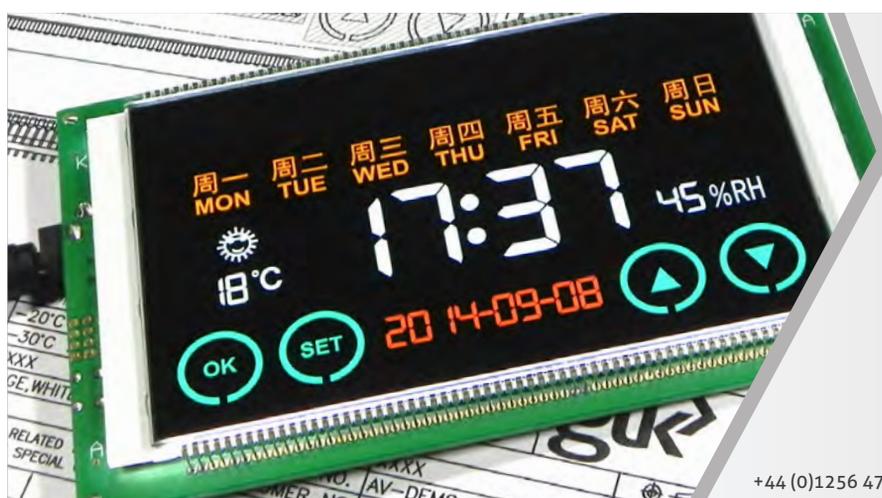
Q What other benefits can CEMs provide moving forward?

A Beyond product manufacture, a CEM should provide other benefits. It can help increase your bottom line and profits by investing in capital equipment and software so that you don't have to and essentially if you choose the correct partner, it will offer manufacturing excellence, allowing you to focus on designing world class products.

www.jaltek.com



Beyond manufacturing a product a CEM should provide customers with other benefits



Custom LCDs

Quality without compromise

- > Latest TFT, PMVA and OLED technologies
- > Optional touchscreens and optical bonding
- > Plug-and-plug display solutions

+44 (0)1256 472000

sales@gtek.co.uk

www.gtek.co.uk

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



DID YOU KNOW....



That the corkscrew was invented by an English vicar? Or that plasticine was invented in the UK in 1897? Britain has a history of conceiving, patenting and applying new technologies, but we are often unaware of how far it stretches back and just how diverse it really is. Here Electronics Sourcing looks at 10 surprising British inventions



Adjustable spanner

The adjustable spanner is the epitome of ingenuity: it's simple, clever and you wouldn't want to be without it. Instead of a toolbox filled with individually sized spanners, the adjustable spanner features moveable jaws that can be adjusted via a screw mechanism to fit the size of the nut. Its invention is credited to English engineer, Richard Clyburn, in 1842.

Diagnostic ultrasound

Anyone who has had children in the last 40 years will understand the magic of medical ultrasound. Although widely used to see all kinds of internal structures such as muscles and internal organs, the use of sound to 'see' inside the body is commonly associated with examining babies in-utero. This non-invasive technique was first used by John Wild in 1949 to assess bowel tissue and was developed in its obstetric context at Glasgow Royal Maternity Hospital.

Extrusion

An invention that has had an enormous impact on many aspects of our daily life, extrusion is the process of pushing a material through a die to create an object with a fixed cross-sectional profile. Think metal pipes, plastic tubing and even pasta! The first extrusion process was used by Joseph Bramah to make pipe out of soft metals, which he patented in 1797.



Caterpillar track

Commonly used in vehicles such as excavators, bulldozers and tanks, the caterpillar track uses a continuous loop of metal or reinforced rubber plates to move across all kinds of difficult terrain. The tracks spread the weight of heavy vehicles, enabling hefty equipment to traverse soft ground without getting stuck. The first continuous track system was developed by Richard Lovell Edgeworth way back in the 1770s.

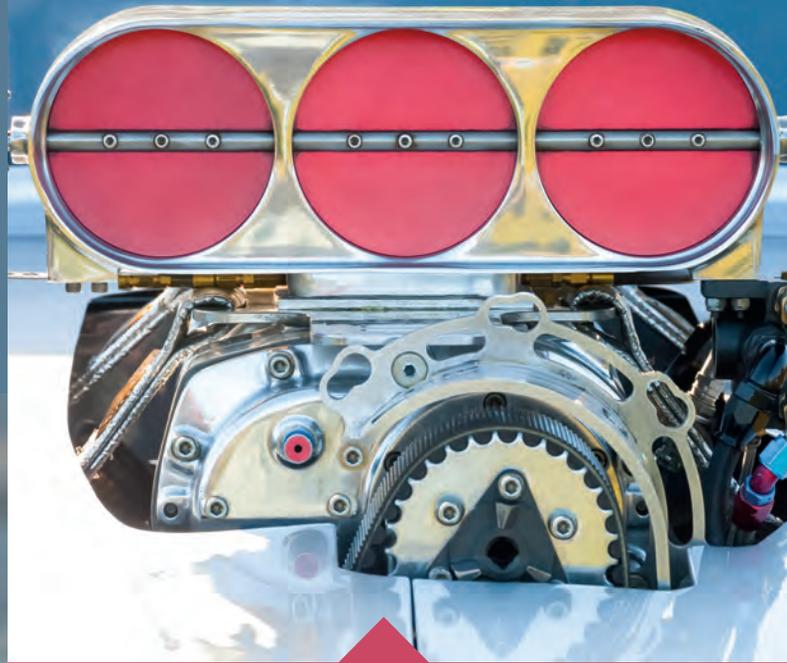
Two-stroke engine

The two-stroke engine was invented by Scotsman, Dugald Clerk, who patented his design in 1881. Named after its two-stroke cycle, this type of internal combustion engine is noted for its light-weight and mechanical simplicity.



Plasticine

This is a toy with a surprisingly long history; plasticine was invented in 1897 by art teacher, William Harbutt. He initially produced the clay for his sculpture students, using ingredients such as gypsum, petroleum jelly and lanolin, but the potential for play was quickly realized. Thanks to its non-drying properties, plasticine has also been widely used in animation and is the inspiration for much-loved characters, Wallace and Gromit.



Supercharger

Dugald Clerk's two-stroke combustion engine also included the first supercharger. Described as a form of air compressor, the supercharger increases air pressure inside the combustion engine. This means the engine can take in more oxygen with each cycle, enabling it to burn more fuel, and consequently provide more power.

Meccano

Children around the world have explored their own inventive streak thanks to Meccano. Patented in 1901, this construction toy consists of metal strips that can be connected using nuts and bolts, as well as incorporating wheels, pulleys and gears for full-on moving designs. It was developed by Liverpoolddian, Frank Hornby, with the idea of making mechanical engineering accessible and fun.



Seatbelt

Here's a life-saving invention many of us use every single day. The first seat belts were invented in the mid eighteenth century by English engineer, George Cayley, and although their design has been improved since then, they are now ubiquitous in the cars we drive today. They protect us from serious injury during collisions and have been a vital factor in reducing road traffic fatalities.



Corkscrew

In 1795 the Reverend Samuel Henshall patented a corkscrew. His idea was to fix a disc between the 'worm' or helix and the straight shank, thus preventing the worm from going too deep into the cork. It must have seemed an ingenious invention at a time when the majority of drinks were housed in a corked bottle and although the humble corkscrew has been reimagined in recent years, it remains a handy device that most of us keep somewhere in our homes to this day.



Buyers look to partner with distributors



James Carbone
contributing editor

Having the right number of capable distributors can help EMS providers avoid shortages, reduce cost and manage supply chain risk *By James Carbone*

One of the most important challenges for electronics purchasers is determining the optimum number of suppliers their companies should use for the commodities needed for production.

Buyers want to have enough suppliers to guarantee continuity of supply and to ensure there is healthy competition for components and other production materials that are purchased. However, they also need to make sure they don't have too many suppliers because then they could lose purchasing leverage if a large number of suppliers were awarded a small amount of business for a commodity.

The issue can be especially challenging for buyers at electronics manufacturing services (EMS) providers, who often must purchase parts from suppliers that are on their OEM customers' approved vendor lists (AVL).

Adding to the challenge is that many EMS buyers by at least some – and in some cases the bulk – of the components needed for production from electronics distributors. Buyers at those companies must make sure that the distributors they use can provide the components and value-added and supply chain services to help the EMS provider meet the requirements of OEM customers.

One such EMS provider is Vexos, a small, full-service EMS

provider based in Markham, Ontario, Canada that builds boards and systems for OEMs in the automotive, communications, medical, safety and security and other industries. "We buy almost exclusively through franchise distribution," said Stephanie Martin, senior vice president of supply chain management for Vexos. "We are in distributors' sweet spot."

Wanted: Fewer distributors
She said Vexos uses 38 authorized distributors for the semiconductors, passives, connectors, electromechanical devices and other components that Vexos needs for production.

"Last year we used about 50 distributors, but late last year we started to consolidate across the company in both North America and Asia. Now we are working with 17 distributors. However, most of Vexos' spend is with just five distributors and much of what it purchases is from global distributors such as Arrow, Avnet and Future and some specialist and catalog distributors such as Mouser.

"We have certain distributors for certain commodities," said Martin. "For instance, when I'm looking at my high-end active products, I'm going to focus on the top three distributors," she said. "If I'm looking at quick turn, startup or low-volume jobs, I'm going to look at Mouser or Digi-Key or Newark," said Martin.

"We buy almost exclusively through franchise distribution," said Stephanie Martin, senior vice president of supply chain management for Vexos



She said with resistors and capacitors "she leans in the direction of TTI because the distributor is much stronger in passives."

However, while Vexos is leveraging its spend with a fewer number of distributors, it is still challenging to have price competition because there has been consolidation in the distribution industry and distributors "tend to be very close in price."

The supply chain factor
In determining which suppliers are awarded business, Vexos factors in value-added and supply chain services that distributors offer. Such services can reduce cost of ownership, improve delivery and reduce supply chain risk.

"We rely on them for various supply chain services," including bill of materials scrubbing, said Martin. She said about 70 per cent of components on a BOM have incorrect part numbers and Vexos relies on distributors to review the bills of materials and correct the part numbers.

Martin added that Vexos also uses distributors for forecast sharing, bonded inventory, tape and reeling and IC programming. "Actually, we tend to use most of the services" she said.

Vexos also purchases components from non-franchised independent distributors. "We do use some of them for spot shortages, but we limit the ones we use," said Martin. She said the independent distributors EMS provider uses are qualified by Vexos before purchase orders are placed.

"We qualify them differently than franchise distributors," said Martin. She noted that franchise distributors purchase components directly from component manufacturers and the parts are packaged on reels or tapes. When Vexos buys from them, the parts are still in the original packages. However, with independent distributors, the parts are often in packages that have already been opened so there could be potential quality problems with the parts.

"You have to inspect independent distributors' quality processes,

their supplier selection process and you have to do extensive audits," said Martin.

Like Vexos, EMS provider Kimball Electronics, based in Jasper, Indiana, Ind., has also reduced the number of distributors it uses, concentrating much of its spend with a few proven distributors.

The number of distributors that Kimball uses is down significantly from five years ago," said Jamey Mann, director of global purchasing for the EMS provider. "Our top four global distributors make up 88 per cent of our electronic component distribution spend," he said.

Distribution reduction journey

"We have been on a journey to focus on reducing our distribution supplier base through consolidation to a smaller set that are able to deliver global services and leverage. We will continue to compress our spend into these major distributors," said Mann.

He said the four primary distributors that Kimball uses are able to deliver the "global scale that smaller, regionally based distributors can't deliver." In addition, Kimball's global distribution partners deliver the flexibility "required to support our global customers and operations."

Mann said while Kimball is concentrating the majority of its spend with several preferred distributors, there are times when it needs to purchase components

from other smaller distributors. "Due to the complexity of components we procure, at times we must align with smaller, specialized distributors," said Mann. During times of shortages and for "small form-factor quantities," Kimball also purchases from catalog distributors.

"In addition to these suppliers we do have a very small, tightly controlled set of preferred independent distributors," said Mann. "We use these partners on a very limited basis and have a very strict process to govern the validation of materials procured as authentic prior to shipment and use," said Mann.

Kimball "leverages the strengths of our preferred global distribution partners" by using their supply chain programs and value-added services including tape & reeling services, programming, and other services that they offer related to product lifecycle management.

Partnering with distributors

Mann said Kimball regards its distributors as partners and as such they are expected to develop supply chain programs that Kimball needs and have the production materials when the parts are needed, "at the cost we require, and delivered to an agreed window."

He said distributors are monitored, measured, and reviewed on an ongoing basis to ensure that they are fulfilling the agreed

"Our top four global distributors make up 88 per cent of our electronic component distribution spend," said Jamey Mann, director of global purchasing for Kimball Electronics



solutions. Mann said distribution performance has improved. "Their performance is measured on an ongoing basis related to quality, service, and competitiveness and in recent years has seen solid improvements in all areas," said Mann.

Having the appropriate number and right combination of distribution partners is also important for large global electronics companies. While many large electronics OEMs and EMS providers have the purchasing volumes to buy directly from component manufacturers, many of them purchase a certain percentage of their production parts through distribution.

For example, Jabil Circuit, based in St. Petersburg, Fla., purchases more than 10 per cent of the components it needs through distributors, including large broad line, specialized, catalog and independent distributors, said Graham Scott, senior director global commodity management at Jabil Circuit.

"We probably deal with most distributors. With the market situation that we are today where it is undersupplied we end up using franchise distribution more than we do normally as we require inventory," said Scott.

Distributors help an EMS provider reduce costs, manage inventory, provide shortage components and supply chain value-added services that help reduce cost.

In some cases, Jabil needs to purchase components from specialized distributors for such products as radio frequency integrated circuits, said Lloyd Kaplan, senior advisor, Jabil Intelligent Digital Supply Chain Solutions. "In some cases, suppliers will only sell certain products through some of their specialty distributors," he said.

Scott said there are times when Jabil purchases from catalog distributors, although Jabil is an EMS provider and not an OEM. "Not all of our customers are high volume," said Scott. "We have a lot of high-mix, low-volume business. In cases like that we use some catalog distributors to support that business.

He says Jabil also purchases from independent distributors. "We limit the number of independents to less than 12," he said.

Having a set of preferred capable distributors is important for EMS providers to completely satisfy the needs of OEM customers. "We need support from our distributors to ensure that we have the flexibility to meet market requirements from customers," said Scott.



"Not all of our customers are high volume. We have a lot of high-mix, low-volume business. In cases like that we use some catalog distributors to support that business," said Graham Scott, senior director global commodity management at Jabil Circuit

Pace of electronics supply base consolidation slows

Mergers and acquisitions among electronics suppliers will continue, but many of the deals will be small and involve connector companies

By James Carbone

The bad news for electronics purchasers is that the consolidation in the electronics supply base that has occurred over the last two years will continue. The good news is that there will be less merger and acquisition activity.

While consolidation in the electronics supply chain is not a new phenomenon, it has been especially aggressive particularly in the semiconductor industry, which saw a record amount of mergers and acquisitions over the last two years.

Mergers and acquisitions announced in the chip industry in 2015 totaled \$107.3 billion. In 2016 about \$99.6 billion of consolidations occurred, according to researcher IC Insights. Rob Lineback, senior research analyst for the company, said 2015 “was the all-time high for mergers and acquisitions in the semiconductor industry and 2016 was the second all-time high. This is totally historic. The last big wave probably would’ve been during the dotcom era in the late 1990s,” said Lineback.

M&A activity has also occurred with passives and connector manufacturers as well as with distributors and electronics manufacturing services (EMS) providers.

Sometimes consolidation can result in a stronger supply base because a struggling electronics manufacturer may be purchased by a larger, financially healthier company that continues to manufacture the acquired supplier’s products.

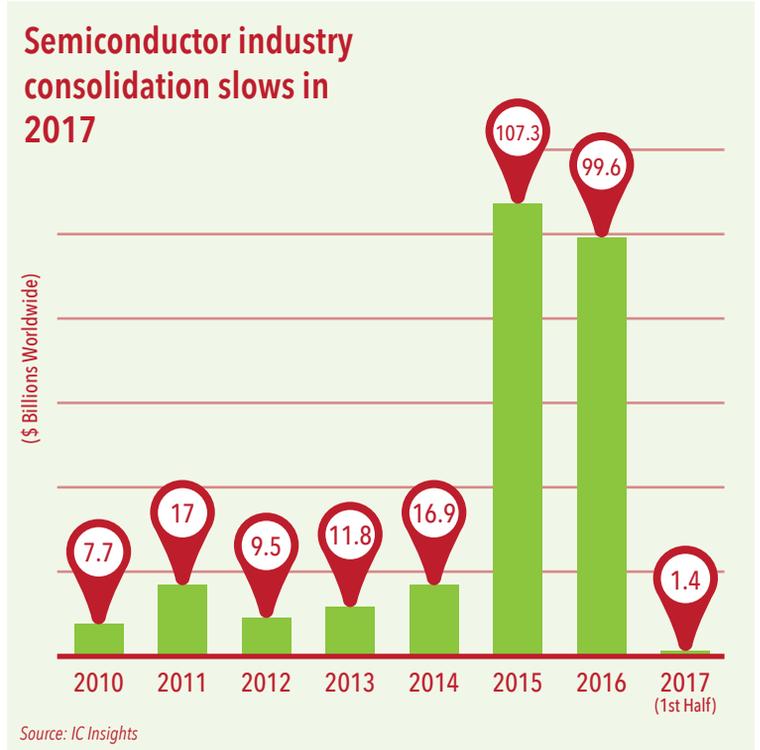
However, many purchasers lament mergers and acquisitions because it can mean fewer sources of supply and result in less purchasing leverage with semiconductor and other component manufacturers. The good news for those buyers is that in the first half of 2017, it appears that M&A activity in the semiconductor industry will be nowhere near the level it was over the last years.

No M&A surge expected
IC Insights says in the first six months of 2017 there were only \$1.4 billion of mergers and acquisitions announced, including MaxLinear’s \$687 million cash acquisition of analog and mixed-signal IC supplier Exar.

“We don’t expect to see a major surge this year to the point where acquisitions will be at the level that there were over the last two years,” said Lineback. However, he cautioned that there were few acquisitions announced in the first half of 2016, too, and it appeared there might be a slowdown in M&A activity for the year. “But then we had big ones hit in the second half of the year. In fact, 95 per cent of the acquisitions last year were announced in the second half,” he said.

Those major mergers and acquisitions included SoftBank buying ARM for \$32 billion; QUALCOMM purchasing and NXP for \$47 billion, Analog Devices acquiring Linear Technology for \$14.8 billion.

More consolidation is likely for the industry in the second half of this year, but it is



unlikely there will be major consolidations like the ones in 2015 and 2016 with one possible exception.

“Everyone is waiting for Toshiba to announce the agreement to sell its flash memory business,” said Lineback. “That is a big one and will be at least \$18 billion,” said Lineback. Toshiba announced in June that a group consisting of Bain Capital, SK Hynix and Japanese-government backed banks was its preferred bidder. Western Digital is also bidding and has filed suit in San Francisco County Superior Court arguing that a previous joint venture it had with Toshiba means Toshiba needs its consent to sell the flash business. It is not known when Toshiba will

The rate of mergers and acquisition activity in the semiconductor industry will lessen in 2017

be allowed to sell its flash business.

Imagination Technologies is another company that may be sold. The company licenses intellectual property for graphics processors used in smart phones including Apple’s iPhone. However, Apple announced it would stop using Imagination’s IP in two years. Apple accounts for half of Imagination’s revenue and because of Apple’s announcement, Imagination put itself up for sale.

“Imagination has processor cores and technology that could be of interest to a

▶▶ continued on page 44



ME, 1979. JUST FOUND MEANING OF LIFE.

We love PCBs. We always have.

We are the geeks. The nerds. The passionate. We all think, talk and dream about that little green masterpiece. We call it **Your Key Component**. Because that's what it is. And our mission is to **produce PCBs for demanding customers, on time, with zero defects, and at the lowest total cost.**

We are the NCAB Group. One of the world's leading producers of PCBs. We have been producing PCBs, and only PCBs since 1993.

Call us on +44 01380 736140, e-mail to salesuk@ncabgroup.com or visit www.ncabgroup.com for more info.



large semiconductor company or a company like SoftBank,” said Lineback. Other companies such as Qualcomm and MediaTek may also be interested in Imagination.

One reason why a slowdown in consolidation in the semiconductor industry may occur this year is companies that made big acquisitions last year are “off the table in terms of consolidation because they need time to digest what they’ve already purchased,” said Lineback.

“In addition, we’ve seen a tremendous amount of government scrutiny of foreign acquisitions, especially with the Chinese and that in part could be putting the brakes” on some consolidation. He noted that both the European Union and the U.S. government have review committees concerning mergers and acquisitions.

Misplaced concern?

While buyers are always concerned about supply base consolidation, Lineback noted that mergers and acquisitions don’t necessarily mean there will be fewer sources of supply for parts.

Sometimes a company will buy another component manufacturer to acquire the products and technologies the acquiring company currently doesn’t have. Such was the case with Intel purchasing Altera which makes field programmable gate arrays (FPGA). “Some companies want to branch areas and are not buying their competitors,” said Lineback.

In some cases, semiconductor companies sell off business units over regulatory concerns because governments don’t want monopolies, said Lineback. “For instance, NXP had to sell off some of its businesses to buy Freescale. It sold its power and RF product business. Freescale had

a strong power and RF transistor business,” said Lineback. NXP sold its power products to Chinese investors that created a new company, said Lineback.

“Consolidating forever”

As with semiconductors, consolidation is a continuing trend in the connector industry. “The connector industry has been consolidating forever,” said Ron Bishop, president of connector research firm Bishop & Associates. “Since 1980, we’ve recorded over 300 acquisitions,” he said. There are years where there may be 25 acquisitions and then the following year there may be less than 10, according to Bishop.

For instance, in 2014 there were 26 mergers and acquisitions in the connector industry. In 2015, the number dropped to 9 and then increased to 19 in 2016, said Bishop.

“A lot of the big mergers and acquisitions are probably over within the industry,” said Bishop. “But there are a ton of smaller acquisitions. Larger and midsize companies are looking to acquire technology and they’re also adding high-tech cable assembly capabilities to their portfolios,” he said.

A lot of consolidation in the connector industry involves startups. “We keep getting new connector companies popping up in China and in various parts of the world,” said Bishop. “One startup gets acquired and another one pops up. You can start a connector company without a lot of capital,” he notes.

A new connector manufacturer may launch a business, develop a small, focused portfolio and serve a niche. The company may operate for 10 years, make a name for itself, and a larger company will “come in and make the startup an offer it can’t refuse. It happens a lot,” said Bishop.

He said there are many startups in Asia and “there is going to be an ongoing round of acquisitions for the foreseeable future.”

Despite consolidation there are still more than 1,000 connector companies worldwide, according to Bishop.

He added that large connector companies such as Amphenol, Molex, and TE are trying to diversify their businesses to improve productivity. As a result, “they are going out to buy peripheral types of companies” such as sensor or test equipment manufacturers, said Bishop. The large connector manufacturers are looking to buy companies that “fit with their technology and their manufacturing knowledge. They are looking for companies with products that are related to the interconnect world, but are not interconnects themselves,” he said.

He said connector industry consolidation often occurs when business is down and small or medium-size

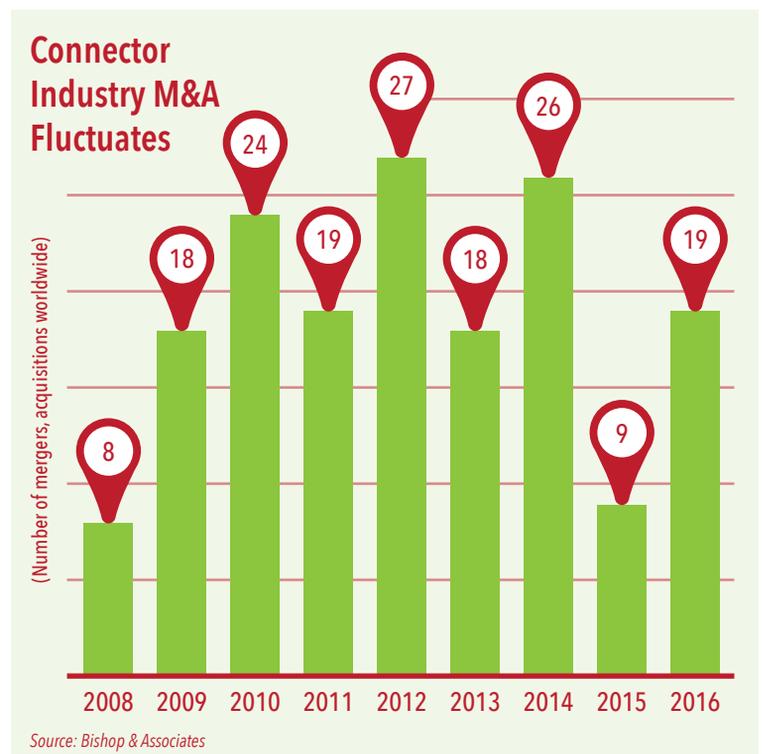
companies are looking for a larger partner. “When business is bad sometimes the bigger companies have a better opportunity to acquire than when things are going good,” said Bishop.

“Cheap financing” available
Consolidation can occur in electronics distribution when business is good or bad and can depend on the availability of financing.

Robin Gray, chief operating officer and general counsel for the Electronic Components Industry Association (ECIA) said mergers and acquisitions have “picked up over the last year or two.”

“I think it is because of cheap financing,” he said. There is an expectation that the days of inexpensive borrowing is going to be ending so companies are looking for acquisition opportunities that they can do now. “Even if the timing isn’t right, the money is certainly right,” said Gray.

The number of mergers and acquisition in the connector industry varies from year to year



Most acquisitions in distribution involve large distributors purchasing smaller distributors that may have an interesting niche.

“Other than Avnet’s acquisition of Premier Farnell, it’s mostly regional and smaller niche distributors being acquired by the bigger guys as well as some mid-size guys buying some niche distributors,” said Gray.

In some cases, a distributor wants to expand its product reach. A passives distributor may decide to carry some semiconductors to reach new customers and to sell more products to existing ones.

For instance, passives and connector specialist distributor TTI in July announced it had acquired Symmetry Electronics, a semiconductor distributor. Symmetry carries integrated circuits for wireless, cellular, Bluetooth and video applications.

Mergers and acquisitions are occurring in the EMS industry, too. Some EMS providers may acquire a small contract manufacturer in a geography that the larger EMS company does not currently manufacture. In other cases, a provider may buy another company that serves a particular customer segments such as aerospace or automotive.

More services needed

Some M&A activity in the electronics outsourcing industry involves EMS providers buying companies that help the manufacturer offer more value-added services to OEM customers, according to researcher Gartner Inc.

Sam New, principal research analyst for Gartner, said OEM customers are expecting more end-to-end solutions from their EMS suppliers and not just core manufacturing and testing capabilities.

Many OEMs are looking to develop very strategic relationships with EMS providers that can offer everything from design services to direct shipment to customers, according to Virginia Howard, research director at Gartner.

“Having these very deep, complex partnerships is very important to businesses,” she said. It means that EMS providers need to add certain capabilities to meet the needs of OEM customers.

Many OEMs are using fewer EMS providers than in the past, relying on just two or three contract manufacturers rather than a dozen or more. As a result, some EMS providers are purchasing companies to help them fill out their suite of services that they can offer OEM customers according to Gartner.

In some cases, EMS providers are purchasing design services companies to help support OEMs. Others may need help managing supply chain risk or component obsolescence and may require a niche software, to help develop solutions to those supply chain challenges.



“Mergers and acquisitions have picked up over the last year or two and many involve regional and smaller niche distributors being acquired by the bigger guys,” said Robin Gray, chief operating officer and general counsel for the Electronic Components Industry Association (ECIA)

ADD THE 2019 DATES TO YOUR DIARY NOW

DSEI

10-13 September 2019
The World Leading Defence & Security Event
ExCeL, London www.DSEI.co.uk

ACCESS THE GLOBAL MARKET AT THE NEXT EDITION OF THE WORLD LEADING DEFENCE & SECURITY EVENT

STAND OPTIONS AVAILABLE

- AIR
- LAND
- NAVAL
- SECURITY
- JOINT

To enquire and reserve your exhibition space contact:
T: +44 (0)20 7384 7770 E: sales@dsei.co.uk
Register to attend:
WWW.DSEI.CO.UK

Organised by

IoT Products



Multi-function sensor makes light work of IoT

Omron Electronic Components Europe has introduced a multi-function environmental sensor that allows users to monitor seven parameters from one module. Designed for the growing number of autonomous internet of things systems, the new Omron 2JCIE-BL01 sensor measures temperature, humidity, light, UVI, barometric pressure, noise and acceleration.

Despite measuring just 46 by 39 by 15mm, 2JCIE features its own embedded memory for data logging to keep track of surroundings. Potential applications include monitoring and controlling both industrial and office environments, as well as for home and outdoor applications.

Data from the module can be downloaded over Bluetooth for access to recorded data. The module boasts low power consumption and can be operated by just a regular 3V DC lithium battery for approximately six months, depending on the measurement interval. The sensor is cloud compatible and bespoke threshold values can be set to provide alerts that notify the user of any abnormal sensor readings.

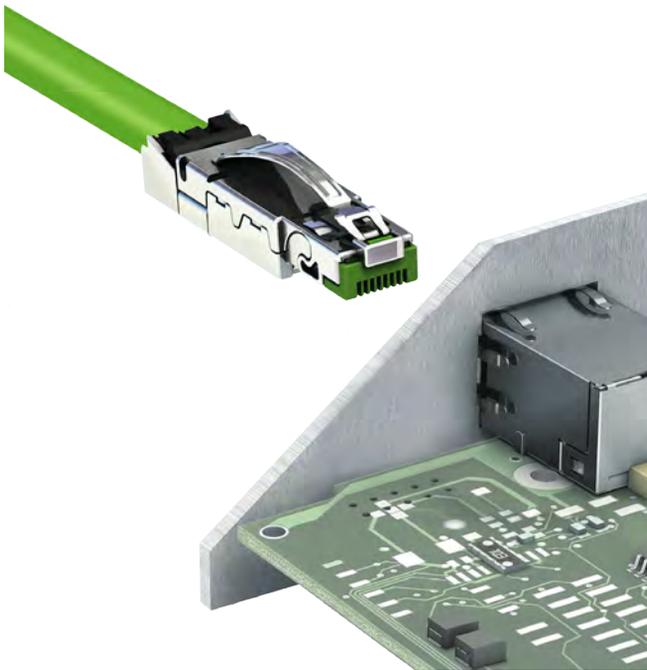
European product marketing manager of Omron Electronic Components Europe, Gabriele Fulco, said: "This sensor offers easy to interpret data that can be analysed, stored on the cloud and used to set parameters and make real-time adjustments." components.omron.eu

Flexible solutions facilitate worldwide connectivity

IoT connectivity specialist, Digi International, has announced immediate availability of the Digi XBee cellular 3G global embedded modem, designed to provide original equipment manufacturers with the flexibility to implement solutions in regions currently offering 3G connectivity. The modem can be dropped into existing designs to instantly achieve 3G cellular integration, without the need for a complete redesign.

Users can thereby create a longer life design, with flexibility to switch between wireless protocols, or upgrade to LTE-M or NB-IoT as those networks are deployed in certain regions. The Digi XBee cellular 3G global embedded modem features TrustFence security and offers secure boot, encrypted storage, protected JTAG and SSL/TLS 1.2. It is also FCC/IC, PTCRB and AT&T certified, eliminating the cost, complexity and risk involved in the certification process.

www.digi.com



Raspberry Pi gets serious with data

Industrial automation with Raspberry Pi just got easier

The new RPI-BC enclosure has made Raspberry Pi projects easier to integrate into industrial applications, especially when combined with RJ45 industrial connectors, offering quick IDC assembly and integrated strain relief. The quick, one piece, shielded assembly is available in straight or angled versions for Ethernet or PROFINET data protocols. Ideal for those industrial IoT data projects.



For additional information call 0845 881 2222 or visit phoenixcontact.co.uk/RPIBC



Franchised global distributor and procurement specialist, Astute Electronics, has signed a deal with Epsilon

DSEI



Charging into defence

Franchised global distributor, Astute Electronics, has signed a deal to supply Epsilon Electric Fuel's mil-spec batteries and portable power supplies to high-rel customers in the UK

Manufacturer of mobile energy products, Epsilon Electric Fuel specialises in creating solutions for defence and aerospace applications. Now its advanced rechargeable and primary batteries will be available to high-rel customers in the UK through Astute Electronics. The distributor and procurement specialist will supply Epsilon's portable power solutions to customers throughout the defence industry.

Power products divisional manager for Astute, Richard Ford, commented: "Epsilon's name is synonymous with the most advanced military batteries and portable power solutions. We represent the company across the globe and

offer a first point of contact for technical advice, design-in expertise and product development."

President of Epsilon, Ronen Badichi, added: "Astute's added value lies in the fact that unlike other distributors, it has an internal engineering infrastructure which is crucial for high-rel customers seeking complicated and sophisticated solutions."

Both Astute and Epsilon will participate in the Defence and Security Equipment International exhibition, with Astute delivering a seminar during the event on 13 September at 2.30pm in the Global Theatre. This will focus on

counterfeit electronics detection and risk mitigation.

Astute has recently played a role in defining and updating the Ministry of Defence's Defence Standard 05-135, accompanied by the Counterfeit Avoidance Maturity Model, which defines how a supplier is managing the risk of counterfeit components entering the MoD's supply chain. Those who attend the seminar can expect to find out more as Astute shares its valuable experiences in the context of heightened electronics supply-chain pressure.

www.astute.co.uk

When you need the most reliable connection



Hi-rel connectors using Smiths Interconnect contact technology

Smiths Interconnect Hyperboloid® contact technology is renowned as enabling the highest performing electronic connectors. Even under severe conditions of shock, vibration and temperature Smiths Interconnect connectors ensure signal integrity, making them the perfect choice for defence applications.

Smiths Interconnect wide choice of connector families are available through franchised distributor, Aerco, a specialist company that has built a 60 year reputation servicing and supporting hi-rel markets.



See us on Stand S2-367



12-15th September
ExCeL, London

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

Harness the power of assembly expertise

There are many factors to consider when sourcing cable harnessing services, according to Intelliconnect. Not only do you need to source the right components, the correct manufacturer is also crucial

Cable harnessing can be found everywhere; even the humble kettle lead is a cable assembly. Used across many industries, cable harnessing is particularly useful for applications such as audio systems, automobiles and robotics where lots of motion and risk is involved.

Although cable harnessing tends to be used as a general term for cable organisation, it can usually be broken down into two categories. A cable harness is a group of cables that will be laced together to organise and protect wires, cables and connectors, while a cable assembly is a cable or wire, terminated by connectors at each end.

Finding a manufacturer

To save time, money and, potentially a great deal of problems, buyers are advised to undertake research before choosing a cable harness manufacturer. Ask questions and consider the following aspects of production.

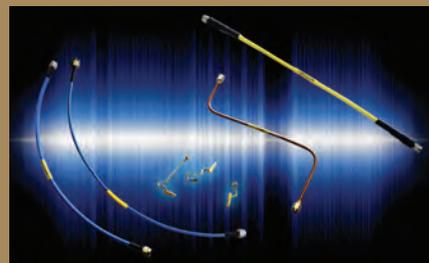
When looking at delivery times, consider how quickly the products will be required and find out what the manufacturer's on-time delivery record is like. Remember also that cable harnesses are easy to make, but difficult to make well. While the obvious quality standard is ISO, there are many other standards to look for. One valuable accreditation is SC21,

awarded by ADS, the aerospace, defense and security organisation. This proves high levels of on-time delivery, quality and customer-supplier relationships, as well as risk management.

Next, assess the available resources and production capacity to establish whether the manufacturer is limited or flexible in its capabilities. Smaller manufacturers will provide a higher level of customer service and accommodate involvement in the manufacturing process, while larger manufacturers may have more resources. Finally, be sure to establish what test equipment is available and whether the manufacturer can guarantee assembly performance.

Delivering on the detail

Having chosen a manufacturer, there are many other factors to consider. Buyers will need to establish whether they require connector series or interface types as well as any configuration options, such as straight, right angle, bulkhead, panel, polarity and keying options. Environmental requirements will need to be considered, including temperature, altitude, moisture or chemical resistance as well as electrical specification, budget and lead-time. Other factors to consider include the desired flexibility or minimum bend radius, the maximum or minimum diameter, and weight.



Once the harness has been designed to meet electrical requirements, a drawing is given to the engineering team. Lead times to receive the finished product can vary from one to eight weeks, with Intelliconnect typically providing cable assemblies in less than seven days.

During the manufacturing process, cables or wires are cut to length and the ends stripped, exposing the core. Generally, connectors are crimped or soldered to the inner and outer core of the cable. Cables are then assembled and fixed together according to the design. Any protective outer layer such as armoring or heat-shrink sleeving is fitted at this point. Testing naturally depends on the type of cable harnessing and ranges from simple continuity testing, to voltage breakdown testing, through to high frequency insertion loss and return loss using a network analyzer.

www.intelliconnect.co.uk

Season Electronics Limited

SEASON GROUP

Season Electronics Limited provides a full range of Electronic Manufacturing Services to the

Aerospace & Defence (A&D) industry from its AS9100 approved site in Havant, UK.

Together with other A&D focused sites within the Season Group (in Malaysia, Canada and USA) we offer:

- Full Turnkey Procurement
- Plastic Injection Moulding
- Plastic Thermoforming
- Tooling
- Cable & Harness Assembly
- Printed Circuit Board Assembly (PCBA)
- Full Product Assembly
- Logistics Services
- After Market Services

Please come along and visit us at DSEI 2017 on Stand S9-242. View our website at www.seasongroup.com or email us at: season.eu@seasongroup.com





Swoop

on counterfeits

Visit our seminar: **Counterfeit Detection & Mitigation**

14.30, September 13, Global Theatre, DSEI, Excel, London

Astute – procurement specialist to the world’s leading defence primes and a member of the Counterfeit Avoidance Working Group – played a leading role in defining and updating the MoD’s Defence Standard 05-135. Hear us share our knowledge of electronics counterfeit detection and mitigation processes at our DSEI seminar, or visit our stand: N3-410.

ASTUTE

See beyond

astute.co.uk

Astute Electronics Ltd Astute House, Rutherford Close, Stevenage, Hertfordshire SG1 2EF +44 (0)1438 909 909 / sales@astute.co.uk



WE CONNECT TECHNOLOGY



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

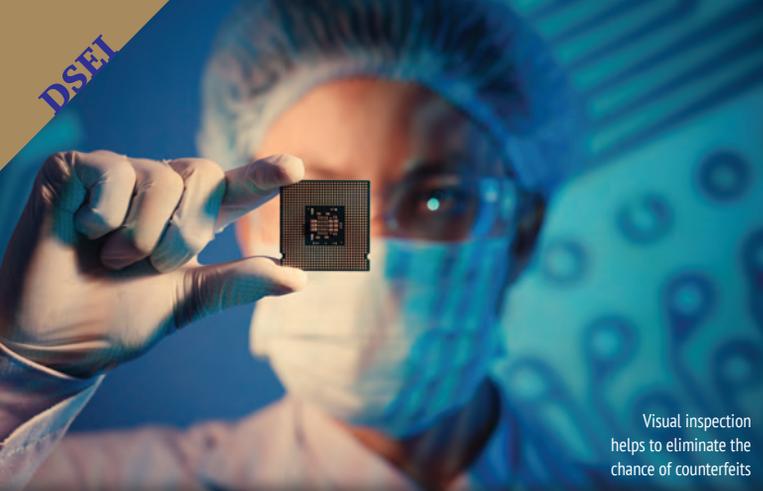


COME AND SEE US
AT STAND NO 54-255

DSEI

12 – 15 September 2017
The World Leading
Defence & Security Event
ExCel, London www.DSEI.co.uk

DSEI



Visual inspection helps to eliminate the chance of counterfeits



The critical nature of aerospace and defence applications leaves no room for error

Let the obsolescence battle commence

Electronic component obsolescence and counterfeiting are growing issues, especially in the military and high-reliability marketplaces. Solid State Supplies helps buyers do battle against obsolescence risks

With its focus on providing sourcing and obsolescence solutions, Solid State Supplies boasts over 20 years' experience and knowledge. The company sits at the heart of a supply chain that includes AS9001C approved test laboratories and AS9120A suppliers, thereby assuring customers that they will receive exactly what they expect.

To this end, the company's sourcing and obsolescence solutions programme is built upon five key pillars. First up is electronic component sourcing. Through globally approved sources, Solid State Supplies can access OEM excess and last time buy stock, as well as sourcing from

within franchised distribution networks.

Its anti-counterfeit process represents another key element. This includes visual inspection, date and lot code checking against counterfeit databases, 100 per cent visual inspection in accordance with AS5553 and x-ray fluorescence testing. The company also offers 'de-capping' to check the authenticity of silicon die.

Electrical re-testing and re-qualification is performed in AS9001C test houses, where components are tested to manufacturers' specifications. Solderability is also tested and paperwork is supplied to the customer.

Component up-screening is another vital part of the process. When the correct component grade is not available, parts can be up-screened to industrial, MIL-883 and application-specific levels.

Finally, to pre-empt issues in production, components can be re-tinned as well as being repacked into tape and reel or moisture-sensitive packaging. Visit Solid State Supplies at DSEI to find the right solution.

www.sssltd.com

SOLID STATE SUPPLIES GINSBURY

YOUR SPECIALISTS IN MILITARY DISPLAYS



**FLAT PANEL DISPLAYS FOR
CUSTOMISED MILITARY APPLICATIONS**

AS9120 and AS9100 certified



Visit us at DSEI, Stand # S9-231
01634 298900 | www.ginsbury.co.uk



Jaltek Systems Ltd

Delivering solutions through technology and partnership



Working with Customers to create history

Jaltek is a leading electronics technology solutions provider, offering a comprehensive range of vertically integrated design and manufacturing services tailored to meet our customer's highly diversified business requirements.

We offer a tool box of solutions which can either be utilised as a fully integrated solution or a single service. From conceptual design and NPI, through manufacturing and test of PCBAs, to final product realisation, Jaltek supports products through-out their complete lifecycle.

www.jaltek.com



- 3 SMT lines
- Dedicated NPI Line
- Vapour Phase
- Selective Solder with IPC-A-610 Class 3 workmanship
- Conformal Coating
- Manual Assembly
- Cable Assembly
- Pressfit
- Extensive test suite
- State-of-the-art 2D/3D inspection technology
- Box-build & High Level Assembly
- System Integration



t +44 (0) 1582 578170 f +44 (0) 1582 578171

Unit 13, Dencora Way, Sundon Park, Luton, Bedfordshire, LU3 3HP

Need Core i Level Processing in a low Heat Enclosure?

Then the AAEON GENE KBU6 is for you

This is a 3.5" sub-compact board with Intel® 7th Generation (Kaby Lake) U Core™ i7/i5/i3 Celeron® Processor SoC

Measuring 146mm x 101.7mm it is ideal for space-constrained applications and boasts up to 16GB of memory via a DDR4 1866/2133, SODIMM x1. Just look at its features:

- 2 CH Audio
- SATA III x 1 & mSATA (share with half-size Mini-Card and selective by BIOS)
- Supports 8-bit Digital I/O, USB 2.0 x 2, USB 3.0 x 4
- COM x 4 (RS-232 x 1, RS-232/422/485 x 3)
- Mini-Card Slot x 1 (Full size), TPM (Optional), SIM
- Wide DC Support 9~36V, +12V Only (Optional)
- 4/5/8-wire Resistive Touch Screen Controller
- Bio Connector for I/O expansion such as extra USB, LAN and COM ports



Need a custom board? RDS has a full electronic design service.



Call today on +44 (0)1959562772 or go to www.review-displays.co.uk

t: +44 (0)1959 563345

e: info@review-displays.co.uk
www.review-displays.co.uk



ODU-MAC®

⊕ Compact modular connector system



VERSATILE MODULAR CONNECTOR SOLUTIONS

ODU MAC – our versatile modular connector solution enables signal, current, data rates, liquid, air and fiber optic transfer.

- ⊕ Various interfaces in one connector
- ⊕ 6 standard docking solutions
- ⊕ High packing density
- ⊕ Data transmission
- ⊕ > 100,000 mating cycles
- ⊕ Blind mating



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



A PERFECT ALLIANCE.

DSEI



Innovation on display

With an emphasis on policy, strategy and innovation, Defence and Security Equipment International (DSEI) provides military and government procurement specialists with a chance to explore the latest in defence, aerospace and security

When it returns to ExCeL, London on 12 to 15 September, DSEI will play host to 1,600 exhibitors from around the world, with more than 34,000 global visitors expected, including military and government officials, academia and industry members. This year the biennial event will be celebrating its tenth edition with new features, expert speakers and a broad range of defence, aerospace and security innovation and services.

As ever, the event provides an opportunity for industry professionals, military and government officials to discuss pressing questions, requirements and issues facing the defence community. Focusing on policy, strategy,

innovation and the implication of future equipment programmes, visitors to DSEI will hear the latest opinions and insight, as well as interacting with the various solutions they can procure at DSEI.

Supported by all four UK armed services, the event will give visitors hands-on experience with the latest technology and products from prime contractors and SMEs working across the supply chain. The British Army, Royal Navy, Royal Air Force and Joint Force Command are all committed to constructing the partnerships needed to deal with complex future operating environments.

Electronics are a critical factor in this environment, powering a range of equipment, devices and systems which enable communications, intelligence gathering, transport and navigation. The markets represented at DSEI stipulate exacting specifications to deliver reliability for life critical systems and equipment. Companies involved in the sector, as well as those looking to enter the defence supply chain, therefore have an opportunity to engage with the industry and supply chain to keep up to date with the latest challenges.

www.dsei.co.uk

NORTHERN 17 Manufacturing & Electronics

EventCity | Manchester | M17 8AS

27th – 28th September 2017
9.30am – 4.30pm (4.00pm close Thurs)

The Leading Manufacturing Technology Exhibition in the North

Over 300+ national and international suppliers will gather in Manchester this September for Northern Manufacturing & Electronics 2017 together with the RoadRailAir event. The exhibition will feature live demonstrations and new product launches of machine tools & tooling, electronics, factory & process automation, packaging & handling, labelling & marking, 3D printing, test & measurement, materials & adhesives, rapid prototyping, ICT, drives & controls and laboratory equipment.

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

The exhibition is **free** to attend, **free** to park and easy to get to. Doors open at 9.30am on Wednesday 27th September.

Pre-register online now for your free entry badge and show preview at www.industrynorth.co.uk

FREE SEMINARS
FREE PARKING

Incorporating the Road, Rail, and Air Exhibition
ROADRAILAIR
EVENTS | MANCHESTER | 27-28 SEPTEMBER 2017



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





Reliable.

**RFI / EMI
shielding gaskets
& components**

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



**MISSION
CRITICAL
CONNECTIVITY**

Visit us at DSEI 2017 | London | Booth S3-256

100 years
cinch
CONNECTIVITY SOLUTIONS
a bel group
of Ingenuity 1917 - 2017

bel
POWER | PROTECT | CONNECT
belfuse.com/cinch



Intelliconnect
A different kind of Interconnect Solutions Provider

Taurus Range of Standard RF Connectors



Intelliconnect's brand new range of low cost, high quality standard coaxial connectors and adaptors. Available from stock on a 1-3 day lead time.

Taurus connectors are provided with the same high level of quality controls as our market leading Precision and Pisces ranges.

BNC, TNC, N Type, UHF, Mini UHF, F Type, FME, SMA, SMB, SMC, SSMA, SSMB, SSMC, MCX, MMCX and Inter Series Adaptors.

For further product information, please call us on **01245 347145**, email sales@intelliconnect.co.uk or visit our website.



THE UK'S ONLY MAJOR MANUFACTURER OF 50Ω COAXIAL CONNECTORS

www.intelliconnect.co.uk

ABMS · BMA · C · N · SMA · TNC · Waterproof RF Connectors · Dustcaps · Cable Assemblies





The defence sector places very specific demands on its supply base



Defence procurement has significantly improved over the past 10 years

Defending the supply chain

Defence procurement presents many supply chain challenges, with extended product lifecycles and zero design flexibility. Director of industry marketing Europe, defence, aerospace and space in Europe, Lee Thompson, explains how TTI can help

The defence sector places very specific demands on its supply base, not only in terms of the high performance of components specified, but also on its supply chain and logistics solutions. To address this issue, a decade ago, TTI created a focused European defence business unit. Now TTI is ISO 9001:2000 and AS9120 registered within its US and European operations. Not only this, TTI Europe is also IECQ registered to manage CECC product demands and JOSCAR accredited.

including improvements to the supply chain process and discussions about what might be possible to help reduce costs.

COTs Plus components are having a positive impact and TTI can advise on best-in-class supplier solutions. Our key defence suppliers are in tune with this approach and when new technology is introduced, such as Kemet's hi-rel polymer capacitor series, we are ready to provide design-in assistance.



The industry is still being challenged to maintain unrealistic cost down models and fixed pricing agreements

Long term agreements

Although defence procurement has improved over the past 10 years, the industry is still being challenged to maintain unrealistic cost down models and fixed pricing agreements that are sometimes close to unachievable. Cost reductions are possible if the system is flexible enough to accept a change in part number or better still, a change in technology, but most defence systems are fixed and require a 'build-to-print model'. This makes taking cost out of legacy products virtually impossible. Long term agreements are possible, but in some cases, TTI sees requests for 10 years and beyond. We believe that such agreements are only practical for up to three years, with regular reviews

Battling obsolescence

At the other end of the life-cycle, obsolescence is something TTI takes seriously. Our information system provides customers with monthly updates on obsolescence and product change notices. TTI then helps manage last time buys and in some cases, can hold long term inventory. Of course, there will never be a perfect solution to obsolescence, but to ensure that counterfeit components do not enter the supply chain, TTI only ever buys through franchise agreements.

TTI's combined franchise portfolio comprises major manufacturers plus key specialist lines, with a broad and deep inventory of mil spec, ESA and commercial off the shelf products. Dedicated sales and support teams complete the package, along with business systems that can manage the demands of strategic multinational customers. Over the past five years, TTI has also developed its European value added connector assembly capability. We provide cutting services for tubing, wire and cable, offering lengths that are tailored to specific requirements for ease-of-use, rapid installation and cost-savings.

On TTI's booth at DSEI, special focus will be given to Kemet's approach to component miniaturisation with new capacitor

TTI director industry marketing Europe, defence, aerospace and space in Europe, Lee Thompson



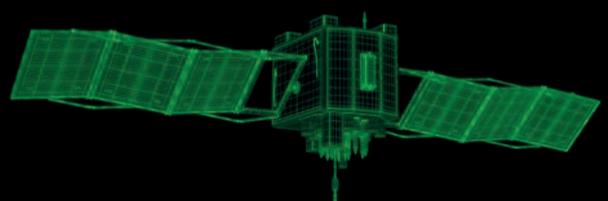
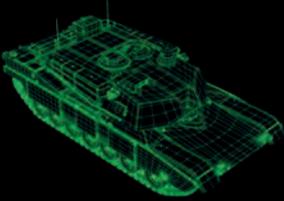
technologies for demanding applications as well as Honeywell's switches, proximity sensors and linear variable displacement transducers for aerospace and military applications. Other highlights include products from Vishay's Sfernice division, which provides highly reliable long-life position sensors with cost-efficient design. A range of plastic, wirewound potentiometer and magnetic encoders also enable Vishay to deliver custom solutions for missiles, fighter aircraft, optronic devices and radar.

www.ttieurope.com



ttieurope.com

The Specialist in Electronic Component Distribution



Defense Aerospace & Space Solutions

Value Added Services

Visit us at DSEI - Stand S3-341, UK Pavillion

Amphenol®

API Delevan

api technologies corp.

AMERICAN TECHNICAL CERAMICS

AVX A KYOCERA GROUP COMPANY

BOURNS®

CDE CORNELL DUBILIER

C&K

Esterline® Connection Technologies SOURIAU

Glenair®

HARWIN INTERCONNECT DESIGN & MANUFACTURE

Honeywell

Electronic Components KEMET CHARGED.

knowles

Littelfuse®

molex one company > a world of innovation

OHMITE

PANDUIT™

Pulse Electronics

Radiall®

smiths interconnect

TE connectivity™ Authorized Distributor

Tr Electronics

TUSONIX

VISHAY

VISHAY FOIL RESISTORS A VPG Brand

For more information on what TTI Europe has to offer, visit ttieurope.com or contact us at sales@uk.ttiinc.com

Electronics at the heart of Northern enterprise

Returning to Manchester on 27 and 28 September, Northern Manufacturing and Electronics fields a rich selection of components, subassemblies and service providers tailored to the needs of industrial enterprise in the North

Described as the only annual event catering for electronics in the North West, Northern Manufacturing and Electronics has quickly established itself as an important marketplace for electronics procurement and subcontracting. With both electronics and mechanical engineering represented, the show is rated for its diversity, which means multiple production issues can be addressed in a single visit.

The show's location at the heart of the UK's biggest manufacturing region make it attractive for production hardware vendors keen to tap-in to the rich supply chain eco-system of the North West. Highlights include rework equipment, test solutions and assembly innovation, with new products from Pace Europe, Pickering Interfaces and Turner Electronics amongst others.

Component connections

With several leading component vendors and manufacturers present this year, Northern Manufacturing and Electronics provides an opportunity to see the latest offerings in the market, including connectors, sensors, enclosures and other electromechanical components. Lemo will exhibit its Anglissimo range of rotatable, right-angled connectors, while Fischer Connectors will highlight its push-pull connectors for a variety of industrial applications, including machine control systems, robotic technology, sensors and inspection.

Other notable exhibitors include MagDev, which supplies permanent magnet components and assemblies in a variety of shapes, sizes and materials. Application specific solutions can be created and the company can also assist with the design of high frequency and high power chokes and transformers. Specialising in the design and manufacture of pressure transducers and pressure transmitters, ESI Technology focuses on specialist applications using sensing technologies such as its silicon-on-sapphire strain gauge. Highlights include

the new GD4200-USB digital pressure transducer, designed to simplify pressure measurement and reduce the need for expensive data loggers.

Source services

Complementing the hardware on show is an equally diverse range of production services – everything from PCB production to full contract assembly. From north of the border comes European Circuits, a contract manufacturer offering a full list of electronics services from its base in Glasgow. The firm offers complete production, or a more tailored service such as bare PCB manufacture and PCB assembly.

Other contract electronics manufacturing service providers present for 2017 include assembly specialist, LCL Electronics, and multi-discipline service provider, Trojan Electronics. First-time exhibitor Electrica will also make its debut. This BS EN ISO9001:2015 registered company offers electronic design, development and manufacturing services from its premises in Cheshire. In-house design is backed by surface mount production lines, as well as through-hole and box-build capabilities, all complemented by test and inspection equipment.

Learning opportunities

A comprehensive free technical seminar programme adds to the show line-up, giving visitors the opportunity to learn about the latest ideas in manufacturing and electronics from experts in their respective fields. Topics addressed this year include Industry 4.0, implementing lean, CE marking, a look at the possibilities of 3D printing and an overview of the forthcoming General Data Protection Regulations, which all businesses would do well to familiarise themselves with. The full seminar programme together with the advanced booking form is available now on the show's website.

www.industrynorth.co.uk



CEM



JUST Electronics

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!



WILSON PROCESS SYSTEMS
ELECTRONICS MANUFACTURING SERVICES

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

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



DEVICE PROGRAMMING



action circuits
(UK) LIMITED

device programming & reeling specialists



I.C. PROGRAMMING & LASER MARKING SERVICES

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

TRAINING



IPC Certified Courses
Plus Practical training for SMD, BGA,
Hand Soldering and PCB rework.
Advanced Rework Technology
Hill Farm, Ford End, Essex
01245 237083

TAPE REELING



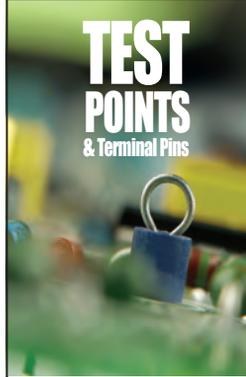
action circuits
(UK) LIMITED

device programming & reeling specialists



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

TEST POINTS & TERMINAL PINS



TEST POINTS & Terminal Pins

For prototype work or volume production

Large loop for easy attachment
Three sizes
Glass bead in a choice of eight colours
Unique shape will not damage through-plated holes

Full details and FREE SAMPLES on request

WILLIAM HUGHES LIMITED

Tel: (01963) 363377
www.wmhughes.co.uk
Station Road, Stalbridge, Dorset DT10 2RZ
Fax: (01963) 363640
Email: sales@wmhughes.co.uk

Advertisers Index

| ADVERTISER..... | PAGE # | | |
|--------------------------------------|------------------|---|---|
| Advanced Rework Technology Ltd | 26 | FC Lane Electronics | 49 |
| Aerco | 47 | GTK UK Ltd | 34 & 36 |
| America II Europe | 13 | Hammond Manufacturing | 27 |
| Anglia | 8C | Industrial Electronic Wiring (IEW) Ltd..... | 31 |
| ANR Manufacturing Ltd | 65 | Intelliconnect | 53 |
| Astute | 49 | Jaltek | 51 |
| Best Windings..... | 66 | Kemtron | 53 |
| Camdenboss | 20 | Metway | 31 |
| Charcroft | 11 | Microchip..... | 7 |
| Cinch Connectivity Solutions..... | 53 | Mouser Electronics ... | 5, 14, 15, 40, 41, 60, 61, 62, 63, & 64 |
| Computer Components Ltd | 8 | NCAB..... | 23, 35 & 43 |
| Cyclops Electronics | 24 | Nemco Ltd | 21 |
| Digi-Key Electronics..... | FC, IFC, 58 & 59 | Northern Manufacturing | 52 |
| DSEI | 45 | ODU | 51 |
| Dynamic EMS | 19 | OKW Enclosures Ltd | 29 |
| Ecopac Power | 17 | PHOENIX CONTACT Ltd..... | 46 |
| Farnell | 57 & IBC | Prestrick Circuits GPS | 28 |
| | | Productronica | 19 |
| | | Rapid | 9 |
| | | Review Display Systems (RDS) | 51 |
| | | Rhopoint Components..... | 10 |
| | | RS | 16 |
| | | Simtek EMS Ltd..... | 30 |
| | | Solid State Supplies | 50 |
| | | Somerset Solders | 31 |
| | | Speedboard | 25 |
| | | Tate Circuits..... | 21 |
| | | Telegartner..... | 33 |
| | | Texcel Technology | 32 |
| | | Tioga Ltd | 22 |
| | | Trojan | 23 |
| | | TTI Europe | 55 |
| | | Wilson Process Systems (WPS)..... | 37 |



INDUSTRIAL AUTOMATION AND CONTROL

Huge selection of products & solutions for your manufacturing facility from the world's most trusted brands.

Electronics Components, Solutions & Support
uk.farnell.com/industrial-automation-control

THE WORLD'S LARGEST SELECTION OF ELECTRONIC COMPONENTS AVAILABLE FOR IMMEDIATE DISPATCH™

6 MILLION+ PRODUCTS ONLINE | 100% FRANCHISED DISTRIBUTOR | 1,300,000+ PRODUCTS IN STOCK

3M
4D Systems
Aavid Thermalloy
Abracon Corporation
ACKme (Zentri)
ACL Staticide, Inc.
Active-Semi
Adafruit
Adapteva
Adesto Technologies
ADI (Analog Devices, Inc.)
Advanced Linear Devices, Inc.
Advanced Photonix
(Luna Optoelectronics)
Advanced Sensors / Amphenol
Advanced Thermal Solutions, Inc.
Advantech
Aearo Technologies, LLC –
a 3M company
Aeroflex (MACOM Technology
Solutions)
Aerospace Defense and Marine /
TE Connectivity
Affinity Medical Technologies -
a Molex company
Agastat Relays / TE Connectivity
AIM-Cambridge / Cinch Connectivity
Solutions
AKM Semiconductor, Inc.
ALCOSWITCH Switches /
TE Connectivity
AlfaMag Electronics (AMGIS)
All Sensors Corporation
Allegro MicroSystems, LLC.
Alliance Memory, Inc.
Alpha and Omega Semiconductor, Inc.
Alpha Wire
Altera (Intel® Programmable
Solutions Group)
American Electrical, Inc.
American Technical Ceramics
Ametherm
Amgis
AMI Semiconductor /
ON Semiconductor
AMP Connectors / TE Connectivity
Amphenol
Amphenol Advanced Sensors
Amphenol Aerospace Operations
Amphenol Anytek
Amphenol Audio
Amphenol Commercial Products
Amphenol Connex (Amphenol RF)
Amphenol Entertainment
Amphenol FCI
Amphenol Industrial
Amphenol LTW
Amphenol Pcd
Amphenol RF
Amphenol Sine Systems
Amphenol Spectra-Strip
Amphenol SV Microwave
Amphenol Tuchel Electronics
Ampleon
ams
Amulet Technologies, LLC.
Analog Devices, Inc.
Anaren
AnDAPT
Angstrom / Vishay
Antenna
Anytek (Amphenol Anytek)
Apacer
APEM Inc.
Apex Microtechnology
Apex Tool Group
API Delevan
API Technologies Corp.
APM Hexseal
Aptina / ON Semiconductor
ARCOL (Ohmite)
Arcoelectric (Bulgin)
Arcotronics (KEMET)
Arduino
Arduino.CC
Arduino.ORG
Aries Electronics, Inc.
ARM
Artaflex Inc.
Artesyn Embedded Technologies
Asahi Kasei Microdevices /
AKM Semiconductor

ASSMANN WSW Components
Aster America (Artesyn Embedded
Technologies)
Astro Tool Corp.
Atmel (Microchip Technology)
Atop Technologies
ATP Electronics, Inc.
Ault / SL Power
Avago Technologies (Broadcom
Limited)
Aven
Avery Dennison
AVX Corporation
Axicom Relays / TE Connectivity
Azoteq
Aztronic / Vishay
B B Battery
B&F Fastener Supply
B&K Precision
B+B SmartWorx, Inc.
Beau Interconnect - a Molex company
BEI Sensors
Bel
Bel Fuse, Inc.
Bel Power Solutions
Belden
Belden's Hirschmann
Bergquist
BI Technologies / TT Electronics
Birtcher / Pentair
Bivar, Inc.
BlueCreation
BlueRadios, Inc.
Bluetech GmbH
BNS Solutions
Bomar (Winchester Electronics)
Bopla Enclosures
Bosch Sensortec
Bourns, Inc.
Brad Harrison - a Molex company
Bridgelux, Inc.
Broadcom Limited
Buchanan Terminal Blocks /
TE Connectivity
Bud Industries, Inc.
Bulgin
Burr-Brown (Texas Instruments)
Bussmann (Eaton)
C&D Technologies (Murata Power
Solutions)
C&K
Caddock Electronics, Inc.
Cal Test Electronics
California Lighting (Bivar)
Calmark / Pentair
Cannon
Cantherm
Capital Advanced Technologies, Inc.
Carlo Technical Plastics
Cardinal Components
Carling Technologies
Catalyst Semiconductor /
ON Semiconductor
CEL (California Eastern Laboratories)
Central Semiconductor
Cera-Mite / Vishay
CGS Resistors / TE Connectivity
CH Products
Chemtronics
Cherry Americas
Cherry Switches (ZF Electronics)
Chip Quik, Inc.
Cicoil
CI / TE Connectivity
Cinch Connectivity Solutions
Cirronet / RFM (Murata Power
Solutions)
Cirrus Logic
Citizen Electronics Co., Ltd.
Citizen Finedevice Co., LTD.
ClaroStat (Honeywell Sensing and
Productivity Solutions)
CMD (ON Semiconductor)
CNC Tech
Cogent Computer Systems
Coiltronics (Eaton)
Comair Rotron
Comchip Technology
Comus International
Concept Technologie (Power
Integrations)
Condor / SL Power

Conex
Connex (Amphenol RF)
Connor-Winfield
Conxall / Switchcraft
Cooper Bussmann (Eaton)
Copal Electronics (Nidec Copal
Electronics)
Corcom Filters / TE Connectivity
Cornell Dubilier Electronics
Cortina Systems (Inphi)
Cosel
Coto Technology
CR Magnetics, Inc.
Cree
Cree Wolfspeed
Crescent
Critical Link
Crouzet
Crydom
Crydom
Crystek Corporation
CSR PLC (Qualcomm)
C-Ton Industries
CTS Electronic Components
CUI, Inc.
Curtis Industries
Curtis Instruments
Custom Computer Services
CW Industries
Cynergy3
Cypress Semiconductor
Daburn
Dale / Vishay
DAVE Embedded Systems
Davies Molding, LLC.
DecaWave
Delta Electronics
Delta Electronics / EMI
Delta Electronics / Fans
Delta Electronics / Power
Desco
DEUTSCH Connectors /
TE Connectivity
DEUTSCH ICT / TE Connectivity
DFRobot
Dialight
Dialog Semiconductor
Dielectric Laboratories (Knowles)
Digi International
Digilent, Inc.
Digital View Inc.
Diodes Incorporated
Displaytech
DLP Design, Inc.
Draloric / Vishay
dresden elektronik
Dynastream Innovations Inc.
E Ink
EasyBraid Co.
Eaton
ebm-papst Inc.
Echelon
Econais
ECS Inc. International
EDAC Inc.
Elco (AVX)
Elcon Connectors / TE Connectivity
Electric Imp
Electro Corp (Honeywell Sensing
and Productivity Solutions)
Electro-Films (EFI) / Vishay
Electronic Assembly GmbH
Electroswitch
Elna America
Embedded Artists
Emerson Connectivity Solutions
Emerson Embedded Power (Artesyn
Embedded Technologies)
EMIT
EnerGizer Battery Company
Energy Micro (Silicon Labs)
EnerSys
enmo Technologies
EnOcean
EPC
EPCOS
Epcos / RF360
Epson
Equinox Technologies
EREM
ERP Power
Essentra Components
ESTA / Vishay

E-Switch
E-T-A
Ethertronics
Eupec (Infineon)
Eveready (EnerGizer Battery Company)
Everlight Electronics
EverSpin Technologies, Inc.
Exar Corporation
Excelitas Technologies
Excelsys Technologies Ltd.
E-Z-Hook
Fairchild (ON Semiconductor)
Fan-S Division / Qualtek
Electronics Corp.
FCI (Amphenol FCI)
FCT Electronics - a Molex company
FDA America
FERROXCUBE
Finisar Corporation
FIT (Foxconn Interconnect Technology)
Flamar - a Molex company
Flambeau, Inc.
FLIR
Formerica Optoelectronics Inc.
Fox Electronics
Foxconn Optical Interconnect
Technologies
Free2move
Freescale Semiconductor, Inc.
(NXP Semiconductors)
Fremont Micro Devices
FTDI (Future Technology Devices
International, Ltd.)
Fujitsu Electronics America, Inc.
Future Designs, Inc.
Future Technology Devices
International, Ltd.
GainSpan Corporation
GC Electronics
GE Critical Power
General Cable
General Semiconductor (Vishay)
GeneSiC Semiconductor
Genuino (Arduino)
GHI Electronics, LLC
Global Power Technologies Group
Global Specialties
Grayhill, Inc.
Greenlee Communications
GWConnect - a Molex company
H&D Wireless
Hamlin / Littelfuse
Hammond Manufacturing
HARTING
Harwin
Heatron
HellermannTyton
Henkel/Loctite
Heraeus Sensor Technology USA
HiRel Systems / Vishay
Hirose
Hirschmann
Hittite (Analog Devices)
Hoffman Enclosures, Inc.
Holsworthy Resistors /
TE Connectivity
Holt Integrated Circuits, Inc.
Honeywell Microelectronics &
Precision Sensors
Honeywell Sensing and Productivity
Solutions
I/O Interconnect
IAR Systems Software Inc
ICCNexergy (Inventus Power)
IDT (Integrated Device Technology)
II-VI Marlow
Illinois Capacitor
ILLUMRA
Industrial Fiber Optics, Inc.
Infineon Technologies
Initial State Technologies, Inc.
Innovasic Semiconductor /
Analog Devices, Inc.
Inphi
Insight SIP
Inspired LED
Integrated Device Technology (IDT)
Integrated Silicon Solution, Inc. (ISSI)
Intel® Programmable Solutions Group
Intematix
Interconnect Systems -
a Molex company

Interlink Electronics
International Rectifier (Infineon
Technologies)
Intersil
InvenSense / TDK
Inventek Systems
Inventus Power
IR (Infineon Technologies)
IRC / TT Electronics
IRTOUCH Systems Co., Ltd.
Isocom Components
ISSI (Integrated Silicon Solution, Inc.)
ITT Cannon, LLC
ITT Interconnect Solutions
ITW Chemtronics (Chemtronics)
IXYS Corporation
IXYS Integrated Circuits Division
J.W. Miller / Bourns
JAE Electronics, Inc.
Jinlong Machinery & Electronics
Co. Ltd.
JKL Components Corporation
Johanson Dielectrics, Inc.
Johanson Technology
Johnson / Cinch Connectivity
Solutions
Jonard Tools
JRC Corporation / NJRC
JST
Jucdo Manufacturing, Inc.
Keil (ARM)
KEMET
Kester
Keystone Electronics Corp.
Khatod
Kilo International
Kilovac Relays / TE Connectivity
Kingbright
Kings (Winchester Electronics)
Klein Tools
Knowles
Knowles NOVACAP
Knowles Syfer
Knowles Voltronics
Kyocera
Kyocera Display
Laird - Embedded Wireless Solutions
Laird Technologies
Laird Technologies - Antennas
Laird Technologies - EMI
Laird Technologies - Signal Integrity
Products
Laird Technologies - Thermal
Products
LAPIS Semiconductor
Lattice Semiconductor
Leader Tech Inc.
LeCroy (Teledyne LeCroy)
LED Engin
LEDdynamics, Inc.
LEDIL
LEM USA, Inc.
LEMO
Lighting Science
Lime Microsystems
Linear Technology / Analog Devices
Link Labs
Linx Technologies
Lite-On, Inc.
Littelfuse
LMB Heeger, Inc.
LOCTITE / Henkel
Logic PD, Inc.
Logical Systems
LSR (Laird - Embedded Wireless
Solutions)
LTW (Amphenol LTW)
Lumberg Automation
Lumex, Inc.
LUMILEDS
Luminary Micro / Texas Instruments
Luminus Devices
Luna Optoelectronics
Luxe
MACOM Technology Solutions
Macraigor Systems LLC
Macronix
Maestro Wireless Solutions
Mag-LED Solutions
Magnasphere Corp.
Mallory Sonalert Products
Marktech Optoelectronics

Marlow Industries, Inc.
 Martel Electronics
 Marutsuelec Co., Ltd.
 Master Appliance Corp.
 Matrix Orbital
 Maxim Integrated
 MaxStream (Digi International)
 Maxwell Technologies, Inc.
 MCB Industrie / Vishay
 Measurement Specialties /
 TE Connectivity
 MEC switches
 Mechatronics
 MegaChips
 Melexis
 Memory Protection Devices
 MEMSIC
 Menda
 Mentor Graphics
 Metelics (MACOM Technology
 Solutions)
 MG Chemicals
 Micrel / Microchip Technology
 Micrium
 Micro Commercial Components (MCC)
 Microchip Technology
 microEngineering Labs Inc.
 Micro-Measurements /
 Vishay Precision Group
 Micron Technology
 Micronas
 Microsemi
 Microwave Technology
 Midcom / Wurth Electronics
 Mide Technology
 Midwest Microwave / Cinch
 Connectivity Solutions
 MikroElektronika
 Mill-Max
 Mills / Vishay
 Milwaukee / Vishay
 MMB Networks
 Molex
 Molex Affinity Medical Technologies
 Molex Beau Interconnect
 Molex Brad Harrison
 Molex FCT Electronics
 Molex Flamar
 Molex GWConnect
 Molex Interconnect Systems
 Molex NuCurrent
 Molex Oplink Communications, LLC.
 Molex Phillips-Medisize
 Molex PolyMicro Technologies
 Molex Temp-Flex
 Molex Woodhead
 Monolithic Power Systems
 MPD (Memory Protection Devices)
 MPS (Monolithic Power Systems)
 Mueller Electric Co.
 Multicore / Henkel
 Multi-Tech Systems, Inc.
 Murata Electronics
 Murata Power Solutions
 Nakagawa Manufacturing USA, Inc.
 National Semiconductor /
 Texas Instruments
 Navman Wireless (Telit)
 NDK
 Nearson
 Neohm Resistors / TE Connectivity
 Nesscap Co., Ltd
 NetBurner, Inc.
 Newava Technology
 Newhaven Display, Intl.
 Nexperia
 Nichicon
 Nidec Copal Electronics
 NimbeLink
 Nippon Chemi-Con
 NJR Corporation / NJRC
 NKK Switches
 NMB Technologies Corp.
 NorComp
 Nordic Semiconductor
 NOVACAP
 NovaSensor / GE Measurement
 & Control
 NuCurrent - a Molex company
 Nuvoton Technology Corporation
 America

NVE Corporation
 NXP Semiconductors / Freescale
 Octavo Systems
 OEG Relays / TE Connectivity
 Ohmite
 OK Industries (Jonard Tools)
 Olimex
 Omron Automation & Safety
 Omron Electronic Components
 ON Semiconductor
 On-Shore Technology, Inc.
 Oplink, a Molex company
 Optek Technology / TT Electronics
 Option NV
 Opto Diode Corporation
 Opulent Americas
 O'Reilly Media, Inc.
 Orion Fans
 OSRAM Opto Semiconductors, Inc.
 Packet Digital LLC
 Paladin Tools (Greenlee
 Communications)
 Panasonic
 PanaVise
 Panduit
 Parallax, Inc.
 Parlex Corp.
 Patco Electronics
 Patco Services
 PCD / Amphenol
 Peerless by Tymphony
 Pentair
 Peregrine Semiconductor
 Pericom Semiconductor Corp.
 (Diodes Incorporated)
 Pervasive Displays
 PHIHONG USA
 Phillips-Medisize - a Molex company
 Phoenix Contact
 Phoenix Mecano
 Phoenix Passive Components /
 Vishay
 Phytion, Inc.
 Pimoroni
 PolyMicro Technologies -
 a Molex company
 Polytech / Vishay
 Pomona Electronics
 Pontiac Coil, Inc.
 Portescap
 Potter & Brumfield Relays /
 TE Connectivity
 Power Integrations
 Powerex, Inc.
 Power-One (Bel Power Solutions)
 PowerStor (Eaton)
 PRD Plastics
 Preci-Dip
 Precision Design Associates, Inc.
 Precision Electronic Components Ltd.
 Precision Technology, Inc.
 ProAnt
 Products Unlimited Transformers &
 Relays / TE Connectivity
 Protektive Pak
 PUI Audio, Inc.
 PULS
 Pulse Electronics Corporation
 PulseCore Semiconductor /
 ON Semiconductor
 PulseLarsen Antennas
 Q-Cee's / TE Connectivity
 QT Brightek
 Quadcept
 Qualcomm
 Qualcomm (RF360 - A Qualcomm &
 TDK Joint Venture)
 Qualtek Electronics Corp.
 Quatech / B+B SmartWorx
 Rabbit Semiconductor
 (Digi International)
 Radial Magnet, Inc.
 RAFI
 Ramtron (Cypress Semiconductor)
 Raspberry Pi
 Raychem Cable Protection /
 TE Connectivity
 RayVio
 RECOM Power
 Red Lion Controls
 REDEL / LEMO

Renesas Electronics America
 RF Digital
 RF Solutions
 RF360 - A Qualcomm-
 TDK joint venture
 Richco, Inc. (Essentra Components)
 Richtek
 Riedon
 Rigado
 Roederstein / Vishay
 ROHM Semiconductor
 Rose Bopla
 Rose Enclosures
 Rose+Krieger
 Roving Networks / Microchip
 Technology
 RPM Systems
 Rubycon
 RushUp
 Sagrad
 Samsung Electro-Mechanics
 America, Inc.
 Samsung Semiconductor
 Samtec, Inc.
 Sanken Electric Co., Ltd.
 Sanyo Denki
 Sanyo Semiconductor /
 ON Semiconductor
 Schaffner EMC, Inc.
 Schrack Relays / TE Connectivity
 Schroff / Pentair
 Schurter
 SCS
 Seeed
 Segger Microcontroller Systems
 Seiko Instruments, Inc.
 Semflex / Cinch Connectivity
 Solutions
 Semtech
 Sensata Technologies, Airpax
 Sensirion
 Sensitron Semiconductor /
 SMC Diode Solutions
 Seoul Semiconductor
 Serious Integrated
 Serpac Electronic Enclosures
 SGX Sensortech
 Sharp Microelectronics
 Sierra Wireless
 Sigma Designs
 Sigma Inductors / TE Connectivity
 Signal Transformer
 SIL Semiconductor Corporation
 Silicon Labs
 SINE Systems / Amphenol
 Siretta
 SiTime
 SkyTek
 Skyworks Solutions, Inc.
 SL Power Electronics - Manufacturer
 of Condor / Ault Brands
 SMC Diode Solutions
 Soberton, Inc.
 SolidRun
 Souriau Connection Technology
 Spansion (Cypress Semiconductor)
 SparkFun
 Spec Sensors
 Spectra Symbol
 Spectra-Strip (Amphenol
 Spectra-Strip)
 Sprague Goodman
 SSI Technologies, Inc.
 Stackpole Electronics, Inc.
 Staco Energy Products Co.
 Standex-Meder Electronics
 Stanley Electric
 Steinel
 steute Wireless
 Stewart Connector
 STMicroelectronics
 Storm Interface
 Sullins Connector Solutions
 Sumida Corporation
 SunLED
 Sunon
 Susumu
 SV Microwave (Amphenol SV
 Microwave)
 Swanstrom Tools
 Swissbit

Switchcraft / Conxall
 Syfer
 Synapse Wireless
 Tag-Connect
 Taitien
 Taiyo Yuden
 Talema
 Tallysman Wireless
 Talon Communications, Inc.
 Tamura
 Taoglas
 TAOS / ams
 TDK Corporation
 TDK InvenSense
 TDK RF360
 TDK-Lambda Americas, Inc.
 TE Connectivity
 TE Connectivity Aerospace Defense
 and Marine
 TE Connectivity ALCOSWITCH
 Switches
 TE Connectivity AMP Connectors
 TE Connectivity Corcom Filters
 TE Connectivity DEUTSCH Connectors
 TE Connectivity DEUTSCH ICT
 TE Connectivity DEUTSCH
 INDUSTRIAL & COMMERCIAL
 TRANSPORTATION
 TE Connectivity Measurement
 Specialties
 TE Connectivity Potter & Brumfield
 Relays
 TE Connectivity Raychem Cable
 Protection
 TE Connectivity Raychem Circuit
 Protection / Littelfuse
 TE Connectivity's Agastat Relays
 TE Connectivity's Axicom Relays
 TE Connectivity's Buchanan
 Terminal Blocks
 TE Connectivity's CGS Resistors
 TE Connectivity's CII
 TE Connectivity's Elcon Connectors
 TE Connectivity's Holsworthy
 Resistors
 TE Connectivity's Kilovac Relays
 TE Connectivity's Neohm Resistors
 TE Connectivity's OEG Relays
 TE Connectivity's Products Unlimited
 Transformers & Relays
 TE Connectivity's Q-Cee's
 TE Connectivity's Schrack Relays
 TE Connectivity's Sigma Inductors
 Teccor / Littelfuse
 Techflex
 TechNexion
 Techno / Vishay
 TechTools
 Teledyne LeCroy
 Telit
 Temp-Flex - a Molex company
 Tensility International Corporation
 Terasic Technologies
 Test Products International (TPI)
 Texas Instruments
 t-Global Technology
 Thermometrics / GE Measurement
 & Control
 ThingMagic
 Thomas Research Products
 TinyCircuits
 TOKO / Murata
 Torex Semiconductor Ltd.
 Toshiba Semiconductor and Storage
 Touchstone Semiconductor
 TPI (Test Products International)
 TPK America LLC
 Transphorm
 Trenz Electronic
 Triad Magnetics
 TRINAMIC Motion Control GmbH
 Tripp Lite
 Trompeter / Cinch Connectivity
 Solutions
 Tronics
 TRP Connector

TT Electronics
 TT Electronics / BI Technologies
 TT Electronics / IRC
 TT Electronics / Optek Technology
 TT Electronics / Welwyn
 Tuchel / Amphenol
 Twin Industries
 TXC Corporation
 Tyco Electronics
 Tymphony (Peerless by Tymphony)
 U.S. Sensor
 UD00
 Ultra Librarian®
 Ungar / Weller
 United Chemi-Con
 US-Lasers, Inc.
 Varitronix International Ltd.
 VCC (Visual Communications
 Company)
 VEAM
 Vector Electronics & Technology, Inc.
 Verivolt
 VersaLogic Corporation
 VersaSense
 Vicor
 Vifa (Peerless by Tymphony)
 Viking Technology
 Virtium Technology Inc.
 Vishay
 Vishay / BCComponents
 Vishay / Beyschlag
 Vishay / Dale
 Vishay / Huntington Electric, Inc.
 Vishay / Semiconductor -
 Diodes Division
 Vishay / Semiconductor -
 Opto Division
 Vishay / Sfernice
 Vishay / Siliconix
 Vishay / Spectrol
 Vishay / Sprague
 Vishay / Thin Film
 Vishay / Vitramon
 Vishay Foil Resistors
 Vishay Precision Group /
 Micro-Measurements
 Visual Communications Company, LLC
 Vitelec / Cinch Connectivity
 Solutions
 Volgen / Division of Kaga
 Electronics USA
 Voltronics (Knowles)
 VPG / Micro-Measurements
 Wakefield-Vette
 Walsin Technology
 Wandboard
 WeEn Semiconductors Co., Ltd
 Weidmuller
 Weller
 Welwyn / TT Electronics
 Wickmann / Littelfuse
 Wiha
 Winbond Electronics Corporation
 Winchester Electronics
 Wintec Industries
 Wiss
 WIZnet
 Wolfspeed - a Cree company
 Woodhead - a Molex company
 Wurth Electronics
 Wurth Electronics iBE
 Wurth Electronics Midcom
 Xcelite
 Xeltek
 Xilinx
 XMOS
 XP Power
 Xsens
 Yageo
 Zentri (Silicon Labs)
 Zetec Semiconductors (Diodes
 Incorporated)
 ZF Electronics
 Zilog



DIGIKEY.CO.UK LINECARD

Buyers' Guide

| Manufacturer | Distributor | Telephone | Website | Franchised Distributor | No. of Lines for Principle | Stock Value for Principle | Minimum Order Value | % Lead Free for Principle Range | No. of Technical Support Staff | Total No. of Staff | Buffer Stock Facility |
|--|---------------------------|---------------------|----------------------------|------------------------|----------------------------|---------------------------|---------------------|---------------------------------|--------------------------------|--------------------|-----------------------|
| CABLE ASSEMBLY & HARNESSING | | | | | | | | | | | |
| FDI | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 100 | N/A | £0 | N/A | 50 | 1,500+ | Y |
| Molex | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 300 | N/A | £0 | 97% | 50 | 1,500+ | Y |
| CIRCUIT PROTECTION | | | | | | | | | | | |
| Bourns | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 5000 | N/A | £0 | 58% | 50 | 1,500+ | Y |
| EPCOS/TDK | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 5000 | N/A | £0 | 58% | 50 | 1,500+ | Y |
| Littelfuse | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 35000 | N/A | £0 | 67% | 50 | 1,500+ | Y |
| DISPLAYS & LEDs | | | | | | | | | | | |
| NLT Technologies Ltd | Review Display System Ltd | 01959 563345 | www.review-displays.co.uk | Y | All | N/A | £0 | N/A | 6 | 25 | Y |
| ELECTROMECHANICAL | | | | | | | | | | | |
| CUJ CORPORATION | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 15,168 | N/A | £0 | 91.34% | 150 | 3,400 | Y |
| MURATA CORPORATION | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 61,903 | N/A | £0 | 99.72% | 150 | 3,400 | Y |
| OMRON CORPORATION | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 70,119 | N/A | £0 | 95.28% | 150 | 3,400 | Y |
| PANASONIC CORPORATION | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 156,533 | N/A | £0 | 93.83% | 150 | 3,400 | Y |
| TDK CORPORATION | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 64,978 | N/A | £0 | 99.30% | 150 | 3,400 | Y |
| TE CONNECTIVITY CORPORATION | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 437,107 | N/A | £0 | 75.47% | 150 | 3,400 | Y |
| ENCLOSURES | | | | | | | | | | | |
| Bud | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 2,500 | N/A | £0 | 80% | 50 | 1,500+ | Y |
| Hammond | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | 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 | | | | | | | | | | | |
| ABRACON | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 1,000 | N/A | £0 | 91% | 50 | 1,500+ | Y |
| AEL Crystals Ltd | AEL Crystals Ltd | 01293 789200 | www.aelcrystals.co.uk | N | N/A | £200,000 | £50 | 100% | 3 | 15 | Y |
| ECS | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 500 | N/A | £0 | 99% | 50 | 1,500+ | Y |
| Epson | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 500 | N/A | £0 | 59% | 50 | 1,500+ | 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 | | 01276 605900 | www.jauch.co.uk | | | £3M | | 100% | 15 | 130 | Y |
| HEATSINKS | | | | | | | | | | | |
| Aavid | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 700 | N/A | £0 | 67% | 50 | 1,500+ | Y |
| ICs & SEMICONDUCTORS (continued on next page) | | | | | | | | | | | |
| ALLEGRO MICROSYSTEMS, LLC | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 2,867 | N/A | £0 | 86.22% | 150 | 3,400 | Y |
| ALTERA | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 10,502 | N/A | £0 | 80.39% | 150 | 3,400 | Y |
| Altera | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 1,600 | N/A | £0 | 60.00% | 50 | 1,500+ | Y |
| ANALOG DEVICES | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 50,633 | N/A | £0 | 73.33% | 150 | 3,400 | Y |
| Analog Devices Inc. | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 9,500 | N/A | £0 | 83.00% | 50 | 1,500+ | Y |



widest Selection

Buyers' Guide

| Manufacturer | Distributor | Telephone | Website | Franchised Distributor | No. of Lines for Principle | Stock Value for Principle | Minimum Order Value | % Lead Free for Principle Range | No. of Technical Support Staff | Total No. of Staff | Buffer Stock Facility |
|------------------------------------|--------------------|---------------------|------------------|------------------------|----------------------------|---------------------------|---------------------|---------------------------------|--------------------------------|--------------------|-----------------------|
| Atmel | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 1,700 | N/A | £0 | 58.00% | 50 | 1,500+ | Y |
| Avago Technologies | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 400 | N/A | £0 | 84.00% | 50 | 1,500+ | Y |
| Broadcom | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 100 | N/A | £0 | 69% | 50 | 1,500+ | Y |
| BROADCOM LIMITED (AVAGO) | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 2,237 | N/A | £0 | 99.96% | 150 | 3,400 | Y |
| Cirrus Logic | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 300 | N/A | £0 | 80.00% | 50 | 1,500+ | Y |
| CREE INC | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 26,398 | N/A | £0 | 100.00% | 150 | 3,400 | Y |
| CYPRESS SEMICONDUCTOR | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 26,030 | N/A | £0 | 89.02% | 150 | 3,400 | Y |
| Cypress Semiconductor | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 1,400 | N/A | £0 | 63.00% | 50 | 1,500+ | Y |
| DIODES INC | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 32,186 | N/A | £0 | 89.01% | 150 | 3,400 | Y |
| Diodes Incorporated | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 1,600 | N/A | £0 | 98% | 50 | 1,500+ | Y |
| Exar | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 1,100 | N/A | £0 | 95.00% | 50 | 1,500+ | Y |
| FAIRCHILD | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 39,380 | N/A | £0 | 97.62% | 150 | 3,400 | Y |
| Fairchild Semiconductor | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 2,500 | N/A | £0 | 90.00% | 50 | 1,500+ | Y |
| Freescale Semiconductor | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 2,500 | N/A | £0 | 42.00% | 50 | 1,500+ | Y |
| FTDI | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 486 | N/A | £0 | 100.00% | 150 | 3,400 | Y |
| FTDI | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 100 | N/A | £0 | 97% | 50 | 1,500+ | Y |
| IDT (Integrated Device Technology) | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 2,100 | N/A | £0 | 97% | 50 | 1,500+ | Y |
| Infineon | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 800 | N/A | £0 | 66.00% | 50 | 1,500+ | Y |
| INFINEON TECHNOLOGIES CORPORATION | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 24,610 | N/A | £0 | 85.64% | 150 | 3,400 | Y |
| Intel | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 500 | N/A | £0 | 78% | 50 | 1,500+ | Y |
| International Rectifier | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 600 | N/A | £0 | 87.00% | 50 | 1,500+ | Y |
| Intersil | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 1,900 | N/A | £0 | 50.00% | 50 | 1,500+ | Y |
| INTERSIL CORPORATION | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 24,063 | N/A | £0 | 74.18% | 150 | 3,400 | Y |
| ISSI | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 700 | N/A | £0 | 98.00% | 50 | 1,500+ | Y |
| IXYS CORPORATION | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 7,268 | N/A | £0 | 99.55% | 150 | 3,400 | Y |
| Lattice | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 700 | N/A | £0 | 69% | 50 | 1,500+ | Y |
| LINEAR TECHNOLOGY CORPORATION | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 36,207 | N/A | £0 | 76.91% | 150 | 3,400 | Y |
| MAXIM CORPORATION | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 65,795 | N/A | £0 | 77.63% | 150 | 3,400 | Y |
| Maxim Integrated | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 11,200 | N/A | £0 | 67.00% | 50 | 1,500+ | Y |
| Microchip | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 12,600 | N/A | £0 | 91.00% | 50 | 1,500+ | Y |
| MICROCHIP CORPORATION | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 58,558 | N/A | £0 | 90.13% | 150 | 3,400 | Y |
| Microsemi | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 400 | N/A | £0 | 90% | 50 | 1,500+ | Y |
| Monolithic Power Systems (MPS) | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 600 | N/A | £0 | 40% | 50 | 1,500+ | Y |
| NXP | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 3,900 | N/A | £0 | 91% | 50 | 1,500+ | Y |
| NXP SEMICONDUCTOR CORPORATION | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 38,701 | N/A | £0 | 99.27% | 150 | 3,400 | Y |
| ON Semiconductor | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 5,100 | N/A | £0 | 87% | 50 | 1,500+ | Y |
| ON SEMICONDUCTOR CORPORATION | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 57,566 | N/A | £0 | 79.85% | 150 | 3,400 | Y |
| Power Integrations | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 600 | N/A | £0 | 59% | 50 | 1,500+ | Y |
| Qorvo | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 300 | N/A | £0 | 90.00% | 50 | 1,500+ | Y |
| ROHM Semiconductor | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 1,400 | N/A | £0 | 55.00% | 50 | 1,500+ | Y |
| SEMTECH CORPORATION | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 3,694 | N/A | £0 | 87.63% | 150 | 3,400 | Y |
| Silicon Laboratories | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 1,500 | N/A | £0 | 96% | 50 | 1,500+ | Y |
| SILICON LABORATORIES CORPORATION | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 17,747 | N/A | £0 | 96.09% | 150 | 3,400 | Y |
| Skyworks | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 300 | N/A | £0 | 91% | 50 | 1,500+ | Y |
| Spansion Inc. | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 600 | N/A | £0 | 93.00% | 50 | 1,500+ | Y |



**MOUSER
ELECTRONICS**



**TEXAS
INSTRUMENTS**

Over 42,000 TI products
and 3,500 TI dev kits **in Stock**

Buyers' Guide

| Manufacturer | Distributor | Telephone | Website | Franchised Distributor | No. of Lines for Principle | Stock Value for Principle | Minimum Order Value | % Lead Free for Principle Range | No. of Technical Support Staff | Total No. of Staff | Buffer Stock Facility |
|---|--------------------|---------------------|------------------|------------------------|----------------------------|---------------------------|---------------------|---------------------------------|--------------------------------|--------------------|-----------------------|
| ICs & SEMICONDUCTORS (continued on from previous page) | | | | | | | | | | | |
| STMicroelectronics | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 4,300 | N/A | £0 | 99% | 50 | 1,500+ | Y |
| STMICROELECTRONICS CORPORATION | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 43,448 | N/A | £0 | 97.47% | 150 | 3,400 | Y |
| Texas Instruments | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 36,900 | N/A | £0 | 41% | 50 | 1,500+ | Y |
| TEXAS INSTRUMENTS CORPORATION | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 210,905 | N/A | £0 | 89.60% | 150 | 3,400 | Y |
| Toshiba | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 500 | N/A | £0 | 100.00% | 50 | 1,500+ | Y |
| XILINX INC | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 7,354 | N/A | £0 | 51.78% | 150 | 3,400 | Y |
| INDUSTRIAL GRADE MEMORY MODULES | | | | | | | | | | | |
| InnoDisk | Simms | 01622 852 848 | www.simms.co.uk | N | 300+ | N/A | N/A | N/A | 3 | N/A | Y |
| INTERCONNECTION | | | | | | | | | | | |
| 3M | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 54,086 | N/A | £0 | 93.83% | 150 | 3,400 | Y |
| 3M | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 3,100 | N/A | £0 | 16% | 50 | 1,500+ | Y |
| AMPHENOL | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 426,945 | N/A | £0 | 82.42% | 150 | 3,400 | Y |
| Amphenol | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 25,600 | N/A | £0 | 53% | 50 | 1,500+ | Y |
| Anderson Power Products | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 800 | N/A | £0 | 50% | 50 | 1,500+ | Y |
| Cinch Connectivity Solutions | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 1,900 | N/A | £0 | 82% | 50 | 1,500+ | Y |
| Delphi Connection Systems | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 3,300 | N/A | £0 | 67.00% | 50 | 1,500+ | Y |
| EDAC | EDAC | 01933 427300 | www.edac.net | N/A | N/A | N/A | £100 | 100% | 34 | 500+ | Y |
| FCI | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 4,300 | N/A | £0 | 94% | 50 | 1,500+ | Y |
| Glenair | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 1,900 | N/A | £0 | 76.00% | 50 | 1,500+ | Y |
| HARTING | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 4,700 | N/A | £0 | 31% | 50 | 1,500+ | Y |
| Harwin | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | 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 | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 6,100 | N/A | £0 | 99% | 50 | 1,500+ | Y |
| HIROSE ELECTRIC CO LTD | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 39,499 | N/A | £0 | 91.53% | 150 | 3,400 | 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 | 100.00% | 6 | 38 | Y |
| JAE Electronics | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 1,200 | N/A | £0 | 32% | 50 | 1,500+ | Y |
| JST SALES AMERICA INC | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 4,320 | N/A | £0 | 81.46% | 150 | 3,400 | Y |
| Kycon | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 700 | N/A | £0 | 99% | 50 | 1,500+ | Y |
| LEMO | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 2,900 | N/A | £0 | 65% | 50 | 1,500+ | Y |
| Molex | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 16,900 | N/A | £0 | 75% | 50 | 1,500+ | Y |
| MOLEX CORPORATION | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 123,772 | N/A | £0 | 95.41% | 150 | 3,400 | Y |
| Neutrik | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 1,000 | N/A | £0 | 86% | 50 | 1,500+ | Y |
| Phoenix Contact | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 12,000 | N/A | £0 | 99.00% | 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 | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 2,200 | N/A | £0 | 69% | 50 | 1,500+ | Y |
| TE Connectivity | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 30,900 | N/A | £0 | 40% | 50 | 1,500+ | Y |



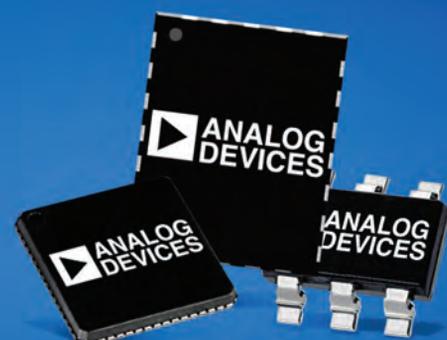
same-day Shipping

Buyers' Guide

| Manufacturer | Distributor | Telephone | Website | Franchised Distributor | No. of Lines for Principle | Stock Value for Principle | Minimum Order Value | % Lead Free for Principle Range | No. of Technical Support Staff | Total No. of Staff | Buffer Stock Facility |
|--|---------------------------|---------------------|-----------------------------|------------------------|----------------------------|---------------------------|---------------------|---------------------------------|--------------------------------|--------------------|-----------------------|
| OBSOLESCENCE / HARD TO FIND | | | | | | | | | | | |
| | America II Europe | 01462 707070 | www.americaiiurope.com | N/A | 1,900 | \$1B | £0 | 75% | 59 | 500+ | Y |
| | Cyclops Electronics | 01904 415 415 | www.cyclops-electronics.com | N/A | 177,232 | £5M | £100 | 75% | 3 | 78 | Y |
| OPTO ELECTRONICS | | | | | | | | | | | |
| Avago Technologies | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 8,200 | N/A | £0 | 89% | 50 | 1,500+ | Y |
| Cree, Inc. | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 22,500 | N/A | £0 | 74% | 50 | 1,500+ | Y |
| Dialight | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 9,800 | N/A | £0 | 99% | 50 | 1,500+ | Y |
| Kingbright | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 3,100 | N/A | £0 | 100% | 50 | 1,500+ | Y |
| Lumileds | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 1,100 | N/A | £0 | 99% | 50 | 1,500+ | Y |
| NEC | Review Display System Ltd | 01959 563345 | www.review-displays.co.uk | Y | 200 | £200,000 | £0 | 100% | 5 | 20 | Y |
| Newhaven Display | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 700 | N/A | £0 | 65% | 50 | 1,500+ | Y |
| Osram Opto Semiconductor | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 2,800 | N/A | £0 | 99% | 50 | 1,500+ | Y |
| VCC | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 5,000 | N/A | £0 | 92% | 50 | 1,500+ | Y |
| Vishay | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 3,100 | N/A | £0 | 99% | 50 | 1,500+ | Y |
| PASSIVES (continued on next page) | | | | | | | | | | | |
| ABRACON CORPORATION | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 28,548 | N/A | £0 | 98.89% | 150 | 3,400 | Y |
| AVX | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 70,700 | N/A | £0 | 58.00% | 50 | 1,500+ | Y |
| BEL FUSE | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 4,207 | N/A | £0 | 83.53% | 150 | 3,400 | Y |
| BOURNS | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 59,314 | N/A | £0 | 82.47% | 150 | 3,400 | Y |
| Bourns | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 49,500 | N/A | £0 | 98% | 50 | 1,500+ | Y |
| Coilcraft | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 10,400 | N/A | £0 | 98% | 50 | 1,500+ | Y |
| Cornell Dubilier | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 33,000 | N/A | £0 | 65.00% | 50 | 1,500+ | Y |
| EATON CORPORATION | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 28,434 | N/A | £0 | 86.49% | 150 | 3,400 | Y |
| EPCOS / TDK | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 31,000 | N/A | £0 | 74.00% | 50 | 1,500+ | Y |
| Fair-Rite | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 1,000 | N/A | £0 | 94.00% | 50 | 1,500+ | Y |
| HONEYWELL CORPORATION | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 26,319 | N/A | £0 | 86.01% | 150 | 3,400 | Y |
| Kemet | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 135,800 | N/A | £0 | 93% | 50 | 1,500+ | Y |
| KEMET CORPORATION | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 48,025 | N/A | £0 | 90.12% | 150 | 3,400 | Y |
| KOA Speer | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 107,900 | N/A | £0 | 82% | 50 | 1,500+ | Y |
| KYOCERA ELECTRONICS CORPORATION (AVX) | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 65,718 | N/A | £0 | 83.48% | 150 | 3,400 | Y |
| LAIRD CORPORATION | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 14,568 | N/A | £0 | 97.21% | 150 | 3,400 | Y |
| Laird Technologies | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 1,800 | N/A | £0 | 50.00% | 50 | 1,500+ | Y |
| LITTELFUSE CORPORATION | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 86,652 | N/A | £0 | 82.87% | 150 | 3,400 | Y |
| Murata | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 67,300 | N/A | £0 | 99% | 50 | 1,500+ | Y |
| NICHICON | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 35,421 | N/A | £0 | 96.30% | 150 | 3,400 | Y |
| Nichicon | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 21,600 | N/A | £0 | 47.00% | 50 | 1,500+ | Y |
| Ohmite | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 17,300 | N/A | £0 | 99.00% | 50 | 1,500+ | Y |
| Panasonic | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 67,900 | N/A | £0 | 69.00% | 50 | 1,500+ | Y |
| PULSE CORPORATION | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 11,098 | N/A | £0 | 93.56% | 150 | 3,400 | Y |
| ROHM SEMICONDUCTOR CORPORATION | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 63,003 | N/A | £0 | 99.85% | 150 | 3,400 | Y |
| Samsung Electro-Mechanics | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 21,522 | N/A | £0 | 100.00% | 150 | 3,400 | Y |
| TAIYO YUDEN | Digi-Key | 0800 587 0991 | digkey.co.uk | Y | 16,677 | N/A | £0 | 99.96% | 150 | 3,400 | Y |
| Taiyo Yuden | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 6,400 | N/A | £0 | 82% | 50 | 1,500+ | Y |

MORE.

ANALOG DEVICES
AHEAD OF WHAT'S POSSIBLE™



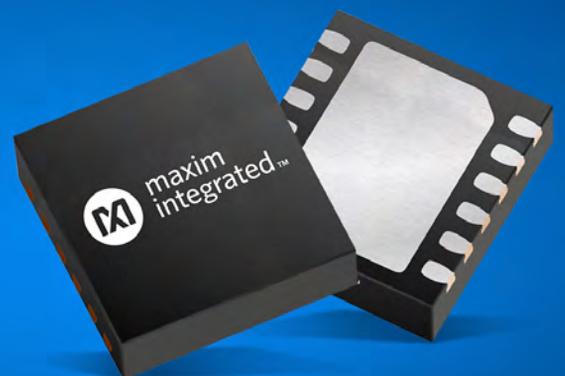
Over 12,000 Analog Devices Products
and 2,000 Dev Tools in Stock.

Worldwide leading authorised distributor of semiconductors and electronic components

mouser.co.uk

Buyers' Guide

| Manufacturer | Distributor | Telephone | Website | Franchised Distributor | No. of Lines for Principle | Stock Value for Principle | Minimum Order Value | % Lead Free for Principle Range | No. of Technical Support Staff | Total No. of Staff | Buffer Stock Facility |
|--|-----------------------|---------------------|-----------------------|------------------------|----------------------------|---------------------------|---------------------|---------------------------------|--------------------------------|--------------------|-----------------------|
| TDK | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 25,300 | N/A | £0 | 85.00% | 50 | 1,500+ | Y |
| TT Electronics | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 32,800 | N/A | £0 | 55% | 50 | 1,500+ | Y |
| United Chemi-Con (UCC) | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 13,900 | N/A | £0 | 99.00% | 50 | 1,500+ | Y |
| Vishay | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 119,800 | N/A | £0 | 76% | 50 | 1,500+ | Y |
| VISHAY CORPORATION | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 275,942 | N/A | £0 | 88.52% | 150 | 3,400 | Y |
| WURTH CORPORATION | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 22,245 | N/A | £0 | 100.00% | 150 | 3,400 | Y |
| Würth Electronics | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 4,500 | N/A | £0 | 63% | 50 | 1,500+ | Y |
| Yageo | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 45,300 | N/A | £0 | 99% | 50 | 1,500+ | Y |
| YAGEO CORPORATION | Digi-Key | 0800 587 0991 | digikey.co.uk | Y | 141,986 | N/A | £0 | 83.67% | 150 | 3,400 | Y |
| POWER & BATTERIES | | | | | | | | | | | |
| Bel Power Solutions | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 1,400 | N/A | £0 | 94.00% | 50 | 1,500+ | Y |
| Cincon | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 5,500 | N/A | £0 | 60% | 50 | 1,500+ | Y |
| Cosel | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 11,800 | N/A | £0 | 99% | 50 | 1,500+ | Y |
| CUI Inc. | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 3,900 | N/A | £0 | 100% | 50 | 1,500+ | Y |
| FRIWO Gerätebau GmbH | Haredata Electronics | 01423 796240 | www.haredata.co.uk | Y | 250 - 500 | €1M | £250 | 100% | 7 | 14 | Y |
| Mean Well | Ecopac (UK) Power Ltd | 01844 204420 | www.ecopacpower.co.uk | Y | 6,000 | £2M | £0 | 100% | 8 | 30 | Y |
| Mean Well | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 4,500 | N/A | £0 | 75% | 50 | 1,500+ | Y |
| Murata | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 5,200 | N/A | £0 | 93% | 50 | 1,500+ | Y |
| RECOM | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 23,300 | N/A | £0 | 92% | 50 | 1,500+ | Y |
| Schaffner | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 900 | N/A | £0 | 98% | 50 | 1,500+ | Y |
| SL Power | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 2,100 | N/A | £0 | 87% | 50 | 1,500+ | Y |
| TDK-Lambda | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 4,600 | N/A | £0 | 99% | 50 | 1,500+ | Y |
| TRACO Power | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 3,400 | N/A | £0 | 95% | 50 | 1,500+ | Y |
| SENSORS | | | | | | | | | | | |
| All Sensors | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 2,300 | N/A | £0 | 70.00% | 50 | 1,500+ | Y |
| ams | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 400 | N/A | £0 | 77% | 50 | 1,500+ | Y |
| Analog Devices Inc. | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 500 | N/A | £0 | 78% | 50 | 1,500+ | Y |
| Bosch | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 100 | N/A | £0 | 94.00% | 50 | 1,500+ | Y |
| Freescale Semiconductor | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 1,000 | N/A | £0 | 66% | 50 | 1,500+ | Y |
| Honeywell | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 15,500 | N/A | £0 | 80% | 50 | 1,500+ | Y |
| Maxim Integrated | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 900 | N/A | £0 | N/A | 50 | 1,500+ | Y |
| Melexis | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 700 | N/A | £0 | N/A | 50 | 1,500+ | Y |
| Omron | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 5,700 | N/A | £0 | N/A | 50 | 1,500+ | Y |
| Sensirion | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 100 | N/A | £0 | N/A | 50 | 1,500+ | Y |
| TE Connectivity | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 1,100 | N/A | £0 | N/A | 50 | 1,500+ | Y |
| SWITCHES & KEYBOARDS (continued on next page) | | | | | | | | | | | |
| ALPS | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 400 | N/A | £0 | 70.00% | 50 | 1,500+ | Y |
| Apem | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 700 | N/A | £0 | 96% | 50 | 1,500+ | Y |
| C&K Components | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 1,500 | N/A | £0 | 84% | 50 | 1,500+ | Y |
| Carlting Technologies | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 300 | N/A | £0 | 87% | 50 | 1,500+ | Y |
| CHERRY | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 200 | N/A | £0 | 77% | 50 | 1,500+ | Y |



Over 12,000 unique
Maxim products in Stock

Buyers' Guide

| Manufacturer | Distributor | Telephone | Website | Franchised Distributor | No. of Lines for Principle | Stock Value for Principle | Minimum Order Value | % Lead Free for Principle Range | No. of Technical Support Staff | Total No. of Staff | Buffer Stock Facility |
|-----------------|--------------------|---------------------|------------------|------------------------|----------------------------|---------------------------|---------------------|---------------------------------|--------------------------------|--------------------|-----------------------|
| EAO Ltd | EAO Ltd | 01444 236000 | www.eao.co.uk | N | 5,000 | £500,000 | £150 | 100% | 6 | 22 | Y |
| E-Switch | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 700 | N/A | £0 | 94% | 50 | 1,500+ | Y |
| Grayhill | EAO Ltd | 01444 236000 | www.eao.co.uk | Y | 2,300 | £150,000 | £150 | 99% | 6 | 22 | Y |
| Grayhill | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 400 | N/A | £0 | 84.00% | 50 | 1,500+ | Y |
| Honeywell | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 700 | N/A | £0 | 98% | 50 | 1,500+ | Y |
| NKK Switches | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 1,100 | N/A | £0 | 94% | 50 | 1,500+ | Y |
| Omron | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 900 | N/A | £0 | 68% | 50 | 1,500+ | Y |
| TE Connectivity | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | 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

| | | | | | | | | | | | |
|--|---------------------------|---------------------|----------------------------|---|-------|-------------|------|--------|-----|--------|---|
| 3m / Laird / Henkel / Brightview / Luminix / Universal Science | Materials direct 247 | 01908 222211 | www.materialsdirect247.com | Y | N/A | N/A | N/A | N/A | N/A | N/A | Y |
| ADDA | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 800 | N/A | £0 | 59.00% | 50 | 1,500+ | Y |
| Delta Electronics | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 500 | N/A | £0 | 28% | 50 | 1,500+ | Y |
| ebm-papst | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 2,200 | N/A | £0 | 99% | 50 | 1,500+ | Y |
| Sanyo Denki | EAO Ltd | 01444 236000 | www.eao.co.uk | Y | 300 | £150,000 | £150 | 99% | 6 | 22 | Y |
| Sanyo Denki | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 2,900 | N/A | £0 | N/A | 50 | 1,500+ | Y |
| Sunon | Thermaco Ltd | 01684 566163 | www.thermaco.co.uk | Y | 3,500 | £230,000 | £100 | 100% | 6 | 12 | Y |
| Sunon | G.English Electronics Ltd | 0208 855 0991 | www.gelec.co.uk | Y | 3,500 | £1,000,000+ | £0 | 100% | 10 | 28 | Y |

TRANSFORMERS & INDUCTORS

| | | | | | | | | | | | |
|---------------|---------------|---------------------|------------------------|---|-----|-----|------|-----|---|----|---|
| Best Windings | Best Windings | 0044 (0)1394 448424 | www.bestwindings.co.uk | N | 300 | N/A | £100 | N/A | 2 | 14 | Y |
|---------------|---------------|---------------------|------------------------|---|-----|-----|------|-----|---|----|---|

WIRELESS SOLUTIONS

| | | | | | | | | | | | |
|-----------------------|--------------------|---------------------|------------------|---|-----|-----|----|--------|----|--------|---|
| Anaren | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 100 | N/A | £0 | 86.00% | 50 | 1,500+ | Y |
| B&B Electronics | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 100 | N/A | £0 | 87% | 50 | 1,500+ | Y |
| Bluegiga Technologies | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 100 | N/A | £0 | 93.00% | 50 | 1,500+ | Y |
| Digi International | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 200 | N/A | £0 | 92% | 50 | 1,500+ | Y |
| Laird Technologies | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 100 | N/A | £0 | 76% | 50 | 1,500+ | Y |
| Linx Technologies | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 100 | N/A | £0 | 99% | 50 | 1,500+ | Y |
| Microchip | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 100 | N/A | £0 | 85% | 50 | 1,500+ | Y |
| Murata | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 100 | N/A | £0 | 100% | 50 | 1,500+ | Y |
| Panasonic | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 100 | N/A | £0 | 91% | 50 | 1,500+ | Y |
| Redpine Signals | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 100 | N/A | £0 | 94% | 50 | 1,500+ | Y |
| RF Digital | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 100 | N/A | £0 | 100% | 50 | 1,500+ | Y |
| Texas Instruments | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 100 | N/A | £0 | 75% | 50 | 1,500+ | Y |
| Wi2Wi | Mouser Electronics | 0044 (0)1494-467490 | www.mouser.co.uk | Y | 100 | N/A | £0 | 36% | 50 | 1,500+ | Y |

SIMPLICITY.

The way Subcontract Manufacturing should be.

www.anrltd.com

ANR Manufacturing Ltd.
Unit 1, Jacksons Industrial Estate, Wessex Road,
Bourne End, Buckinghamshire SL8 5DT
T: +44 (0)1628 819157
E: sales@anrltd.com



PCB Assemblies



Cable Assemblies



Box Build



Milling



Turning



5-Axis Machining



PCB Buyers' Guide

| Manufacturer | Telephone | Website | Service Provided (ie. Board Manufacture &/or Repair) | Location | Approvals | Volume Small, Medium, Large | Double-sided | Multi-layer 4-10/10-20-30 | Metal PCBs | Flexi / Flexi-Rigid | Obsolescence Solutions | Modifications | Prototyping |
|-------------------------------|-------------------|------------------------------|--|---------------------|--|--------------------------------|--------------|------------------------------|------------|---------------------|------------------------|---------------|-------------|
| Cambridge Circuit Company Ltd | 01223 423100 | www.cambridge-circuit.co.uk | M | SE | ISO9001:2008, UL | SML | Y | 4-16 | Y | Y | Y | Y | Y |
| Cleveland Circuits Ltd | 01287 651991 | www.pcb.co.uk | M | NE | ISO9001:2008 UL | SML | Y | 4-30 | Y | N | Y | Y | Y |
| CS Electronics (UK) Ltd | 0116 242 4058 | www.cs-electronic-pcb.co.uk | B | M | UL, ISO 9001, TS16949 | SML | Y | 4-32 | Y | Y | Y | Y | Y |
| Daleba Electronics Ltd | +44(0)1992 510000 | www.daleba.co.uk | B/M | SE | ISO9001:2008, TS, UL | SML | Y | 4-30 | Y | Y | Y | Y | Y |
| GSPK Circuits Ltd | +44(0)1423 321100 | www.gspkcircuits.ltd.uk | M/R | UK, Europe, Asia | BSEN, ISO9001:2008, TS16949:2009, UL, CECC release, Queens Award | SML | Y | 4-16 | Y | Y | Y | Y | Y |
| LEF Circuits | 0116 2891122 | www.lefcircuits.co.uk | M/R | M | ISO 9001:2008, UL | SML | Y | 4-30 | Y | F/R | Y | Y | Y |
| Photronix Group | 01903 231901 | www.photronix.co.uk | B | SE | ISO9001:2008, ISO14001:2004, AS9100-B, NADCAP, TS16949:2002 | SML | Y | 4-58 | Y | F, F/R | Y | Y | Y |
| Prestwick Circuits GPS Ltd | 01294 224631 | www.prestwickgps.com | B | UK, Portugal, China | ISO 9001, ISO-TS16949, AS9100, IPC610 Class I/III, UL | SML | Y | 4-48 | Y | Y | 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 |
| Techbridge Circuits | 0207 993 6503 | www.techbridgecircuits.co.uk | M Rep. | UK Europe | UL, TS16949(2009), ISO14001(2004), ISO9001(2008) | SML | Y | 4-16 | Y | N | Y | Y | Y |

Contract Manufacturers Buyers' Guide

| Manufacturer | Telephone | Website | Turnover | Location | Employees | Number of Surface Mount Lines | Approvals | BGA Capacity | Lead Free Manufacturer | Prototyping | Design Capability | Full Turnkey | Cables and Harnessing |
|-----------------------------------|--------------------|-------------------------------|----------|-----------------------|-----------|-------------------------------|---|--------------|------------------------|-------------|-------------------|--------------|-----------------------|
| AWS Electronics Group | 01782 753200 | www.awselectronicsgroup.com | £40m | UK & Slovakia | 430 | 11 | AS9100, ISO9001, 13485, 14001, TS16949, IPC-A-610 Class 3, NADCAP | Y | Y | Y | Y | Y | Y |
| Axiom Manuf. Services | 01495 242130 | www.axiom-ms.com | £40m | SW | 300 | 3 | ISO9001, AS9100, ISO13485, ISO14001, SC21, IPC610E, BSI Kitemark, NADCAP, ISO27001 | Y | Y | Y | Y | Y | Y |
| Briton EMS Ltd (OSI Electronics) | 01234 266300 | www.britonems.co.uk | £12m | Bedford & Singapore | 100 | 3 | ISO: 9001, 13485, 14001, AS9100, BSI Kitemark IPC610 | Y | Y | Y | Y | Y | Y |
| Challenger Solutions Ltd | 01245 325252 | www.challengersolutions.com | £5M | Essex/SE | 55 | 7 | ISO 9001, 14001, UL, IPC-610, SC21 | Y | Y | Y | Y | Y | Y |
| Cleveland Circuits Ltd | 01287 651991 | www.pcb.co.uk | £3.7m | NE | 60 | 2 | ISO9001:2008 UL | Y | Y | Y | Y | Y | Y |
| Contract Production Limited | 01751 475950 | www.contract-production.co.uk | £1.9m | North Yorkshire | 20 | 2 | ISO9001:2008, IPC-A-610 Class 3 | Y | Y | Y | Y | Y | Y |
| Corintech Ltd | +44 (0)1425 655655 | www.corintech.com | £7.5m | UK | 72 | 3 | AS9100, ISO9001, IPC-A-610 Class 3 | Y | Y | Y | Y | Y | Y |
| CT Production Ltd | 01202 687633 | www.ctproduction.co.uk | £4.5m | Poole, Dorset | 55 | 3 | ISO9001:2015, AS9100, SC21 Bronze Award | Y | Y | Y | Y | Y | Y |
| Custom Interconnect Ltd | 01264 321321 | www.cil-uk.co.uk | £14m | Andover (Hampshire) | 130 | 6 | ISO 9000, IPC610, ISO 13485 | Y | Y | Y | Y | Y | Y |
| DJ Assembly | 01904 436 456 | www.djassembly.com | £1.25m | North Yorkshire | 15 | 2 | ISO9001:2008, IPC-A-610 Class 3 | Y | Y | Y | Y | Y | Y |
| Dynamic EMS Ltd | 01383 822911 | www.dynamic-ems.com | £9m | Scotland | 94 | 3 | ATEX, ISO9001:2015, OHSAS18001, IPC-610-F class 3, ISO14001, UL | Y | Y | Y | Y | Y | Y |
| Electronic Technician Ltd | 01202 897722 | www.etuk.co.uk | £3.5m | SE | 55 | 2 | AS9100, ISO9001, ISO14001, IPC610/620 Class 3 | Y | Y | Y | Y | Y | Y |
| Elite Electronic Systems Ltd | 028 6632 7172 | www.elitees.com | £17m | UK | 160 | 5 | ISO9001, ISO13485, UL, IPC610/620 | Y | Y | Y | Y | Y | Y |
| Esprit Electronics Ltd | 02380 455411 | www.espritelectronics.com | £9m | S/Malaysia | 80 | 4 | ISO9001:2008, IPC610 to Class 3 | Y | Y | Y | Y | Y | Y |
| Exception-Fabrinet | 01249 814081 | www.exceptiongroup.com | £21m | UK/Thailand/US | 210 | 5/31/2 | AS9100/NADCAP/EN13485/OHSAS18001/14001/9001/TS16949/FDA/ATEX | Y | Y | Y | Y | Y | Y |
| FermionX Ltd | +44(0)1903 524600 | www.fermionx.com | £5M | Worthing, W. Sussex | 40 | 4 | ISO9001:2008, ISO14001 | Y | Y | Y | Y | Y | Y |
| G&B Electronic Designs Ltd | 01420 474188 | www.gandbelectronics.co.uk | £4.2m | Hampshire | 60 | 2 | ISO9001, ISO13485, IPC-A-610, IPC-J-STD-001, IPC 7711/7721, BS EN 61340-5-1/2 (ESD) | 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 798294 | www.iconelectronics.co.uk | £6.5m | Hampshire & Yorkshire | 70 | 6 | AS9100, ISO9001, BS EN ISO/IEC 80079-34:2011 ATEX, IPC-A-610 Class3 | Y | Y | Y | Y | Y | Y |
| Industrial Electronic Wiring Ltd. | +44(0)1793 694033 | www.iwew.co.uk | £4.5 m | Swindon, UK | 60 | N/A | ISO9001:2008, IPC610, IPC620 | N | Y | Y | N | Y | Y |
| Jaltek | 01582578170 | jaltek.com | £750 | UK | 80 | 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 |
| JJS Manufacturing | 01455 555500 | www.jjsmanufacturing.com | £23m | M/CZ Republic | 270 | 3 | ISO9001:2008 and IPC610 to Class 3 | Y | Y | Y | Y | Y | Y |
| Nemco Limited | 01438 346600 | www.nemco.co.uk | £11.25m | SE | 120 | 6 | AS9100, ISO9001:2008, IPC610/620 to Class 3, ISO14001-2004, SC21 | Y | Y | Y | Y | Y | Y |
| NOTE | 01453 797580 | www.note.eu | £100m | UK/EU/China | 1,000 | 14 | ISO9001, 13485, 14001, 18001, IPC-610 Class 3 | Y | Y | Y | Y | Y | Y |
| M-TEK (Assembly) Ltd | 01189 455377 | www.mtek.co.uk | £2.4m | SE | 30 | 4 | ISO9001:2008, IPC-A-610 Class 3, WHMA-620/ISO14001-2004/IPC-7711/7721 | 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 | UKAS ISO9001:2008, IPC-A-610 | Y | Y | Y | Y | Y | Y |
| Season Electronics Limited | 02392 452222 | www.seasongroup.com | £5m/£95m | Havant/Global | 65/1800 | 2/18 | (AS9100 & ISO9001 in UK) (TS16949 & ISO13485 at sister sites) | Y | Y | Y | Y | Y | Y |
| Sedgewall | 01582 475555 | sedgewall.com | £12 M | Bdefordshire | 25 | 2 | | Y | Y | Y | Y | Y | Y |
| Simtek EMS Ltd | 01843 233120 | www.simtekems.co.uk | £4m | SE | 50 | 3 | ISO9001:2008, ISO13485, IPC-A-610 Class 3 & IPC-7711 | Y | Y | Y | Y | Y | Y |
| Speedboard Assembly Services | 01753 746700 | www.speedboard.co.uk | £12.5M | Windsor, SE | 99 | 4 | ISO9001:2008, IPC610 to Class 3, ISO9001:2015 | Y | Y | Y | N | Y | Y |
| Tenkay Electronics Ltd | 01903 855455 | www.tenkay.co.uk | £4.1m | West Sussex | 50 | 1 | ISO 9001:2008, ISO 14001:2004, OHSAS 18001:2007 | N | Y | N | N | Y | Y |
| TEXCEL TECHNOLOGY PLC | +44(0)1322621700 | www.texceltechnology.com | £12m | SE | 105 | 7 | ISO9001, ISO14001, IPC610 Class 3, | Y | Y | Y | Y | Y | Y |
| Tioga Limited | 01332 360884 | www.tioga.co.uk | £15m | Derby | 110 | 6 | ISO 9001:2015, ISO 13485:2016, IPC 610, IPC 7711/7721 | Y | Y | Y | Y | Y | Y |
| Trojan Electronics Limited | 01792 469020 | www.trojanelectronics.co.uk | £2m | South Wales | 20 | 2 | BS EN ISO 9001:2008, ISO 14001 2007 | Y | Y | Y | Y | Y | Y |
| Wilson Process Systems | 01424 722222 | www.wps.co.uk | £12m | SE | 100 | 4 | ISO9001:2008, IPC-A-610 Class 3 | Y | Y | Y | Y | Y | 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



Farnell

element14

INDUSTRIAL AUTOMATION and CONTROL

Huge selection of products
& solutions for your manufacturing
facility from the world's most
trusted brands.

Electronics Components,
Solutions & Support

uk.farnell.com/industrial-automation-control

45th
ANNIVERSARY
1972 – 2017



Thank you for being part of our journey

anglia

www.anglia.com

anglia
sigma
VENDOR RATING DASHBOARD

www.anglia-live.com/sigma

anglia **80/20**
INTELLIGENT VMI SOFTWARE

8020.anglia.com

anglia **live**

www.anglia-live.com