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On the cover – January 2018

page 36

Contents

04

News

Ordering intelligent touch

09

Distributor and Supplier Focus

Reliable automotive fuses

16

What's New

Capacitance meets industrial demand

78

Semiconductor Market Watch

European semiconductor market grows

92

Buyers' Guide

All the facts and figures to help you buy

Contact

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Editor's Word



Getting 2018 right

At this time of year magazine editors often take it upon themselves to predict the future, myself included. I don't relish the task for the simple reason that, over my life, I have managed to fail to predict some significant events and trends. For example, I didn't spot people's surging demand for charm bracelets. Likewise, I missed the rapid growth in ice-cream parlours. However, my biggest oversight was people's willingness to share their innermost secrets with the world's population via social media.

On the upside, I did see some potential for the internet when I witnessed my first page of hyper text mark-up language. More recently, I backed the idea of computerised ordering and table service in fast food restaurants and, wow, did I get that one right.

Closer to home, I'm guessing you are wondering what my predictions for the electronics industry in 2018 might be. Well it's simple. Everyone I've talked to over recent months has told me that, basically, the industry has never had it better, which is driving growing demand.

So 2018 will be the year of: device manufacturers who invested in production capacity; distributors who invested in inventory; and purchasers who invested in developing long-term supply chain relationships.

Thus, my prediction is simple. There is a real danger that purchasers (who chop and change suppliers; who themselves 'list' rather than 'stock'; brands which are produced in facilities with limited capacity) will end up waiting a long time for parts that were once on tap.

Jon Barrett

View current editions online

www.electronics-sourcing.co.uk



Ordering intelligent touch

Digi-Key Electronics can now offer Neonode zForce Air Touch Sensors for worldwide shipment. Said to provide advantages over traditional touch technologies, the sensors enable touch interaction on any type of display or surface, making it easy to add interactivity to products with, or without, displays.

Based on laser light technology, the sensors boast high scanning frequency, low latency and good touch accuracy, without the need for calibration. Touch functionality also requires no glass or plastic film overlay, resulting in optical transparency with consistent image quality and no disturbing glare.

Chief executive officer at Neonode, Thomas Ericsson, said: "Digi-Key is a perfect fit for Neonode's expansion from our traditional strongholds in printers, e-readers and automotive into a variety of new business segments. Together we will service the global engineering community with technology that opens up exciting possibilities for interaction." www.digikkey.com

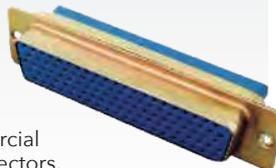
Adding value in tough environments

PEI-Genesis is now the exclusive authorised value-add partner for Amphenol PCD's MIL-spec and commercial qualified D-Sub connectors.

Ideal for applications where space and weight are constrained, the connectors feature polarized shells and pin and socket machined contacts.

Buyers utilising the value-add service have access to a range of options, including hundreds of MIL-spec and commercial shell and insert combinations, RoHS compliant platings and a variety of shell sizes and contact layouts. Options are available with and without contacts and tooling. The resulting connectors can be shipped globally, with no minimum order quantity.

www.peigenesis.com



Fuse holders win fire safety approval

CamdenBoss has announced that its CFTBN fuse holders have been approved by VDE according to the latest EN 60127-6 fire safety standard, which came into force in October 2017.

The new standard pays more attention to fire safety than the original 1994 IEC standard. It requires components to pass a stringent glow-wire test with an increase required to the glow-wire resistance of the product material. Also, components must now be endurance-tested both vertically and horizontally.

Managing director at CamdenBoss, Nicola Kay, said: "We are proud to have achieved the new fire safety standard for our CFTBN range, which passed with flying colours. The new standard is difficult for manufacturers to achieve, with many having to replace materials throughout their ranges and others still struggling to achieve compliance." www.camdenboss.com

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Advertisers Index

- 4E-Futures**
32
- Advanced Rework Technology Ltd**
14
- Alpha 3 Manufacturing Limited**
33
- America II Europe**
13
- Anglia**
BC
- Avant Electronics**
71
- Best Windings**
98
- Binder**
10
- Camdenboss**
14
- CML**
65
- Components Bureau**
9
- Comus Europe Ltd**
49
- Corintech**
45
- Digi-Key Electronics**
1FC, 90 & 91
- Display Solutions Ltd**
61
- Dynamic EMS**
48
- EECO Switch**
15
- Embedded World**
81
- Esprit**
44
- Euroquartz Ltd**
97
- FC Lane Electronics**
11
- FermionX Ltd**
17
- Fischer Connectors**
41
- Foremost Electronics Ltd**
83
- Forge Europa**
37
- G. English Electronics Ltd**
62
- Gateway**
53, 54, 55 & 56
- GTK UK Ltd**
75 & 77
- Intelliconnect**
28

(continued on page 08)



EMS provider hits the accelerator

Dynamic EMS has revealed strategic plans to become an end-to-end supply chain partner focussed on accelerating customers' time-to-market by enhancing its scale, scope, and speed. The company aims to transition from a traditional EMS model to one that positions it as a supply chain and product solutions architect, from design to distribution.

Speaking about the changes, operations director, Peter Birrell, said: "As a complete solutions provider throughout the entire production lifecycle, from product realisation, through to product fulfilment, we will add real value to the overall product solution and experience."

In its bid to adapt to the market environment, Dynamic revealed some key industry drivers for both its established OEM and developmental OEM customers. All technology customers were keen to meet aggressive launch targets and to reduce supply chain risks by removing excess touchpoints that slow the process. They also required suppliers to flexibly scale in a responsive way.

Peter concluded: "Bearing these factors in mind, Dynamic has increased its focus on systems and solutions that accelerate OEM customers' time-to-results."

www.dynamic-ems.com

Getting real

The latest figures from the Electronic Component Supply Network confirm that manufacturers continue to experience solid growth in new orders, output and staffing levels. With input price inflation at a six-month high, however, material inventory lead-times continue to extend and supply networks are being stretched.

ECSN chairman, Adam Fletcher, commented: "Extended manufacturer lead-times for electronic components are likely to continue, certainly throughout 2018 and probably beyond. UK customers must continue to increase their order cover for electronic components to match lead-times in line with this new reality. Failing to do so is likely to lead to supply problems towards the end of the year and on into 2018."

www.ecsn-uk.org



Custom distributors on the shelf

Aerco can now supply Provertha's custom-specific M12 T and Y distributors, designed for Profibus and CANbus systems. Based on a modular T and Y distributor concept, these variants enable compact and secure solutions for fast connections.

Several options are available. The distributors can be delivered with or without grounding clips, and where IP67 protection is required, options include moulded distributors in robust metal housings.

The fully shielded Profibus distributors are designed for applications with special electromagnetic compatibility requirements and challenging environments. Versions with two fixing holes are available for wall mounting, while for direct connection to the Profibus/CANbus M12 interface, devices with a rotating M12 nut are the ideal solution.

www.aerco.co.uk



Memories of the future

Simms International is now distributing the Intel Enterprise SSD range in its role as an Intel memory and storage specialist. These rugged SSDs have no moving parts, making them ideal for applications that require speed and reliability. Intel's Optane memory also claims to bridge the gap between DRAM and storage in the high-performance computing market.

With a range of capacities up to 8TB, multiple form factors and interfacing with SATA III and PCIe NVMe, the new SSDs could help managed service providers, value added resellers and system integrators reduce costs and improve efficiencies for their customers.

Chief sales officer, Kevin Howse, explained: "Data centres will be a key focus for us. It's a sector with a clear challenge to future-proof enterprise infrastructure with extraordinary performance and reliability; Intel's range meets and exceeds that requirement. There is also clear potential for us to develop consumer, professional and embedded opportunities."

www.simms.co.uk

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Advertisers Index

(continued)

IS Rayfast

25

Jaltek

18

Jauch Quartz UK Ltd

63

Just Electronics Ltd

15

Kemtron

81

Lacon Electronics

23

Legacy Distribution Limited

19

LP Elektronik Ltd

38

M-TEK

39

Metway

18

Microchip

7

Micronel

46

Mouser Electronics

FC, 5, 34, 35, 78, 79, 92, 93, 94, 95 & 96

NCAB

50 & 51

ODU

40

OKW Enclosures Ltd

21

Olson Electronics Ltd

IBC

Protronix EMS

22

Rapid

31

Rebound Electronics

72 & 73

Retronix

27

Review Display Systems (RDS)

18

Rhpoint Components

64

RS

16

Season Group

84

Simms

24

Simtek EMS Ltd

43

Solid State Supplies

47

Southern Manufacturing

74

Staubli

57

Tate Circuits

66

Telegartner

76

Trizo Ltd

69

Trojan

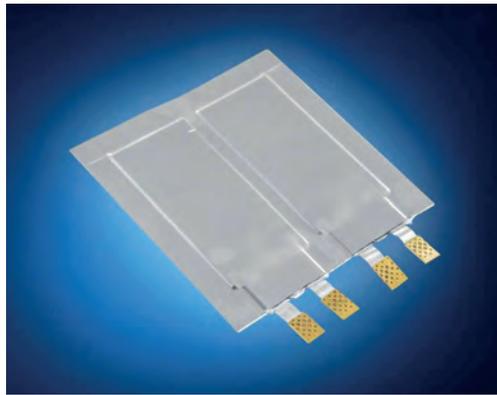
29 & 49

TTI Europe

67

Wilson Process Systems (WPS)

59



Supercapacitor ready to ship

Mouser Electronics is now stocking the DMH series supercapacitor from Murata. Featuring an ultra-thin profile of 0.4mm, the DMH series is designed for peak power assist in wearables, medical patches, e-paper devices, smart cards and other space-constrained mobile devices.

Capable of delivering high power with a low equivalent series resistance of 300 milliohms at 1kHz, the capacitor is also said to provide a high peak voltage of 4.5V and exhibits stable output characteristics over an operating temperature range of -40 to 85°C.

The DMH series supercapacitor boasts more than 100 times the energy storage of ceramic capacitors and electrolytic capacitors with a longer work life than ordinary secondary batteries. This makes it ideal for peak power assist in small electronics, to increase output and power stability. It can also be used for high-power backup and energy-harvesting applications.

www.mouser.com



Rapid delivery on any part number

TTI is offering Amphenol Socapex' new 38999 reduced flange connector for space-constrained aviation and defence applications. According to TTI, its value-added services capability enables each possible part number from this series to be built with a 48-hour lead time.

The reduced flange 38999 receptacle is designed for harsh environments where small dimensions and low weight are critical. It is said to provide a 41 per cent average footprint surface reduction and is 20 per cent lighter than a standard MIL-DTL-38999 III connector, with identical technical and electrical characteristics, as well as resistance to corrosion, shock and vibration.

Available in crimp, PC tail and stand-off versions, the components offer the same inserts and are pin and plug compatible with 38999 series III standard connectors.

www.ttieurope.com



Pre-assembled panels simplify procurement

Cliff Electronics can now supply up to 16 of its Feedthrough connectors pre-assembled into a 1U, 19in rack panel to simplify system assembly, reduce manufacturing time, component count and cost.

Each panel features sixteen 24mm holes designed to accept the XLR format Cliff FT connectors with options for threaded mounting bushes. A connector labelling strip is located on the front and a cable strain relief bar is fitted at the rear. The 1U assemblies can be factory loaded with the required connectors including BNC, single or dual USB or RJ45. Internal cable harnesses are also available as a special order.

Applications will include broadcast and AV patch panels as well as military, medical and control and instrumentation signal input/output panels.

Managing director of Cliff Electronics, John Hall, commented: "Customers are asking us to provide pre-assembled panels to simplify their procurement and system building. Our pre-loaded Feedthrough connector panels allow customers to order a single assembly to meet their connectivity requirements instead of having to order large numbers of components, fabricating a rack panel and assembling it." www.cliffuk.co.uk



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Automotive-grade fuses deliver on reliability

Components Bureau's latest AEC-Q200 qualified surface-mount fuses are designed specifically for reliable operation in high-stress automotive applications

Manufactured by AEM in its TS16949-certified facility, wire-in-air AirMatrix QA and solid body SolidMatrix QF fuses offer reliable performance in applications ranging from engine controls and battery-management to infotainment and communications systems.

Features of the QA series include high current ratings up to 20A, 250V, while its hermetically-sealed wire-in-air structure helps ensure consistent electrical

performance. QF solid-body fuses, meanwhile, feature an anti-sulphur end-cap construction and provide mechanical and thermal stability over a temperature range of -55 to 150°C.

To further support reliability, the fusible element in the QA series is uniformly straight across the internal cavity and bonded externally to the endcap through the plating process. This differs from the traditional approach, which uses solder beads inside a

ceramic tube to bond the fusible link, resulting in non-uniform performance and potential internal connection failure.

General manager at Components Bureau, Andrew Ferrier, explained: "Under high-stress conditions, the solder can vaporise, causing prolonged arcing that can lead to package failure and damage to the circuit board and surrounding components. In comparison, the new automotive-grade fuses



Automotive-grade fuses enhance reliability in harsh environments

enhance reliability in harsh environments by eliminating the solder joint."

www.componentsbureau.com

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Data transmission gets a boost

Binder has enhanced its range of M12 x-coded connectors designed to push data transmission limits with new panel mount options and connecting cables

Three new female panel mount versions have been added to Binder's growing range of eight-pole, M12 x-coded connectors, along with the introduction of male to female connecting cables.

The female panel mount versions include a right-angle PCB connector with dip-solder contacts, a female front-fastened connector pre-terminated on 0.5m of green Ethernet cable and a lead through female-female panel

adaptor for control cabinets. In addition, male to female PUR cables now include standard lengths of two, five and 10m, with special lengths available on request.

These new options complement existing versions, which offer data transmission of up to 10Gbit/s for applications in security, CCTV, or other applications using industrial Ethernet protocols such as Profinet.



Binder now provides more options for its M12 x-coded connector range

High bandwidth is achieved by isolating the four pairs of wires from one another with a cross or x-coding shield to separate the transmissions. This ensures that the Ethernet wiring will remain compatible with growing requirements to transmit high volumes of data. The x-coding conforms to the industry standard IEC 61076-2-109 and is specified for broadband transmission by Ethernet protocols including Profinet.

Further introductions are planned for 2018, including a series of x-coded female to RJ45 lead-through panel adaptors and a shieldable female cable connector with insulation displacement termination for easy field assembly. These developments will be supported by approvals for applications in the rail industry.

www.binder-connector.co.uk

Fast|lane



- M12 X-Coded 10 GB
- 8 Contacts
- Shielded metal housing
- IDT Connection
- Ethernet cable



Non-standard connectors delivered in days

Lane Electronics' inventory of piece parts and accessories ensures it can deliver non-standard 8D series/38999 connectors with a rapid turnaround

Many specifiers of 8D series/38999 compliant circular connectors require standard, off-the-shelf products delivered by return, however, some customers need a 'special' for their application and they too expect a quick turnaround.

To meet the needs of both customer types, Lane Electronics keeps a comprehensive inventory of standard 8D series/38999 connectors, as well as a vast selection of piece parts and accessories that can be assembled, tested and delivered on short lead times. For maximum application flexibility, the connectors and

accessories can be supplied in a variety of materials and finishes, all of which can be specified and purchased online.

Lane's 8D series/38999 connectors are manufactured by Souriau, for which Lane is a franchised assembling distributor. These high performance, high density threaded coupling circular connectors are available in a range of shell materials including aluminium, composite, marine bronze and stainless steel. They can be supplied in different finishes including RoHS compliant, black zinc nickel, nickel and olive-green

cadmium platings. Purchasers can also specify several contact types including signal, power, high power, coax, triax, quadrax or Elio fibre optic contacts.

To complete the solution, Lane offers a range of accessories from Weald Electronics. These include LMD protective caps, designed to perform to MIL-DTL-38999. Several styles of protective plug and receptacle are available in shell sizes nine to 25. All are machined from solid material and can be supplied in a choice of finishes.

www.fclane.com

8D series/38999 connectors and accessories can be supplied in a variety of materials and finishes



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Bringing value to the supply chain

With a history of expansion, America II has widened its reach around the globe, as well as extending its stock profile, to ensure purchasers can access the supply chain solutions they require

With more than four billion components in stock, America II claims a position as one of the world's largest distributors of semiconductors and electronic components. Through franchise and direct distribution lines, this global distributor serves as a primary partner for both its original equipment manufacturer and electronics manufacturing services customers.

The company achieves this from its Florida headquarters, with offices in the UK, Germany, China, Japan, Singapore and Mexico. Not only this, it also provides value-added services and inventory solutions from its ISO 9001:2008 and ESD-certified 300,000ft² distribution facility.

An eye on expansion

With a dream of establishing a successful distributorship in the integrated circuit market, Mike Galinski founded America II Electronics in 1989. Since that time, the company has grown from its St. Petersburg, Florida roots into a globally successful distributor of electronic components.

Interestingly, America II had an eye on expansion from the start. In 1994, it opened its UK operation, America II

Europe. With a presence on two continents, Asia soon became the next logical stop on the America II expansion list. In the year 2000, America II opened its Mexico office and the Yokohama location in Japan jumpstarted the company's Eastern expansion. Offices followed in Singapore in 2004 and China in 2011. In the midst of this Asian expansion, America II also broadened its stake in Europe with the founding of a Germany location in the year 2002.

A complete offering

America II stocks more than four billion components, valued at \$1 billion USD. It offers a complete range of products, from active, passive and electromechanical components to memory and speciality products.

As a global distributor, America II stocks and distributes many types of semiconductors and electronic components, including: batteries, cable assemblies, capacitors, crystal oscillators, diodes, filters, FPGAs, fuses and circuit breakers, inductors and coils. It also offers LEDs, memory, microcontrollers, microprocessors, power supplies, resistors, switches and relays, thermistors, transistors, transformers and voltage regulators.

In tandem with this comprehensive line-up, America II's objective is to bring value to its customers' supply chain. As a result, it has developed a line card that includes products and manufacturers that customers can depend on.

In addition, America II can provide supply chain solutions, cost-saving and inventory solution programmes. With 165,000 unique part numbers available, America II offers many hard-to-find and allocated parts, as well as offering assurance of supply. Other services include electronic data interchange transaction programmes and price point variance programmes, as well as bonded and reserve inventory. Customers can also access vendor owned inventory programmes, spot buy orders and concurrent cost reduction programmes.

These services support customers in many industries ranging from telecommunications, industrial and lighting to healthcare, automotive and military. Experience in global markets allows America II to provide superior service and a broad array of solutions to customers around the world.

www.americaii.com



America II provides value-added services and inventory solutions from its ISO 9001:2008 and ESD-certified 300,000ft² distribution facility



America II stocks more than four billion components, valued at \$1 billion USD



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-  Acceptability of Printed Boards

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Distributor and Supplier Focus

Keep pace with industry updates

Two of the most widely used standards have been updated to keep pace with the ever-changing electronics industry. J-STD 001, which covers requirements for soldered electrical and electronic assemblies, and IPC-A-610, covering the acceptability of electronic assemblies, have now been released to revision G.



Training and certification materials were also released, allowing companies to transition swiftly to revision G for all training requirements.

Advanced Rework Technology master IPC trainer, Debbie Wade, is the vice-chair of the IPC product assurance committee that over sees the IPC acceptance documents and their

associated training programmes. She said: "I am proud of what the committees have achieved, especially as this is the first time we have released the updated training materials at the same time as the new document."

As a long running UK-based IPC authorised training centre, ART can provide both certified IPC trainer and certified IPC specialist level certification.

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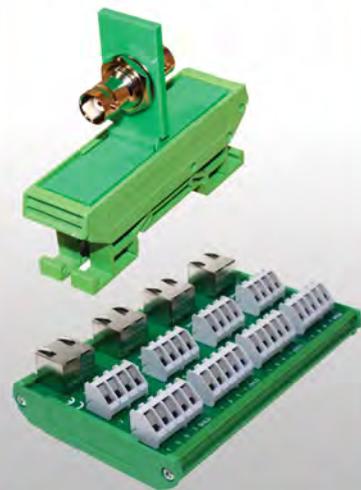


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Switches deliver a history of reliability

EECO switches and keypads are used in many industrial sectors including medical, communications, security and transport. Some of its thumbwheel switches are made to military specifications and, in fact, the company still gets orders for replacement switches to match those made in the 1970s and 1980s.



The company supplies switches made in the USA by EECO Switch of California, which has been making electro-mechanical switches since 1947. The keypads are made in Taiwan by a group associated factory, for which it is a UK agent.

www.eecoswitch.co.uk

Alongside its switch line-up, which includes thumbwheels, strip switches and micro-dips, EECO also supplies custom made elastomer keypads, switched membrane keypads and elastomeric connectors.

Cut out the hassle

Just Electronics began life to help manufacturing companies build the electronic and electro-mechanical elements of their design. Its focus is on small and medium batches, where going off-shore, or to a larger contract manufacturer, isn't appropriate.



Just Electronics aims to provide hassle-free product assembly

In the eight years since it opened, the company's portfolio has expanded from assembling PCBs, cables and electro-mechanical parts to include everything from prototypes to complete products, as well as shipping the resulting products all over the world.

As such, Just Electronics welcomes new customers with established products or those with prototypes that need assistance. Naturally, it is equally pleased that existing customers return with new products and

repeat orders. There are many reasons for this success, but according to Just Electronics, the most telling comes from one of its largest customers, which said: "I just want to place an order and get my product with no hassle!"

www.justelex.com

EECO

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Membrane Switches are a self contained printed keyboard which offers low cost and high reliability. They are custom designed, thin and flexible. They are available with tactile/non tactile feedback, surface embossing, backlit legends, silver or carbon tracking and RFI or EMC shielding if required.

Elastomeric connectors made from silicon rubber offer an economic and reliable solderless connection. They are widely used on digital screens, home electrical goods and communication equipment.

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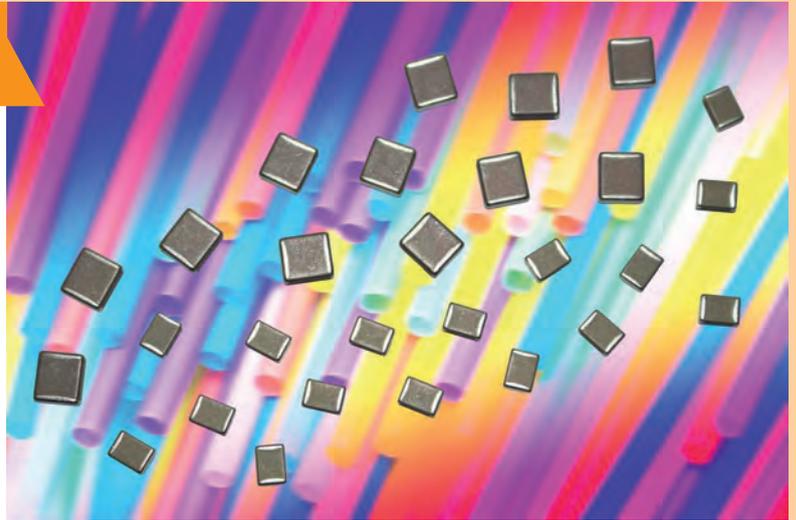
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Extended capacitance meets industrial demand

Knowles brand, Syfer, can now offer multilayer ceramic capacitors for non-safety critical industrial applications up to 500V AC, 50/60Hz continuous. In response to customer demand, Syfer has extended its non-safety critical solution for applications where extended capacitance values are required, up to 47nF.

The capacitors are suitable for use in 440 and 480V AC three-phase type industrial electronics applications where a 500V AC rating gives a comfortable margin. Initially, the launch range is 10nF maximum in case size 1812, extending to a maximum of 47nF in case size 2220. Other values will follow, but smaller case sizes will not, due to electro-mechanical issues with such high voltages. www.knowlescapacitors.com



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Tough displays withstand lower temperatures

Densitron has introduced a newly-expanded range of thin film transistor displays for use in exceptional temperatures. The new displays function from as low as -30 up to 85°C, making them ideal for harsh outdoor applications.

Available in a variety of size options, including 3.5, 4.3, 5.0, 7.0 and 10.1in, the displays boast wide viewing angles for all-round and handheld views. They are designed to be easy to read outdoors, even in sunlight, with sharp images and colours. For robust performance, the displays use in plane switching and multi-domain vertical alignment industrial grade glass. Consequently, they are available with a five-year long-term supply.

Global product manager TFT, Densitron. Luo Luo, said: "We expect strong interest, particularly from the automotive, power and security sectors, however, Densitron is renowned for customising displays for any industry. In the case of these wide temperature TFT displays, we can include bespoke lenses, projected capacitive touch and haptic touch, flexible printed circuit or backlight modifications and optical bonding for greater strength." www.densitron.com

Tailored services underpin growth

A customer centric, flexible approach to business prompted growth for electronics design and manufacturing service company, FermionX

Innovation, combined with excellent customer service, are key factors for growth, according to Sussex-based FermionX. This principle underlines the company's ethos as managing director, Dan Crothers, explained, saying: "It ensures we challenge ourselves and our supply chain to provide the best service offering."

Investment in manufacturing facilities, the introduction of electronics design capabilities and a new innovation centre have further enhanced the company's offering. This enables FermionX to provide a complete end-to-end solution, from product design

to electronics manufacturing and global distribution.

With over 35 years' experience, FermionX boasts an open and flexible approach to its manufacturing services, which combine technical expertise with commercial acumen. This collaborative approach gives customers an extension to their own manufacturing and design capabilities.

Accordingly, FermionX provides comprehensive services from rapid prototyping, surface mount and conventional assembly, through to conformal coating,

ATEX and UL manufacture and global distribution. With an emphasis on flexibility and accuracy, the company operates to high quality standards, supported by ISO 9001:2008, ISO 14001 certification and IPC-A-610 certification.

In addition to these services, FermionX also manufactures two of its own global product brands: Seward and Airbox Sampling Products. FermionX believes this helps it appreciate the importance of working with suppliers that are aligned with its own product strategy. The success of its design and manufacturing service



FermionX provides an end-to-end solution, from product design to electronics manufacturing

therefore lies in going beyond industry norms to support and cultivate the customer's product goals. Understanding customers' products, services and business needs, both today and in the future, underpins strong relationships.

www.fermionx.com

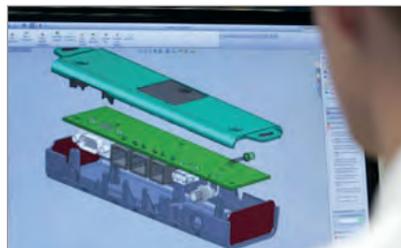


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Distributor and Supplier Focus

Get a handle on streamlined design

Purchasers can now order Metcase's Technomet instrument enclosures with, or without, carry handles for portable electronics applications. The tilt/swivel carry handle bar is said to be comfortable to hold and doubles as a desk stand which can be indexed in 30deg increments. The 150mm high desktop models also feature recessed side handles as standard.



wraparound top cover sliding over the chassis assembly.

Designed to replicate the aesthetics and ergonomics usually found only in moulded plastic enclosures, Technomet enclosures feature a diecast metal front and rear bezels that fit flush in the case body. Front and rear snap-on trims conceal the fixing screws for the front panel and case. Access to components is designed to be fast and easy, with Technomet's

Eight standard sizes are available, each with two options for installing PCBs: four M3 mounting pillars in the base for a single PCB; accessory snap-in anti-vibration guides for multiple slide-in PCBs.

www.metcase.co.uk

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Rely on resistor expertise

A comprehensive standard range, the ability to cross-reference many manufacturers' parts and access to custom component services, ensure Legacy Distribution can meet most resistor requirements



Thanks to his accumulated expertise, customers have named managing director, Brian Wiggins, Mr Resistor

Franchised distributor, Legacy Distribution, specialises in the supply of resistors, offering an extensive range suitable for numerous applications. Managing director, Brian Wiggins, has over 40 years' experience in the resistor market, bringing a wealth of knowledge, specifically in through-hole and surface mount component types. Thanks to this accumulated expertise, customers have given him the title of Mr Resistor.

Supported by this expert know-how, Legacy Distribution is focused on giving customers full support, from design-in through to main production, to ensure continuity throughout the

supply process. The company carries a comprehensive range of precision thin film, low-ohm current sensing, surge and pulse protection, high-voltage and high-power resistors in surface mount format, together with more traditional through-hole vitreous enamelled wirewound, metal glaze, metal film precision and current sensing types.

Buyers who need to find an equivalent should be aware that Legacy can cross reference most manufacturers' component types, generally on a shorter lead-time, and with the potential for cost savings. Those that require non-standard components should

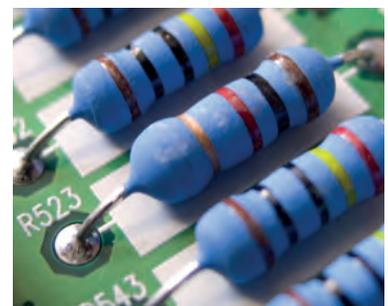
also take note, as Legacy has access to a diverse range of component manufacturers able to supply customised component types such as closer tolerance, improved temperature coefficient of resistance and alternative packaging.

In addition to these services, Legacy Distribution also carries interconnect components manufactured by Amtek, opto-electronics from Betlux, Suntan capacitors, Thinking circuit protection devices and fuse products from Vicfuse.

www.legacydistribution.co.uk



Legacy can cross reference most manufacturer's component types



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RESISTORS - SURFACE MOUNT

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- SMD Automotive AEC-Q200
- SMD Current sense
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Buyers benefit from digital efficiency

Digi-Key is utilising new digital technologies to enhance the service level it offers purchasing professionals, both today and in the future

With so much buzz around 'digital' it's important to define the initiative: for Digi-Key it means utilising innovative technologies to deliver a world class customer experience, as well as achieving higher levels of efficiency for customers and Digi-Key teams. It goes beyond a specific technology, platform, application programming interface or automated solution. Rather, digital is a new way of doing business, where everyone benefits by aligning business moments, or passing opportunities, with efficient methods to meet that need and exceed customer expectations.

Designing a digital platform Digi-Key has been a leader in the e-commerce aspect of digital for many years. Many of its processes and solutions are built around technologies that deliver an excellent customer experience, coupled with automation to keep delivery costs down and efficiencies high. As customers become accustomed to visual, voice, artificial intelligence and unified communication as methods to interact with technology, Digi-Key is working to ensure it designs a digital platform that best matches the expectations of

legacy customers and new customer needs.

It's important to deliver the best solutions for all customers who visit Digi-Key sites or work with technical and customer service people directly. The company therefore has a number of updates planned over the next 18 to 24 months, with the first expected by mid-2018.

Investing in API

The world is moving towards application programming interface technologies for efficient and direct business to business communications. Digi-Key aims to lead the industry by providing multiple API solutions today. These solutions are not prototypes; they are used by customers at all levels to get and provide the information required to receive the parts they need, utilizing the most efficient technology available. Digi-Key aims to have the documentation and support to help customers benefit via a real-world proven digital capability.

With growth on the horizon, Digi-Key is expanding its operation via a new product distribution centre. Here, the company will utilise new digital automation

technologies designed to guarantee a continued positive experience for customers. Interestingly, it is also working to integrate technologies for its website that will maintain the legacy experience for the tens of thousands of design engineers who feel they would like it to remain 'as-is', while simultaneously accommodating visitors who need more assistance and guidance to find what they need.

Embracing opportunity

Overall, Digi-Key is excited that digital is something customers are working to incorporate into their solutions to benefit their business. Having been involved in aspects of digital for many years, Digi-Key looks forward to helping customers achieve their digital goals by utilising the digital solutions it is working on today. The digital road is one of incredible opportunity and Digi-Key has many deliverables planned along the way that will benefit customers as it continues to build out its platform.

www.digikey.co.uk



Digi-Key is working to ensure it designs a digital platform that best matches customer expectations



'Digital' represents a new way of doing business

Connectors ensure uncompromised data

Bulgin claims its new M-series circular connectors will decrease downtime and increase production efficiency by providing reliable and uncompromised data, signal and power transmissions for industrial automation systems in harsh environments. Applications could include robotics, process control, medical, food and beverage processing and industrial networking.

Featuring an M-style threaded locking nut, the M-series offers a choice of industry standard interconnect solutions including: M5, M8, M12, M16 and M23 variants. With A, B and D coded variants available throughout the range, the connectors are ideal for actuator/sensor, fieldbus and Ethernet connections.

Options for this IP67-rated range include field installable connectors, receptacles and over moulded cable variants with PVC/PUR jackets. Electromagnetic interference shielded options are also available, in addition to plastic or metal housing materials, in either straight or right-angled configurations.



www.bulgin.com



Converters carry medical approval

Artesyn Embedded Technologies' new AEE15W-M and AEE20W-M series 15 and 20W DC/DC converters are designed to provide an economical solution in applications that require a certified supplementary or reinforced insulation system to comply with industrial or medical safety standards.

The reinforced insulation system, which is critical for medical equipment, is rated for 300V AC working voltage and 4,200V AC RMS input/output isolation. The modules are certified to the third edition UL/CSA/EN/IEC 60601-1 medical safety standard and are rated for two times means of patient protection. Mean time between failures is greater than one million hours.

Both series boast up to 89 per cent efficiency with an input voltage range from nine to 75V DC and three 2:1 input voltage ratings. The two families include regulated single output and dual output models. Additional features include low leakage current, which is required in medical applications, protection from overvoltage, and electromagnetic interference characteristics that meet EN 55022, class A and FCC level A.

www.artesyn.com



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Look beyond the assembly line

Original equipment manufacturers increasingly expect electronics manufacturing service providers to take more responsibility for projects, making it essential to look beyond simply finding an assembly line

With OEMs relying on their EMS provider to take more responsibility for projects, and their products in general, it is now more important than ever for OEM purchasers to look beyond finding an assembly line,

towards forming strategic partnerships.

Once trust has been established, Protronix EMS says customers often require much more than just manufacturing capability.

Vendor reduction has been the focus for many OEMs in recent years and Protronix is now required to design and source more than just board level material; injection moulding and sheet metal work are examples

of how Protronix' single order manufacturing service has been utilised.

Obsolescence monitoring and management provides another benefit. Customers receive advance warning when components reach end of life status, and with support, alternatives have been designed in to enable continuity of production and supply. There has also been a transition from ship to stock, with ship to site and distribution to end customers becoming more popular. This level of risk management is often an expectation and is something that Protronix EMS can handle with its experience and depth of supply chain.

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www.protronix.co.uk



With OEMs relying on their EMS provider to take more responsibility for projects, and their products in general, it is now more important than ever for OEM purchasers to look beyond finding an assembly line

It was another year of growth for Protronix in 2017 and further investment is planned for 2018, to ensure the company maintains its performance and capability. Protronix believes investing in processes to improve product reliability demonstrate the company's commitment to quality, a core strength that is also highlighted by its ISO9001 and IPC-A610 certification.

protronix.co.uk

Cable expertise can harness savings

Lacon boasts diverse experience in cable harnessing, providing German quality engineering at competitive pricing, thanks to its Romanian manufacturing facilities



Backed by specific expertise in mechatronics, the German Lacon Group has been providing electronics manufacturing services to the automotive, medical, energy, rail, robotics and machine building industries for over 30 years. From simple braided cable to complete system box build solutions, Lacon develops, optimises and manufactures prototypes as well as series production of between 10 and 100,000 units per year.

Harness skills

Expertise in cable harnesses is one of the main services offered, covering a wide spectrum, from stranded wires to cables, modules and system cabling. The company's motto highlights this knowledge when it says: 'there's never been a cable invented that Lacon can't handle.' Competitive pricing is a further advantage, strengthened by access to the company's Romanian volume manufacturing capabilities. This factory combines German operating and testing equipment with the manual work of more than 250 employees under German management.

In both its locations, Lacon designs, manufactures and inscribes flat or ribbon, round, coaxial and special cables, as well as motor and encoder cables according to relevant manufacturers standards. The company also provides an extensive portfolio of assembly services, from simple clamp connections to industrial cable harnesses.

Automated advantages

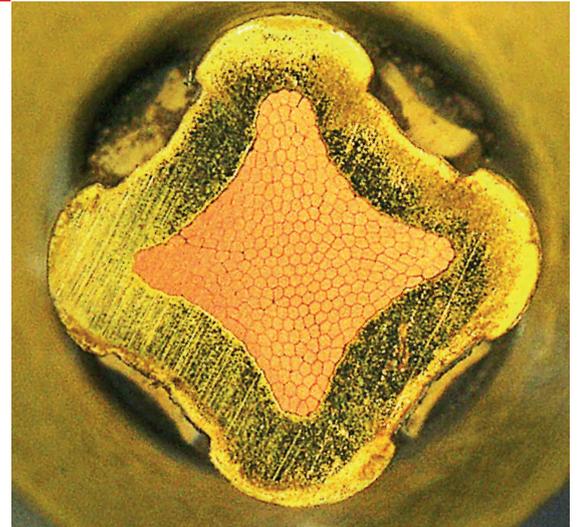
By investing in the latest technologies, Lacon brings added value for the high mix, middle-volume cable market, using automatic technology for ultrasonic welding, crimping, soldering, moulding and press-fit technology. Customers also benefit from over 600 quick-release tools for standard contacts designed for use with crimping machines, as well as an expert database for all crimp contacts. With the latest Komax alpha 356 machines, Lacon produces up to 5,000 welded or crimped braids per hour.

Component procurement is managed at group level through the facility in Germany. According to Lacon, this ensures customers benefit from German quality at Romanian cost factors, as well as from competitive purchasing prices. Lacon is certified to ISO 9001, ISO 14001, EN ISO 13485, ISO TS 16949, OHSAS 18001 and UL for cables and wires, being audited by references such as Knorr-Bremse, Thermo Fisher, TUV and Brainlab.

Encouraging new customers to test this philosophy of providing the best quality at affordable costs, Lacon is offering first timers a 10 per cent bonus on all trades and projects.

www.lacon.de/en

Ultra Sharp



We are the Picassos of Cable Compaction

Lacon Electronic designs, manufactures and supplies a wide range of cable harnesses from its two plants located in Germany (prototypes and low volume) and Romania (series production: up to 100.000 units/year).

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- Hot-Melt, Cable Marking, Potting
- Cabinets, Box Builds & Switchboard Assembly
- Ultrasonic Compaction



Quality Management

- Certifications: ISO 9001, ISO 14001, EN ISO 13485, ISO TS 16949, UL-listed
- German operating and test equipment; Romanian labor costs
- Programmable cable test systems with up to 4000 measuring points

Lacon

Tom Maguire

UK Sales Representative

tom.maguire@lacon.de

m. +44 7836 338122

<https://www.lacon.de/en/>

Buyers' guide to SD cards

SD and microSD cards continue to be popular, but with so many options available, buyers can find it difficult to select the right card for their application

Thanks to their small size and capacity to retain vast amounts of data, SD and microSD cards continue to be the removable storage device of choice. With so many to choose from, however, it can be hard to differentiate between them.

Industrial or consumer

On the surface, industrial and consumer grade SD cards and flash devices look the same, with identical mechanical design and the same capacity and size. There



are significant differences, however, and it is important to consider the impact this can have on reliability, endurance, compliance and total cost of ownership.

Choose wisely

Understanding which card manufacturer is right for your application may seem daunting, but the technical team at Simms can help. The first step is to find out what



the card is being used for and what data is being written to it. Perhaps there are performance issues, the cards keep failing, or data is being lost? Simms is often contacted by companies that have experienced such issues, usually when they purchased cards, often online, with price as the key driver.

Based on this experience,

Simms believes that understanding the limitations of each technology and the demands placed on it, can avoid costly failures and save on engineering resource. Applying this expertise to resolve challenges can add value for buyers.

www.simms.co.uk

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Distributor and Supplier Focus

Harness cable know-how

IS-Rayfast works closely with electrical harness suppliers to provide the knowledge and experience manufacturers need

Manufacturers in the UK and Europe that produce high-performance products rely on distributors, such as IS-Rayfast, to supply high performance, high quality components. They require partners who can supply not only the best price and delivery times, but who are equally able to act as a solution partner; with knowledge, experience and a team of sales engineers and technical support consultants

to ensure the right product is selected for each task and environment.

To achieve this, IS-Rayfast works with a variety of electrical harness suppliers. Whether buyers require a lighter, more flexible cable for portable communications systems or need to meet tight bend radii in a naval vessel, the company's sales engineers are available to provide guidance and support. They

offer niche expertise in the aerospace, motorsport, energy, defence, industrial, rail, marine and medical markets.

Close co-operation with manufacturers enables IS-Rayfast to provide products that perform in harsh, demanding environments. This enables the distributor to explore alternative components that are more suitable for

a specific application. By understanding the customer's intended purpose and long-term volume, IS-Rayfast can sometimes offer lower cost materials with optimum delivery turnaround.

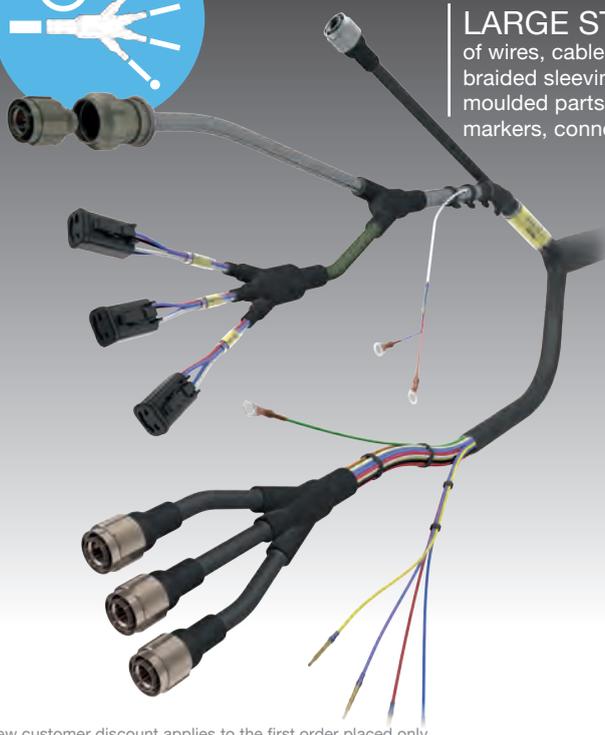
A catalogue, which can be requested online, details the company's range of harness components, associated products and expertise.

www.is-rayfast.com

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Switches
and
Relays

Expanding small pack choice

Anglia Components has expanded its range of small pack quantities, including split reels, across thousands more stock items on its improved Anglia Live website

Customers looking to order low volumes for design and prototyping can now access stock items on commodity surface mount parts in small quantities supplied in cut tape format. Up to ten breaks can be shown for each part, giving customers greater choice and complete pricing transparency. The small pack quantity service is in addition to Anglia's Ready Reel service, which provides production ready smaller reels of popular components for use on standard pick and place machines, with full lot traceability back to the original manufacturer's batch.

Chief executive officer at Anglia, Steve Rawlins, commented: "Anglia is committed to supporting customers through all the phases of a project's life from initial design through prototype to volume production. With small pack quantities, our support in the early phases is now as comprehensive and flexible as our support during volume production."

Streamlined interface
At the same time, Anglia has rolled out improvements to Anglia Live, with faster loading and streamlined navigation. Market sections have been introduced covering applications such as internet of things, industrial and lighting. These sections replace previous satellite websites, such as Anglia Lighting and Anglia Displays, giving all of Anglia's customers a single destination.

Designed to offer a comprehensive source for information on the specification and availability of components for new designs, Anglia Live lists all active supplier part numbers, including lines not held

in stock. Buyers can also cross-reference over two million industry standard part numbers. This data can be searched via a powerful parametric search engine, populated with data verified and entered by Anglia to ensure complete consistency of presentation.

All listings include full visibility of Anglia's current and projected stock levels and any product change or termination notifications issued by the supplier. Historic PCN and PTN information is also available through Anglia Live, which can be accessed by customers in the UK and Eire.

All-round service
As an independent authorised distributor of semiconductors, optoelectronics, interconnect, and passive and electromechanical components, Anglia is a signatory of the ADS SC21 programme. The company also holds AS9120, ISO9001 and ISO14001 accreditations and IECQ-CECC qualification.

Technically adept, and boasting an experienced team, Anglia supports OEM and EMS companies in every sector. Its suppliers include leading component brands, as well as many smaller companies that excel in their chosen technologies.

Key to meeting all kinds of buyer requirements is Anglia's stock of over one billion components, from over 900,000 product lines, held in the UK. Components from every supplier are stocked in depth and breadth for same-day dispatch. Furthermore, Anglia aims to streamline logistics and reduce customers' transaction costs through services that include kan-ban, electronic data interchange

and customer-dedicated inventory. Accurate, on-time delivery performance is a vital goal for the company.

To complete the picture, Anglia's technical support spans a sampling service that delivers over £150,000 worth of free evaluation parts each year, with expert advice from trained product specialists and face-to-face guidance from field applications engineers. Both commercially and technically, management of industry legislation and component obsolescence are recognised as areas of vital importance.

www.anglia-live.com



Anglia CEO, Steve Rawlins



Anglia supports OEM and EMS companies in every sector

An improved Anglia Live website provides faster loading and streamlined navigation

The screenshot shows the Anglia Live website interface. At the top, there's a navigation bar with 'Home', 'Products', 'Ready Reel', 'News', 'About Us', 'Markets', and 'Resources'. A search bar is prominently displayed. Below the navigation, the product page for '0402 COG 33PF 50V 5%' is shown. It includes an image of the component, a 'Resources' section with a 'Data Sheet' link, and an 'Availability' table. The 'Availability' table shows 'Free Stock' at 4580000, 'Reserve Stock' at 970000, and 'Total Stock Due' at 1600000. A 'Price (Each)' table lists prices for different order quantities: 100 units at £0.00214, 150-250 units at £0.00178, 300-1000 units at £0.00153, 1050-2000 units at £0.00143, 2050-10000 units at £0.00138, and 10050+ units at £0.00134. A 'Specifications' section at the bottom lists details like Capacitance (33 pF), Class or Package Type (0402), Dielectric (COG (NPO)), Mounting Type (Surface Mount), Operating Temperature (-55°C to +125°C), Tolerance (±5%), Type (General Purpose), and Voltage (50 V).

Partnership smooths supply process

By providing distributors with component preparation and anti-counterfeiting solutions, Retronix helps them to supply exactly what buyers need

Retronix offers franchised and non-franchised distributors a variety of services thanks to an initiative it describes as the 'distribution solution.'

Integrated circuit distributors that service high reliability industries like defence and aerospace, or those that want to enter these markets, know that customers here often have specific requirements, such as a tin lead finish on terminations. Rather than selling standard parts, Retronix enables its distributor clients to sell exactly what their customer needs, without any investment. With Retronix

able to turn parts around in days, distributors can sell custom components before paying for the alteration.

Testament to the appeal of the service, Retronix has recently partnered with a large franchised distributor to offer just such specialised services; capabilities include component preparation, including laser reballing, automated conversion from RoHS to lead solder, and upscaling parts to military specification.

Broker services

In addition to this line-up, Retronix also offers services in situations where the

history of a part is unknown. This allows broker customers to sell components they know are correct. For example, Retronix can provide obsolescence solutions should parts need to be salvaged from old boards or anti-counterfeit IC tests where parts are from an unknown source.

www.retronix.com

Buyers in high reliability industries often have specific requirements



Retronix enables its distributor clients to sell exactly what buyers need

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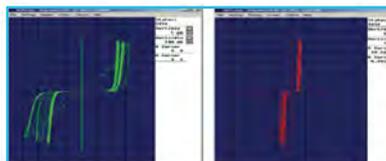
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Buyers are backing Britain

With supply chain initiatives driving down the cost of sourcing components closer to home, UK purchasers are beginning to buy British again, says managing director of Intelliconnect Europe, Roy Philips

Something exciting has been happening in the UK electronic component manufacturing sector over the last few years. People are buying British again. Not because of patriotism or Government policy, or even long delivery lead times, but because of price.

UK buyers are purchasing UK products based on price. Electro-mechanical component manufacturers like Intelliconnect are reporting increases in sales values of up to 50 per cent since the middle of 2016 in the UK and significant uplifts in export revenues.

The reason for this, of course, is primarily the weak pound which is causing effective increases in some imported products and consequently a decrease in the cost of UK goods to foreign buyers.

Pursuing productivity

It is not, however, the only reason that UK manufacturers are becoming more competitive. Productivity is improving, volumes are increasing, and UK manufacturers are much more willing to trim their margins to win business. The total acquisition cost of purchasing locally is also being driven down by supply

chain excellence initiatives such as SC21 in the defence and aerospace markets and by supply chain excellence awards across all sectors.

The downside, however, is that while UK buyers are now much more willing to buy British, they often face problems finding a British manufacturer of the part they require. Google searches reveal that there are plenty of distributors out there, but very few UK electronic component manufacturers that appear high up on the listings.

It's easy to see the issues



UK manufacturers are becoming more competitive, productivity is improving and volumes are increasing

buyers and engineers face when sourcing general electronic and electro-mechanical components from UK manufacturers. Fortunately, no such issues exist in the RF connector, adapter and cable assembly area. Here Intelliconnect aims to provide a one stop shop for all interconnect needs, providing an ever more competitive platform for UK manufactured and low-cost components.

www.intelliconnect.co.uk



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Extra deep enclosures measure up

Metcase has launched an extra-deep 24in version of its Combimet 19in enclosure, which is perfect for server rack type applications. Applications include networking, communications, AV and studio systems, laboratory instruments, industrial computers and control systems.

The new cases are 610mm deep, which is significantly deeper than the existing standard depths of 265 and 365mm. Models are available in all heights from one to 6U and are painted in black, RAL 9005. Cases are supplied fully assembled, with prices starting at £120. www.metcase.co.uk



Shrinking fibre optic footprints

OMC has launched two new high-density surface mount assembly style housings for its range of fibre optic transmitters and receivers. Designed to save board space and ensure long-term performance, there are two styles available: high density SMA, which is designed to be edge-to-edge stackable while offering enhanced board density, and vertical SMA, which boasts an even smaller footprint for applications where devices are used singly on a PCB.

With a footprint of 10 by seven millimetres, the HDSMA housing offers a potential increase in device density of between 22 and 50 per cent, depending on the amount of board edge available. The package is designed for systems requiring multiple Tx/Rx channels per PCB and features an all-metal, bolt-down design. OMC's full range of fibre-optic emitter and receiver diodes can be supplied in the new HDSMA receptacle.

Alternatively, the VSMA package has a footprint of only eight by seven millimetres. With a slimline design and all-metal body, the VSMA device bolts in place with a single screw and features a locating lip which slots into a groove in the PCB edge to fix the device in place. The VSMA package is available with a range of visible and infrared emitters and fibre-optic receivers mounted within. www.omc-uk.com

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One-stop ethos helps you make it

Managing director of Rapid Electronics, James Bates, explains how transitioning from a broadline distributor to a service-led solutions specialist is helping Rapid help customers

Last year saw electronic components distributor, Rapid, take a new direction, with impressive results. Under the guidance of managing director, James Bates, who took over 18 months ago, the company has repositioned itself from a broadline distributor, to one that is focusing on individual sectors and developing a service-led approach. The industry took note too, with the company featuring in the British engineering excellence awards.

James explained: "This year we all worked incredibly hard to do more for our customers. Identifying and focusing on our strengths, we developed our new customer proposition of 'Helping you make it,' providing everything customers need to design and manufacture innovative products and technologies. This includes high service levels and innovative online solutions, as well as components, consumables and equipment.

"Key to this has been the franchised agreements we

have developed with major suppliers such as Schneider Electric, Loctite, 3M, Wago and Facom. Customers now have access to a far wider range of stocked products from these suppliers, as well as being confident that we can meet their product quotations for large scale projects."

Powering EV rollout

Rapid has also worked closely with installation contractors, ICEE and Schneider Electric, to develop a fully integrated implementation service for installing Schneider's electric vehicle charging stations, which are available from Rapid.

James continued: "We realised that buying an EV charging station is one thing, but how do you go about installing one, or providing a commercial charging point? More solutions were required to build the charging infrastructure required by UK Government targets on emissions and EV take up. Our partnership with both ICEE and Schneider has helped to create a seamless,

one-point of contact supply chain for the customer looking to install an EV charging network."

One-stop services

Making Rapid a 'one-stop-shop' for customers is the idea behind several product-based services the company introduced in the last year. Modification services are now available for any brand of enclosure on the Rapid website, saving customers the time and expense of outsourcing modifications like cut-outs, recesses and artwork. Specific services are offered for the Hammond and CamdenBoss enclosure ranges. Rapid has also partnered with Telegärtner UK on a cable assembly service which supplies bespoke cables and connectors ready for customer applications.

Other initiatives include improving customer care standards by doubling the business development management team and establishing a new quotations team and customer experience department.



Customer care standards have been improved by doubling the business development management team

The technical skills of the company's business development management specialists mean they can provide full design-in support for customer projects.

James concluded: "Over the last year, Rapid has grown in ambition, as it focuses on new standards and a range of customer needs. Export and online sales have had record-breaking years and there is more to come next year, not least a fully responsive website, kitting services and further expansion of our customer support teams."

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Seamless transition

Changing sub-contractors always invites the same apprehensions: time, money, disruption and quality issues

Thanks to a history of supporting clients with manufacturing solutions, 4E recognises the problems involved in switching to a new contract electronics manufacturer and says the key to success is making the transition as seamless as possible. This means listening to clients, understanding their needs and building excellent working relationships.

Quality is critical. With 4E's ISO 13485:2016 accreditation, it believes clients can be confident of quality service and attention to detail with an emphasis on quality control and full traceability throughout all processes. No matter what product, 4E aims to provide

the same quality assurances to all.

For the most part, clients will be looking for a CEM to provide a variety of services. 4E therefore offers a range of services from wire preparation and PCBA population to electro-mechanical assembly and test. From product concept to production, irrespective of job size, 4E says clients will benefit from its consolidated purchasing power and excellent service.

With Brexit looming, many OEMs may be looking to reshore manufacturing and should consider the advantages of UK manufacturing. As 4E suggests, the benefits include

flexible, local production and the ability to phase deliveries to regulate capital expenditure. These factors, combined with a shorter more responsive supply chain and a greater control on quality, mean it might just be time to consider switching.

www.4e-futures.com



With Brexit looming, many OEMs may be looking to reshore manufacturing and should consider the advantages of UK manufacturing



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4E specializes in the manufacture and support of high quality, regulatory controlled products. At 4E we have many years' experience supporting clients' product requirements, from prototyping through to production, whilst continuously managing the product life cycle. We pride ourselves on the excellent working relationships we forge with our clients, and our record of delivering a successful outcome, whatever the project.

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Distributors expect robust European sales growth in 2018

Component demand in Europe was unexpectedly strong in 2017 and orders for chips, passives and connectors will remain healthy through the first half of 2018 and maybe longer



James Carbone

Electronics distributors are optimistic that European component sales in 2018 will continue to post strong growth after revenue rose at double-digit rates in 2017.

Distributors report that component demand in 2017 was robust if not stellar as prices for many passives and semiconductors increased contributing to sales growth. With strong demand, lead times for many passives and discrete semiconductors increased. Lead times for components that typically were 8-12 weeks increased to 25 or more weeks with delivery times for some parts stretching to 40 weeks.

Because of strong demand and increasing prices, distribution sales in Europe will end up growing about 10-12 per cent in 2017, said Adam Fletcher, chairman of trade association Electronic Component Supply Network and chairman of International Distribution Electronics Association. As a result, distribution business in Europe will end 2017 growing an average of 10-12 per cent, he said.

Some distributors say their sales growth in Europe may end up stronger than average. For instance, Avnet says its sales in Europe, Middle East and Africa (EMEA) will finish calendar 2017 growing between 10-20 per cent. Mouser says its sales growth was up more than 30 per cent through late October. Digi-Key said it had 30 per cent year-to-year date

sales growth in Europe as of November.

While there may be less price erosion and more stable lead times in 2018, distributors say that component demand in Europe will remain healthy, especially in the first half of the year. The European automotive and industrial market segments will continue to be drivers of component demand in 2018.

Some expect healthy sales growth in Europe to continue beyond 2018 and 2017 was in fact the beginning of a period of long-term growth for distributors.

"I think 2017 was an inflection point for the electronics component industry," said Fletcher. "I think we are at the beginning of a five-year period of growth because the products of major market drivers are starting to roll out."

Those market drivers are products related to transportation, including automotive and autonomous vehicles, trucks, trains and planes.

Going autonomous

The impact of development of the autonomous vehicle is being felt in the electronics supply chain. "Autonomous vehicles are really driving quite significant growth," said Fletcher. Automotive in general is contributing to sales growth as more safety and infotainment systems are designed into more models of vehicles. Even low-cost models are being equipped with



Adam Fletcher, chairman of trade association Electronic Component Supply Network and chairman of International Distribution Electronics Association

"I think 2017 was an inflection point for the electronics component industry. We are at the beginning of a five-year period of growth because the products of major market drivers are starting to roll out"

more sophisticated electronic systems. Such systems require a wide range of semiconductors including wireless ICs, sensors, microcontrollers among others.

In addition, the development of 5G infrastructure will have a significant impact on the electronics supply chain. While standards for 5G are still being developed, the rollout of 5G infrastructure is expected to begin in 2020, which will further drive component demand over the next five years, said Fletcher. The fifth-generation wireless infrastructure "is going to have a huge impact in terms of base station deployments," he said. It will also result in more

consumers upgrading their phones to be compatible with the new, faster wireless networks. As a result, Fletcher said while "2018 is going to be a time of pretty reasonable growth, 2019 and 2020 will be years of very strong growth."

He said in 2018 there should be 10-20 per cent growth in electronic component sales globally and about 12 per cent growth in Europe.

Carry over growth

Many distributors generally agree with that forecast because business in the second half of 2017 was strong and many believe it will carry over into 2018.



Mark Burr-Lonnon, senior vice president, EMEA and Asia for Mouser Electronics, said that Europe is Mouser's fastest growing region for sales.

"Europe is leading the way. Our business was up 34 per cent (year-to date as of late October) in Europe, while Asia was up 32.5 per cent and the Americas were up 18 per cent," he said. Mouser's sales in Europe in 2017 were up 10 points from 2016, said Burr-Lonnon.

While most of Mouser's sales are to engineers designing new products, some of the sales increase was due to component shortages. "We put in a lot of inventory this year and people came to us because of shortages," said Burr-Lonnon.

He said in 2018, Mouser's European business will remain healthy. Electronics component sales in Europe overall next year is "going to be pretty good at least through the first half of next year. Some are saying it is going to be a good for the full year, with just a few blips in the second half," he said.

Burr-Lonnon noted that adding new product lines was key to Mouser's continuing sales growth. "We have consistently added a

lot of new lines in the last 10 years. We have over 650 lines and there's only so many big lines left," he said.

Burr-Lonnon added that Mouser continues to "backfill with niche lines" to give customers as much choice as possible. Doing so helps to attract new business for Mouser.

Kevin Hess, senior vice president of marketing for Mouser, noted that 20 per cent of Mouser's sales in 2017 were for products that Mouser added over the last four years. "So that's what we need to continue to do. We need to make sure when manufacturers launch new products, we are stocking and selling" them because those new products will represent nearly 30 per cent of Mouser's sales four years from now.

Burr-Lonnon said Mouser's goal was to have the broadest inventory of parts whether they are from Texas Instruments, ADI, TE, or Molex.

A pleasant surprise

For some distributors, robust component demand in 2017 was an unexpected, but pleasant surprise. "If you look at the calendar year, we are very satisfied. It was a surprisingly good year," said Georg Steinberger, vice president of

Georg Steinberger, vice president of marketing and communications for Avnet EMEA

"The automotive industry, including subcontractors, have discovered distribution is a reliable partner for their business whether it's on the design side or on the supply chain side"



marketing and communications for Avnet EMEA. He says sales would be up 10-20 per cent.

"It has been very good business so far in Europe," he said. Unlike the Americas and Asia, the growth drivers in Europe are automotive and industrial, according to Steinberger. "We don't have a huge computer business or communications business. Our business is really around automotive and industrial."

Steinberger noted that in Europe, automotive represents about 35 per cent of semiconductor sales, while industrial accounts for 30-35 per cent although distribution sales to the segments are not as high. He noted that automakers and their first-tier suppliers have direct relationships with component manufacturers.

Steinberger said that industrial represents about 50 per cent of Avnet's European business, while automotive is about 25 per cent. However, Avnet is growing its sales to the automotive segment.

"Fifteen years ago, the automotive share of our business was about 15 per cent," he said.

"The automotive industry, including subcontractors, have discovered distribution is a reliable partner for their business whether it's on the design side or on the supply chain side," said Steinberger.

He noted that 70 per cent of distribution's business in Europe is for semiconductors, while interconnects, passives and electromechanical devices account for 30 per cent of distribution sales.

"Many of the subcontractors in automotive use distribution for semiconductors. But they still get a lot of attention by the manufacturers of connectors or passives," said Steinberger.

Steinberger said that consolidation impacted sales in 2017 and will likely affect business in 2018. He said in some cases, consolidated companies "cleaned out their product portfolios, resulting in shortages in some product areas" as well as higher prices.



"Europe is leading the way. Our business was up 34 per cent (year-to date as of late October) in Europe"

Mark Burr-Lonnon, senior vice president, EMEA and Asia for Mouser Electronics

Everyone wants rapid delivery

Sometimes purchasers and designers have similar demands: they both require quick access to freely-available parts, as Mouser Electronics' vice president of marketing, EMEA, Graham Maggs, explains

It may seem counter-intuitive, but sometimes the needs of the purchaser and the designer coincide. For the purchaser, this may be because they have been let down and are facing the extreme prospect of a manufacturing line standstill for want of a specific part. For the design engineer, having immediate access to the latest technology means new projects gain competitive edge by increasing performance and adding functionality.

The answer for both situations is the same — they need a distributor that believes in holding stock. This may seem obvious, but inventory is expensive. Mouser president, Glenn Smith, takes a different view. He sees inventory as Mouser's 'secret sauce', except that Mouser doesn't mind sharing the secret: having a broad inventory selection is the central pillar of its business model. Those who need parts fast, for whatever reason, should visit Mouser's website.

Investing in service

Of course, having a wide and freely-available inventory is only part of the solution. In

order to achieve the rapid delivery of components anywhere in the world, Mouser has to provide best-in-class customer service.

In Europe, Mouser delivers to most locations within two days. To support this, the company has invested heavily at its worldwide headquarters and warehouse in Texas. Selection, speed and accuracy are the core principles of the warehouse team, with sophisticated equipment enabling orders to be processed 24/7.

A wireless warehouse management system provides nearly perfect pick-and-ship operations, delivering a five-Sigma confidence rating, better than 99 per cent. Orders are processed and ready to ship in 15 minutes in most cases, enabling same-day shipping on most orders to nearly 500,000 customers in 170 countries.

Providing BOM tools

Another part of achieving great customer service is providing customers with the tools they need to be more effective. Mouser hosts a range of free, online tools for all business functions.

The most recent addition is Forte, an intelligent BOM tool that quickly evaluates millions of parts to improve order accuracy, save time and increase confidence in specifying and purchasing semiconductors and electronic components. Even better, it's free to anyone with a My Mouser account.

Key features of the tool include a time-saving, one-step BOM spreadsheet importer that maintains customers' original format. Using this interface, buyers can access millions of orderable part numbers online, adding and deleting parts, with visibility on multiple quantities and prices.

Where only partial part numbers or descriptions are available, software analysis can intelligently suggest parts. Design risk indicators help buyers match and choose the best parts for a design, as well as recommending alternative products to reduce design and product lifecycle risks.

Despite investment in automation and online tools, Mouser also recognises that sometimes customers

need to speak to someone, in their own language and time zone, who understands their business culture. To this end, local support has not been centralised. In Europe, Mouser operates nine offices that can provide help and information at a personal level.

So, from initial conceptualisation right through to manufacture, Mouser is set up to provide fast, accurate and intelligent support.

www.mouser.co.uk



Selection, speed and accuracy are the core principles of the warehouse team, with sophisticated equipment enabling orders to be processed 24/7

Bright ideas forge ahead

Forge Europa's custom and standard displays provide advanced solutions in a variety of industries as well as satisfying the buyer's checklist

Backed by a wealth of experience, Forge Europa manufactures LED light solutions designed to meet cost and performance targets, as well as relevant standards. Working closely with customers, it has successfully manufactured display solutions for backlighting, instrumentation, passenger information and gaming industries.

The company also aims to meet the all-important needs of the buyer, with Forge solutions potentially simplifying assembly, cutting costs and reducing stock holding requirements.

One example of this approach is the company's interlocking seven segment display. With a square pin-out arrangement that accepts industry standard insulation displacement contact connectors and dovetail interconnect across all sizes, the solution not only simplifies assembly, but significantly reduces the amount of investment in work in progress. It also uses high performance LED die and is available in many colour options.

For purchasers with an application that could be enhanced with LED but

are not sure where to start, discussion with Forge can help. With 25 years' experience, Forge has the knowledge, expertise and resources to provide the clever light solution required. In addition to custom capabilities, the company's LED display range also comprises standard dot matrix and seven segment display that are still ideal for a host of applications. The displays incorporate the latest LED chip technology in several sizes and face colour options.

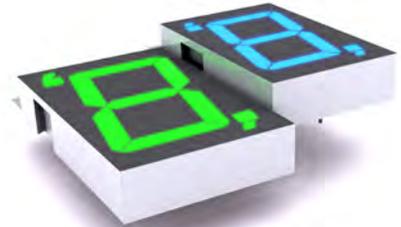
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Interlocking seven segment displays are still ideal for a host of applications

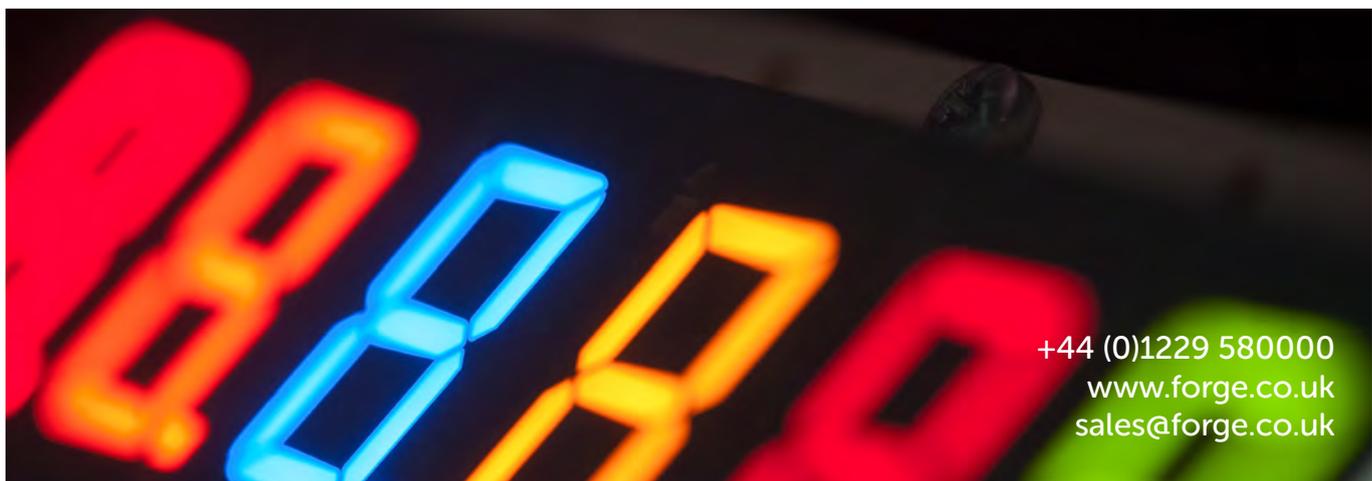


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Distributor and Supplier Focus



With services covering the design, manufacture and assembly of printed circuit boards, LP Elektronik has been operating in the printed circuit board market for more than two decades. The company's business culture is to offer a safe and complete service from its headquarters in Hungary, Budapest, backed by a logistics and quality office in Hong Kong.

From quick turnaround prototypes to mass production of boards up to 36 layers,

LP Elektronik boasts broad technical PCB supply expertise. The company can supply rigid standard boards, flex and rigid-flex designs, as well as offering FR-4, CEM1, Teflon, halogen-free, Arlon, metal base and high glass transition temperature boards. Other capabilities include: high density interconnect technology, blind and buried vias, filled-up vias and impedance controlled boards.

www.lpe.hu

Distributor and Supplier Focus

Two new sizes join handheld line-up

OKW has extended its Style-Case range of high-gloss, handheld, enclosures with two new sizes: size S measures 123 by 48 by 24mm, and size M measures 147 by 56 by 27mm.



Ideal for remote controls, notably in medical and social care, but also in household, office and industrial electronics applications, the Style-Case range features a high-gloss finish, which is pleasant to touch, imparts a high-quality user experience and is also easy to keep clean.

Style-Case offers ingress protection up to IP65 and is assembled using tamper-proof Torx screws, which is an important feature for medical and wellness applications. Units

also feature a recessed top to accommodate a membrane keypad or product label, plus an integrated battery compartment, accessible from the outside.

Enclosures are moulded from high quality UV-stable ASA plastic in white, or black PMMA plastic for infrared applications. Both are rated UL 94 HB for flammability.

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M-TEK Investment in agility pays off

With analytics and connectivity set to drive manufacturing in the future, M-TEK believes its policy of investing in agile tools is already starting to pay off

The next wave of industrial manufacturing leaders will build an ecosystem that capitalises on the promise of analytics and connectivity to maximize efficiency for themselves and their customers. They will prioritise measures that bring the most value and get closer to customers' needs. "They can succeed", says Frederick Kayrouz -General Manager at M-TEK, "if we move forward in smart and deliberate strides".

So, what are customers' priorities? Surveys undertaken over the past year indicate that 92 per cent of manufacturers say product quality defines success in the eyes of their customers. Just over half find their customers most frequently demand short notice production capabilities

as a value-added service, while 50 per cent define success as meeting on-time deliveries consistently.

Since 2015, M-TEK has focused on equipping its plants and employees with agile tools to stay in step with customers who expect every manufacturing experience to be as intuitive as an online Amazon purchase. The company has invested in providing accurate, real-time feedback 24/7 to customers and partners. Consequently, the past two quarters have seen an unrivalled intake and on-time delivery of new product introductions (NPI) and large volume full turnkey contracts, from PCB fabrication to full product assembly, for sectors ranging from internet of things

(IoT) to oil and gas through renewable energy and large tier one security contracts.

In its efforts towards engineering excellence, M-TEK's strategy has focused on combining expertise in interpreting operational data, with the introduction of robotics for repetitive and manual tasks. "Production teams can then focus on more valuable tasks to deliver quality and compliance and reduce global supply chain risk through better supplier collaboration and maximise production efficiency" added Kayrouz. This, combined with further investment in technologies such as 3D CT scans, robotisation and clean controlled environments, has enabled M-TEK to challenge current design,



Production teams focus on valuable tasks to deliver quality and compliance and reduce global supply chain risk

fabrication and production concepts and methodologies by establishing new manufacturing throughput performances, and focusing on engineering and production excellence.

M-TEK is proud to announce it will be exhibiting at the Southern Manufacturing Show, on Stand D95 from the 06th of February 2018 until the 08th of February 2018. www.mtek.co.uk

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Solving tough connector challenges

Describing itself as a manufacturer of 'problem-solving' connectors and assemblies, ODU supplies into several niche and environmentally challenging markets

Backed by expertise in the design and manufacture of rugged, miniature circular multipole connectors and modular rectangular connectors, ODU supports buyers in various niche markets. It specialises in connectors for the military, medical and instrumentation sectors, with manufacturing facilities in Germany, Romania, USA, Mexico and China.

Specifically, ODU is targeting military requirements with a new generation of miniature circular push-pull and snatch connectors. As a long-term supplier to the likes of Thales, Selex and General Dynamics, ODU based the

new connectors on feedback from several Future Soldier trials, as well as on existing programmes. In the UK, for example, the Bowman programme has utilised over 100,000 helmet 'snatch' connectors from ODU, reportedly without a single failure.

Focusing on medical applications, ODU helps buyers select the right connector system to ensure that applications function flawlessly. Although smaller, lighter and cheaper are constant demands, technical requirements are also tightening, with buyers looking for ISO 13485 approval and a

high number of mating cycles. Other essential factors in this sector include extreme contact stability, economical disposable cord-sets, and an ability for connectors to be autoclave compatible.

In industrial applications, ODU provides reliability. Connectors can work at 400°C in drying systems, or in mobile programming devices, operating truck load-cells in Siberian winters. ODU-MAC modular connectors also allow a combination of multiple transmissions in one connector including signals, current, data, air, liquid or fibre optic.

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ODU-MAC modular connectors combine multiple transmissions in one connector



The Bowman programme has utilised over 100,000 helmet 'snatch' connectors from ODU

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No batteries, no downtime

Panduit has launched a new uninterruptible power supply featuring ultracapacitor technology instead of batteries. This eliminates the number one cause of conventional UPS failures and is said to lower the risk of downtime by 39 per cent to keep key equipment operating at full capacity. The no-battery design also makes the device maintenance-free for up to 20 years, providing two times greater return on investment and 50 to 70 per cent lower cost of ownership than an ordinary UPS.

The Industrial Network UPS is powered by a 24V DC input and can provide 24V DC output at 100W for a duration of 2.1 minutes. A network interface enables remote monitoring of device health through simple network management protocol. The remote device management uses standard web browsers and is compatible with FactoryTalk.

This ensures the new UPS can provide uninterrupted power for critical applications including managed network switches, micro PLCs, and human machine interface systems on the factory floor.
www.panduit.com



Connectors ensure a clean signal

Harting's new PushPull SFP XS fibre-optic connector addresses the biggest challenge for optical connectors: their susceptibility to dirt. Dirt can damage contact surfaces, which interface with the transceiver that converts optical signals into electrical ones. Contamination here can result in poor or useless signals.

To alleviate this problem, the Harting PushPull SFP XS connectors can be easily and quickly connected to a transceiver without having to open the optical link. Optical contacts are protected, even in dirty operating environments, to guarantee a clean signal.

The Harting PushPull SFP XS is ideal for use in industrial fibre-optic systems involving data transmission rates of more than 10Gbit/s or distances of over 100m. Typical applications include telecommunications or camera-based surveillance over large areas in the process industry.
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2018: challenge accepted

Lead times are lengthening and the market is becoming more challenging for buyers, but Charcroft is ready to take on the challenge to help customers avoid a line-stop

Although 2017 will be remembered as a good year for the electronics industry, it will also be remembered as the year in which life started to get a lot tougher for buyers. As actual growth significantly out-stripped predicted growth, we enter 2018 with component manufacturers' orderbooks full and their production lines struggling to keep up with demand.

Comfortable four- to six-week lead-times on passives and other types of components have not just drifted out, but sprinted to 12, then 28 weeks or more. There is even one manufacturer quoting an 85-week lead-time on one of its ceramic capacitors. Of course, the industry has been here before. Senior buyers will remember the tantalum shortages of the 1990s which tested original equipment manufacturers, contract electronics manufacturers and distributors.

Learning from the past
As one of the few specialist distributors to have remained independent, Charcroft has worked with customers through every crisis to hit industry since the 1970s. Its senior managers know what it takes to prevent a line-stop. Furthermore, all senior managers are based in the UK, in the same building as the sales, customer service and warehouse teams, which means they are immediately available to share their knowledge with the new generation of staff.

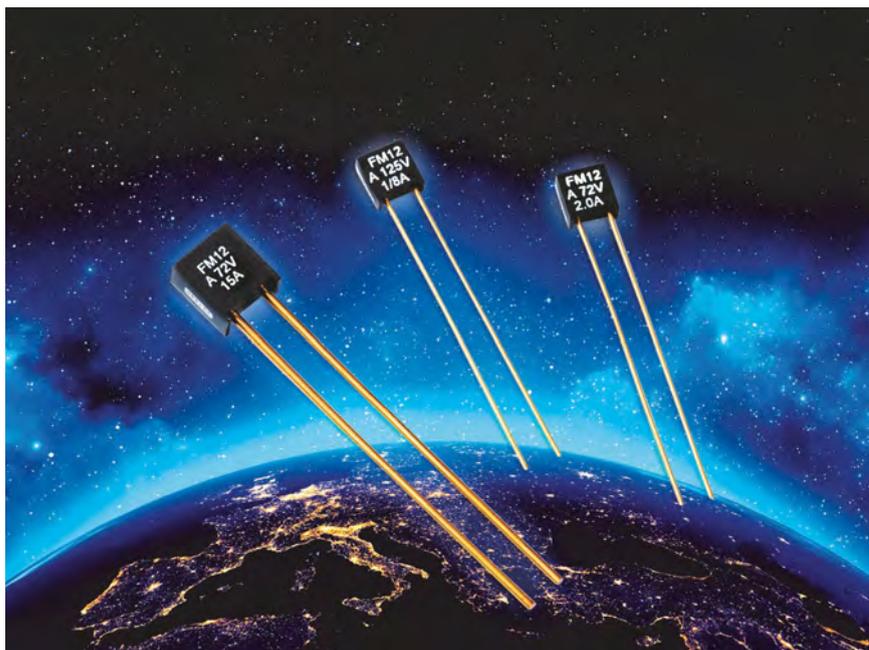
Focus is important within the customer-base too. Rather

than trying to sell millions of components to a mass of customers, Charcroft remains focused on its core customers. These are typically OEMs and CEMs in high-reliability sectors such as mil-aero, rail, oil and gas, industrial and NewSpace, the burgeoning market related to smaller, commercial satellites.

Close, long-term relationships with suppliers mean that Charcroft not only knows its front-line contacts, but also their production managers. These relationships have helped to prepare contingency plans such as using flexible logistics to cut vital days or weeks from a lead-time to avert a line-stop.

A problem lead-time can also be reduced by using a drop-in alternative to a capacitor or resistor. Analysing system and component specifications can often help identify an alternative part that has a slightly tighter tolerance or a different voltage or temperature rating. Less well-known specialist manufacturers, who are not often found on the linecards of global distributors, can also sometimes provide an acceptable alternative on shorter lead-times.

Looking to the future
Far from going into lockdown over potential shortages, Charcroft enters 2018 full of optimism. Customer buffer stocks have already been increased and the company has recently signed a new and exclusive UK franchise with AEM. As



The new AEM franchise includes QPL solid-body, current-limiting fuses

a manufacturer of high-reliability ferrite chips and what are claimed to be the industry's only QPL solid-body, current-limiting fuses, AEM's products are supported by a tin-whisker mitigation process for RoHS-exempt applications. This will be particularly useful for customers in the avionics, defence and NewSpace markets.

So, while buyers may look forward to the new year with some concern, Charcroft is, as always, ready to take on the challenge of helping customers to keep their production lines rolling.

www.charcroft.com



Charcroft has worked with customers through every crisis to hit industry since the 1970s

Director, Charcroft Electronics,
Debbie Rowland



Cut out the commodity gamble

Availability of commodity parts is often taken for granted, but pricing can be volatile. A proactive purchasing strategy can minimize the risks, says microchipDIRECT global sales manager, Martin Warmington



microchipDIRECT global sales manager, Microchip Technology, Martin Warmington

Watching manufacturing lead-time trends on single-source products can become an obsession. When there is no other source for a part, the manufacturer's lead-time will dictate an original equipment manufacturer's procurement strategy. So, for example, when lead times go out, stocks may be depleted faster than forecast, but when lead times come in, the OEM may need to push out scheduled deliveries and relax its inventory levels.

This obsession with proprietary parts is understandable, but it can mean that commodity parts are not given the same level of attention. Where there are pin-for-pin replacements, there are usually multiple sources for devices such as low pin-count microcontrollers or standard memories. For this reason, manufacturers tend not to treat commodity parts as strategic devices.

Pricing fluctuations

But, while the availability of commodity parts is often taken for granted, pricing

can be more volatile. Buyers will often have two or more sources for the same part at similar pricing levels, at least until one manufacturer cannot supply anymore. A single large order is all it takes to reduce market availability and increase pricing significantly, which is why commodity parts should carry the same importance as proprietary devices.

At a minimum, buyers should regularly check lead-times from the manufacturer, but there are more proactive methods that can provide greater protection against volatility.

Plan procurement

Including commodity parts in a distributor supply agreement is a useful tool for managing volatility. OEMs can ensure the supplier is ordering those parts into stock, rather than using back-to-back orders on the semiconductor manufacturer, as this practice will still leave the OEM susceptible to risk.

Alternatively, microchipDIRECT can send

a lead-time email at the start of each week providing information on all the parts in the order book. This gives buyers a timely way to plan their commodity procurement for the months ahead.

Purchasers can also utilize microchipDIRECT's standard 30-day cancellation policy, whereby any order for standard non-custom parts can be cancelled up to 30 days before the shipping date. This allows buyers to secure availability without the risk of over-ordering and being left with unnecessary stock.

OEMs can access their order-book online, 24/7, to check the real-time status of each item and make changes immediately. This allows buyers to respond rapidly to dynamic changes in the market.

Treating all components with equal importance and sourcing from multiple suppliers brings many benefits because just below the surface of easy availability and low unit

cost, there is always the potential for volatility. Many manufacturers in the semiconductor and passive markets have had 26-week lead-times for the simplest of commodity devices.

Commodities should therefore never be ignored — it's not worth the gamble. By applying simple procurement techniques, buyers can minimize their risk and greatly lessen the volatility inherent in the commodity component market.

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Learning to navigate the growth cycle

Supply chain director at Esprit Electronics, Paul Handley, examines the impact of the current growth cycle and subsequent long lead times

The burgeoning IoT, automotive and mobile markets have resulted in lead-times for many semiconductor and passive products now exceeding 30 weeks, with some product lines stretching to over 50.

This is not simply a UK issue and most analysis suggests that growth in these markets will continue to increase in 2018. Combine this with optimistic global GDP forecasts and the extent of the global supply and demand problem begins to emerge.

So, how has Esprit been working to mitigate supply

risk? Communication is key to provide customers with timely information. Esprit therefore uses software to analyse product lifecycles and aid part selection. This helps to suggest multiple manufacturers and, if acceptable, generic options.

Working closely with franchised distributors also provides information on new projects. This allows project lifecycles and launch dates to be discussed with both the distributor and the manufacturer, so realistic assessments can be made on material availability.

Predicting these challenges would worsen, in 2016, Esprit decided to monitor the market to analyse trends. It met with key suppliers and manufactures to discuss the impact on the marketplace. This research has facilitated discussions regarding how to support long-term contracts by identifying and finding solutions to issues.

It seems one thing is safe to predict: if organisations are to continue to provide the service customers demand, they will have to work smarter to meet forecasts and expectations.

www.aeiuk.com/esprit-electronics



Supply chain director, Esprit Electronics, Paul Handley



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Time to shop

Electronics manufacturing specialist, Corintech, advises buyers not to become complacent with contractors and suggests criteria for CEM qualification

Why are original equipment manufacturers so reluctant to shop around when it comes to enlisting contract electronics manufacturing services? Unfortunately, it often takes catastrophic disappointment with an existing contractor before action is taken. The following checklist highlights some essential CEM qualification criteria.

Purchasing power

A CEM's procurement processes are vital. It is therefore important to establish whether the company approves its suppliers and whether its purchasing reach is global. The ability to purchase at low cost, from reliable sources,

with consistent component availability, is key.

Quality first

All CEMs should adhere to an appropriate quality management system such as ISO9001 or AS9100, as well as working to recognised assembly standards such as IPC J-STD-001 or IPC-A-610. Ask what key performance indicators the CEM works towards.

Building relationships

Timely and accurate communication is fundamental to a successful working relationship. A personal account manager, responsible for managing the entire process from quotation, through

production, to invoice can streamline this process.

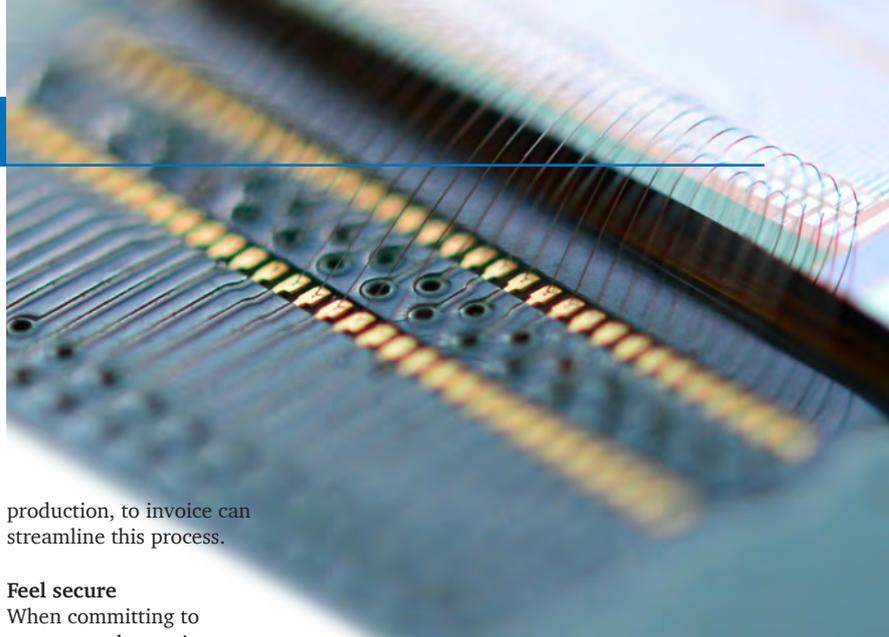
Feel secure

When committing to a contract electronics manufacturer, you want to know you are in safe hands. Ask prospective manufacturers for a company history and request testimonials from previous or existing customers.

Technical capabilities

Lastly, assess the company's technical abilities. Find out if it has in-house engineering expertise and whether the company invests in equipment to stay at the leading edge of the industry.

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Assess the company's technical capabilities and find out if it has in-house engineering expertise



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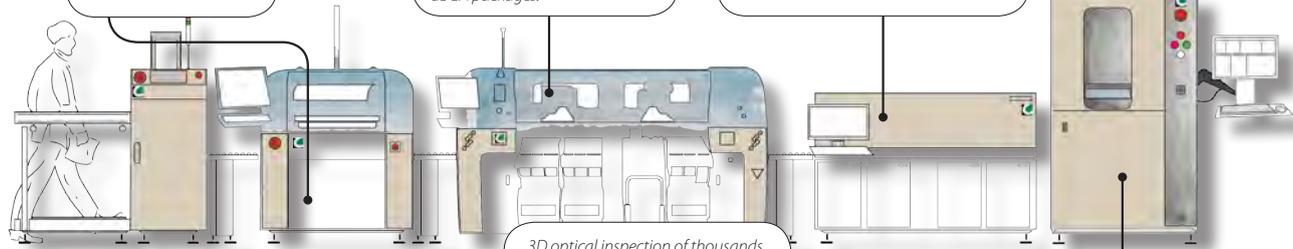
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Micronel has expanded its range of miniature radial blowers with several new additions for 2018. The U85 radial blower range, for example, can now produce up to 16,000 pascals of static pressure and up to 1,000 litres per minute free blowing airflow in a package size under 85mm diameter. Suction cups can be fitted to the inlet port for use in lifting and handling operations.

Designed to provide high performance in a minimal space, the 24V DC U85MX blower is capable of rotation speeds up to 46,000rpm. Operating between 15 and

24V DC, the efficient 125W brushless DC motor draws only 2.5 to 8.5A, which can offer significant energy and cost reductions.

For additional advantages, U85MX blowers are available with built in brushless DC motor drivers that allow plug and run capability plus optional functions for speed control, tacho/frequency signal outputs and locked rotor protection. Other functions include 16kV ESD protection, over temperature and polarity protection, as well as optional inlet and outlet adaptors.

With expertise in high performance blowers and fans, Micronel aims to satisfy industries with special performance requirements such as medical, packaging, gas analysis, laboratory, transportation, and process control. Buyers are presented with a wide choice of standard ultra-slim fans, axial fans and high performance, high-pressure radial blowers from UK stock, as well as having access to technical

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The 24V DC U85MX blower is capable of rotation speeds up to 46,000rpm

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Bluetooth just got smaller

Solid State Supplies has introduced what it describes as the world's smallest Bluetooth low energy module, ideal for ultra-small, low power consumption applications

Ideal for space-constrained applications such as internet of things devices, wearables, asset trackers, mobile healthcare and Bluetooth beacons, the BGM11S Blue Gecko is a new Silicon Labs Bluetooth low energy system, available from Solid State Supplies. The system in package module targets applications requiring ultra-small size, reliable high-performance radio frequency, combined with low power consumption, full modular certification and easy development.

Measuring just 6.5 by 6.5 by 1.4mm, this highly integrated solution

encompasses a complete Bluetooth subsystem with on-board radio transceiver, antenna, serial interfaces, core processor, memory, clock management, I/O, timers, triggers, hardware security and power management.

Based on a 32-bit 38.4MHz ARM Cortex-M4 processor with 256kB of flash program memory and 32kB of RAM data memory, the device consumes just 8.7mA when operating and 2.5µA in deep sleep mode due to its integrated energy management circuitry.

The BGM11S is Bluetooth 4.2 compliant, as well as

being compatible with Bluetooth 5 advertising and Bluetooth mesh capable. Solid State Supplies reveals the integrated antenna offers up to +8dBm transmit power and -90dBm receive sensitivity, requiring just 51mm² of PCB area to deliver exceptional performance up to a range of 200m.

As a further advantage, the inbuilt metal shield enables full modular certification for worldwide regulatory compliance, allowing end products to be certified with minimal effort.

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BGM11S is ideal for space-constrained applications



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Accreditation heralds medical market growth

Building on existing medical market expertise, electronics manufacturing services provider, Dynamic EMS, has added ISO 13485 compliance to its credentials

In a move which will enable the company to expand into the medical device market, Dynamic EMS has secured BSI authorisation confirming that its Dalgety Bay, Scotland facility complies with ISO 13485. This certification demonstrates the EMS provider's commitment to efficient quality management, in line with international regulatory, safety and quality concerns specific to the medical device industry.

Monitoring trends

Thanks to a policy of continuously monitoring global industry trends, Dynamic EMS identified the medical device market as one that holds significant potential. Clients are looking to source manufacturing and supply chain solutions from Dynamic, which can also act as a gateway for European and North American original equipment manufacturers.

For Dynamic, this step toward ISO 13485 accreditation highlights the strategic initiatives

the company is taking to ensure it has the right mix of traditional and non-traditional electronics manufacturing customers. Its aim: to support their needs through the entire production lifecycle from design, to development, to distribution and beyond.

Achieving ISO 13485 quality certification enables the company to tailor-make specific customised solutions for customers in the med-tech and pharma industry, such as the medical device sector. It also enhances Dynamic EMS's ability to support customers in regulatory audits from bodies such as the Food and Drug Administration, further establishing Dynamic EMS as the customer's product solutions architect.

Managing director, John Dignan, explained how current experience with medical companies led the organic decision to deepen the company's service level, capabilities and competencies. This will help ensure Dynamic EMS is a

natural choice for medical device companies.

John said: "Dynamic EMS employs approximately 90 people and recently celebrated its 60-year anniversary. During this time, we have built up a wealth of knowledge and expertise, which has built our ISO certification diversity. Quality is a key value embedded in our culture. All of the services offered by Dynamic EMS are underpinned by our quality management system, as we understand that working in high-reliability market segments means quality and reliability are paramount. Our in-house QMS system ensures customers have complete traceability throughout the product build and conform to required industry certifications."

Foundations for growth

In fact, Dynamic EMS has already won several contracts in the sector and is building on its experience with pharma companies.

John continued: "Our team has been working within the

medical device market for a number of years and have, through closely collaborative customer relationships, developed real intelligence, insights and expertise in this area."

Clearly, Dynamic EMS understands that no two electronic equipment manufacturing customers are the same. Their products, their supply chains, and their markets all differ. Offering customised electronics manufacturing services to customers with complex, highly-diversified businesses depends on providing a tailor-made solution, which is why Dynamic believes it has a solid understanding of the requirements of this evolving market sector.

With its manufacturing facility now certified to ISO 9001 and ISO 13485 compliant, it seems Dynamic EMS is ideally positioned to provide supply chain solutions to the med-tech and pharma sectors in the UK, across Europe and the Americas.

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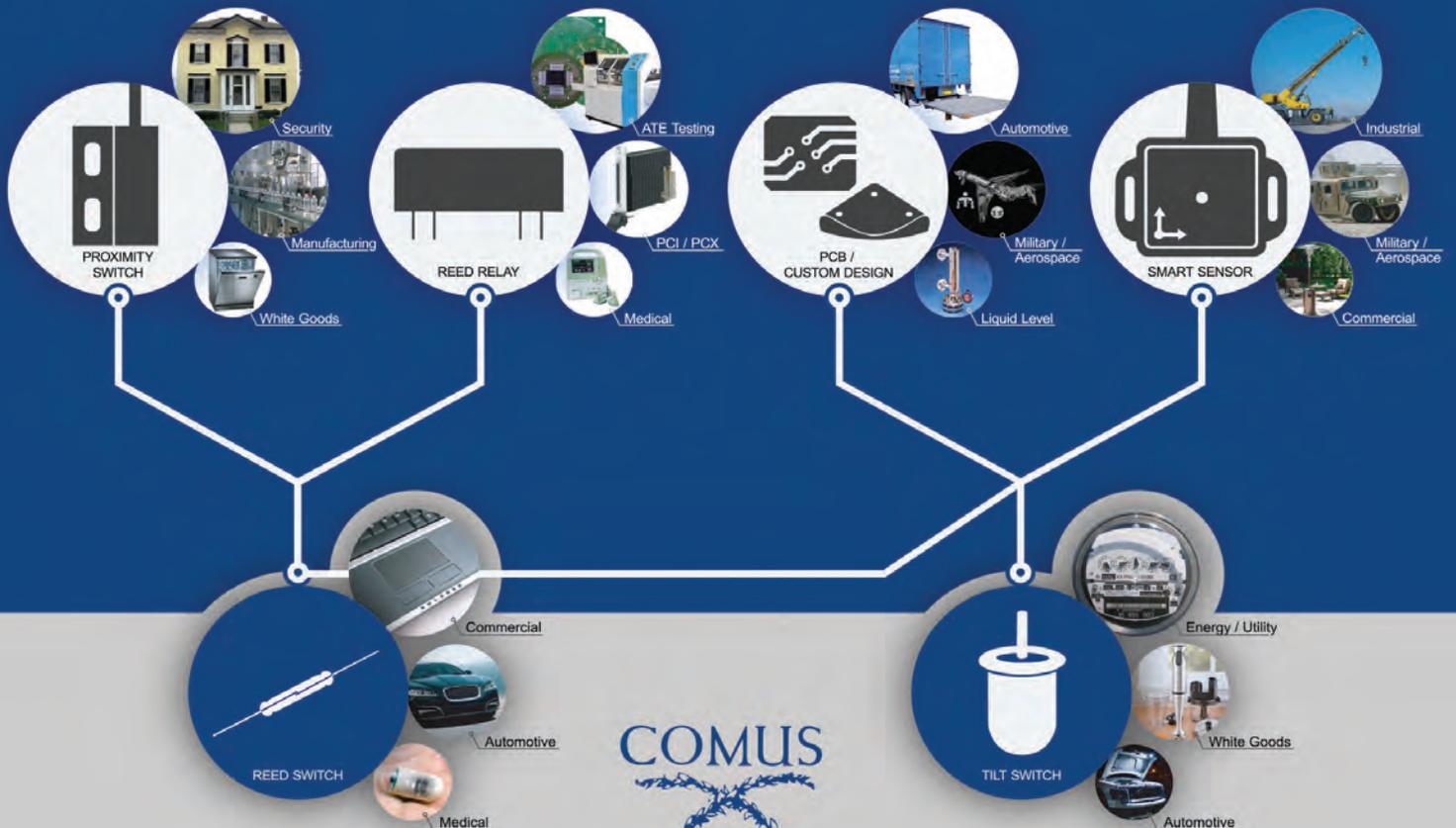


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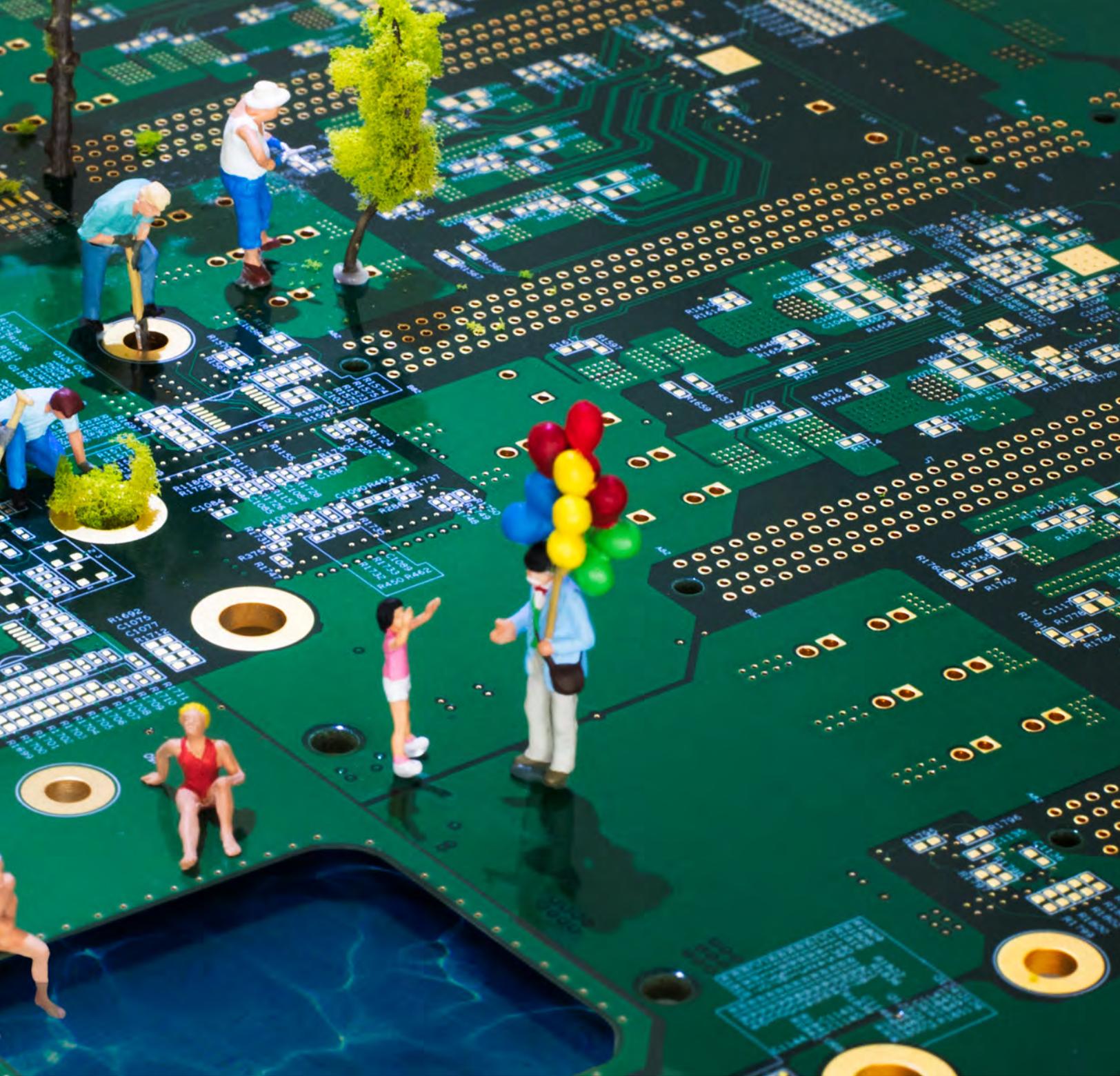
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ISO 26000 provides guidance on how businesses and organizations practice social responsibility to improve their impacts on their workers, their natural environments and their communities.

Full steam ahead in 2018

Accelerating economic growth bodes well for the electronics industry, but buyers remain plagued by long lead times and hiring concerns



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

Lead times and hiring • By Victoria Kickham

The accelerating global economic growth that began in late 2016 looks increasingly sustainable, painting a positive picture for the U.S. manufacturing sector in 2018, according to the latest outlook from the Manufacturers Alliance for Productivity and Innovation, a Virginia-based industry research and education firm. A rise in business spending, along with economic growth in Europe, East Asia, and Canada, add up to positive signs for U.S. industry, MAPI research shows.

Other economic indicators released late in 2017 bolster that view. The Institute for Supply Management's Purchasing Managers Index (PMI) registered 58.2 in November, indicating 15 straight months of growth in the U.S. manufacturing sector. A separate survey of procurement leaders conducted by the industrial buying group Prime Advantage was equally positive, revealing growing optimism among mid-level manufacturing firms heading into the New Year. Nearly 90% of the 100 purchasing and supply chain executives surveyed for the group's 16th Annual Purchasing and Manufacturing Survey said they expect their company's revenues to increase or remain steady over the next year.

All of this doesn't mean business will be going gangbusters in 2018--just that the sluggish times may be well behind us. Although economic uncertainties remain, the widely accepted outlook is for moderate growth as far as the eye can see. MAPI anticipates average U.S. economic growth of around 2% between 2017 and 2021, with U.S. manufacturing growth of between 1.2% and 1.8%.

"In spite of a range of political and geopolitical risks, the moderate but durable and widening world economic recovery is propelling a modest rebound in U.S. manufacturing growth after years of virtual stagnation," Cliff Waldman, MAPI Foundation chief economist, wrote in the group's fourth-quarter outlook, released in late November.

As conditions improve, other issues are rising to the surface and remain on buyers' watch lists for the coming year. Increasing lead times for some electronic components and the fight to find qualified workers for manufacturing jobs rank high.

Lead times, hiring

Longer lead times and rising prices for some components and materials is the top procurement concern heading into 2018 for Tim Crammer,

vice president of supply chain for Ohio-based Henny Penny, maker of commercial food service equipment. Procurement managers at Henny Penny are responsible for buying everything from raw materials such as stainless steel to industrial products and a wide range of electronic components. Crammer says lead times on some of those components are approaching 30 weeks or more -- opening the door to planning and production challenges as well as cost concerns.

"That's what 'keeps me up at night,'" Crammer says.

Indeed, 61% of respondents to the Prime Advantage survey cited component parts as one of the top cost pressures they face heading into 2018 -- a close second to logistics and transportation costs (62%) and distant third to raw materials costs (94%).

Also at the top of Crammer's list: hiring trouble on the factory floor. Although Crammer admits that Henny Penny's rural location is a large part of the problem -- the company is located 35 miles west of Dayton, Ohio -- he says finding workers to fill vital blue-collar jobs has become even more challenging in recent years. Henny Penny is addressing the issue through a combination of efforts -- including internships, partnerships with local schools and colleges, and tapping into employees' network of friends and family -- but challenges remain.

"We've not found that silver bullet yet," Crammer says, adding that employee retention strategies go hand-in-hand with recruiting efforts as companies seek to keep their production lines running smoothly.

This rings true across the manufacturing spectrum, and especially with mid-sized firms. Forty percent of respondents to the Prime Advantage survey cited a lack of qualified workers -- for blue- as well as white-collar jobs -- as the greatest potential barrier to business growth in the year ahead. Still, most say they need to add employees in 2018 to keep up with projections, making the hunt for the right workers an even more important task.

The issue promises to remain on the front burner. Manufacturing employment grew for the 14th consecutive month in November, according to ISM's December 1 PMI report, "in spite of signs of labor market tightening," the group said.



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NEWS & VIEWS

GAPPING GETS GOING AT GATEWAY



Specialist distributor Gateway has officially opened its ferrite core gapping facility in its UK based headquarters. A dedicated machine shop, test room and wash down area have been installed in the Cheshire facility to house the new surface grinding machinery that will enable Gateway to offer a ferrite machining service to its growing base of customers across Europe. It positions Gateway as the only UK based franchised distributor for TDK, Fair-Rite and Ferroxcube to offer this support service and means that customers can enjoy the benefits of a local solution from an accredited outlet supported by a team of technically qualified staff.

As a franchised outlet for some of the biggest names in ferrite products, Gateway is able to tap into its vast stockholding of ungapped cores to machine those cores to the desired dimension or AL value, and can provide a solution for small and large volume requirements with rapid turnaround, CAD based approval and an integrated works order solution built into its master operating system to provide for orderbook management and control.

To register your interest in the gapping and machining service from Gateway visit the dedicated page at www.theferritegateway.com, email gapping@theferritegateway.com or phone +44 (0)1270 615997.



NEW YEAR EDITION 2018

WHATS INSIDE

2



TDK DISTRIBUTED AIR GAPS IN FERRITE CORES

3



Siretta
Inspired Wireless M2M Technology
5 REASONS WHY SNYPER-LTE COULD BE FOR YOU

4



CAMDENBOSS
ELECTRONICS & ENCLOSURES
NEW UNIVERSAL ENCLOSURES FROM CAMDENBOSS



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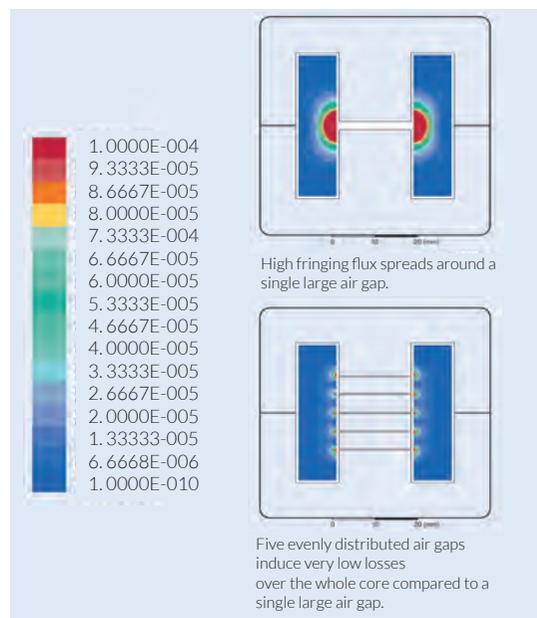


TDK DISTRIBUTED AIR GAPS IN FERRITE CORES

An air gap increases the magnetic resistance in the magnetic circuit. Magnetic saturation then occurs only at higher field strengths and reduces the slope of the B-H loop. The air gap is required to increase the power handling capability and makes the core inductance independent of the material permeability. However, the bigger the air gap, the higher is the fringing flux that spreads around it, e.g. into the copper winding. This phenomenon leads to higher losses (e.g. copper losses). EPCOS offers a technical solution designed to significantly reduce the fringing flux effect in order to reduce electromagnetic emissions and heating.

By offering several distributed air gaps rather than one large air gap in key core ranges, TDK is able to:

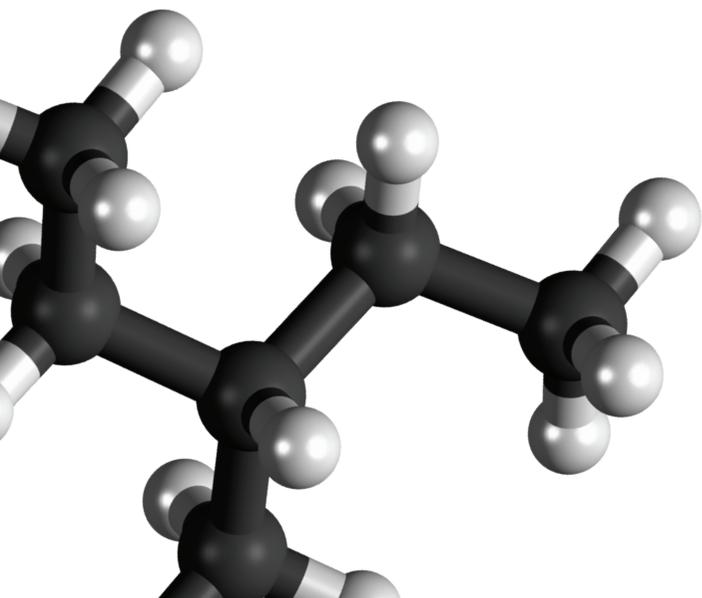
- significantly increased power density,
- achieve up to 70% reduction in leakage field losses,
- enable the use of a larger winding area by reducing fringing flux,
- achieve low winding losses compared to a single large air gap,
- reduce the necessary core size by one class thanks to lower winding losses, e.g. E 65, E 55 or ETD 59, ETD 54,
- enables copper saving.



To download the product brief, visit our technical blog area on www.theferritegateway.com



BOASTS TWO NEW 'BEST IN CLASS' MATERIALS



As one of the leading manufacturers in the ferrite industry, Ferroxcube has been providing ferrite cores with low power losses and high saturation magnetic flux density over a wide range of frequencies (20KHz-10MHz), to the power conversion industry. This has enabled greater miniaturization, lower weight and reduced power consumption in applications where the temperature rise and maximum achievable temperature can be estimated.

Energy loss in power conversion systems is generated, among others, in the magnetic components. Within the magnetics there are losses in the windings (due to ohmic losses) and on the ferrite core. Ferroxcube keeps on working to improve the ferrite materials used on them to offer solutions that enable fulfilling the most stringent energy efficiency standards, such as Energy Star or 80 Plus.

3C98

Ferroxcube 3C98 material is the new best in class medium frequency power conversion material (up to 400 KHz), offering extremely low losses under high flux conditions (250 mw/cm³ at 100 kHz, 200 mT) and high saturation flux (530 mT). Being a material with minimum loss at 100°C, the loss curve has been flattened, resulting in good performance at room temperature. These characteristics are more remarkable in the frequency band below 200 kHz.

3C96

Ferroxcube 3C96 is a premium material for power conversion used in transformers and inductors working below 400 kHz. Low losses and high saturation flux have lead 3C96 to be the preferred material on applications demanding high efficiency. Together with Ferroxcube 3C90 and 3C94, the 3C96 material completes the low loss power conversion material family with optimal working temperature at 100°C.

GATEWAY PARTNERS WITH SIRETTA FOR

IoT TECH EXPO GLOBAL 2018

As Siretta's technical specialist distributor in the UK, with headquarters in Cheshire, and comprising an industry-experienced team, with a time-served pedigree in the field of electronic components' distribution and supply, Gateway is able to offer IoT and M2M connectivity solutions with a Can-Do enthusiasm supported by a technical flair.

The company is proud to announce that it will partner with Siretta for the 2018 IoT Tech Expo event at Olympia, London on 18th and 19th April 2018, to share their inspired wireless M2M technology with visitors and guests.

Specialising in signal analysers, and complemented by their range of antennas, cellular modems, cellular routers, cable assemblies, RF connectors and adapters, Siretta products can offer the IoT and M2M designer a comprehensive connectivity solution.

The full range of Siretta products is showcased on Gateway's dedicated IoT portal,

www.theiotgateway.com, offering support services to help customers realise their objectives in the ever growing smart-world. Additionally, with its internal team of developers and programmers, Gateway is able to offer off-the-shelf 'connect, communicate and control' software and also offer bespoke development solutions when needed.

Together Gateway and Siretta has expertise in developing wireless technology solutions to a broad M2M application base, helping to add significant value to our customer's product proposition.

To register for the show, visit our dedicated show page and links on www.theiotgateway.com.



5 GOOD REASONS WHY SNYPER-LTE COULD BE FOR YOU

SNYPER-LTE, the all new advanced 4G analyser from Siretta, combines state of the art cellular network connectivity assessment along with contemporary design and rugged construction. SNYPER-LTE is an invaluable tool for systems integrators and engineers dealing with deployment and ongoing support of cellular connected M2M equipment. SNYPER enables rapid analysis of signal strength and other factors in order to maximise the uptime, data rate and resilience of 2G/GPRS, 3G/UMTS and 4G/LTE systems.

One.
SNYPER-LTE provides detailed information about available base-stations for 2G/3G/4G shown on its sunlight readable colour display. This includes the number of base stations for each network and relative signal strengths of each network – thus helping to select the best network provider for a given location.

Two.
SNYPER-LTE can save up to 50 surveys with simple download of results to a PC via the supplied USB cable.

Three.
The SNYPER-LTE kit comes with two antennas, one for 2G/3G signal scans and the other tuned to be sensitive at 2600MHz for more detailed 4G/LTE surveys. Furthermore, SNYPER-LTE antennas are detachable for connection directly to the installed equipment's antenna.

Four.
SNYPER-LTE SPECTRUM comes complete with liveSCAN antenna in the kit. The liveSCAN antenna is a directional antenna making it possible to point directly towards the base station providing the best quality signal. liveSCAN ensures installation of equipment and antennas at the very best position.

Five.
With long life rechargeable battery and in-car charger, combined with power saving modes, SNYPER-LTE is always ready to perform.

SNYPER-LTE is a key tool in optimising and improving the resilience of cellular connected systems, leveraging high quality of service to end applications.

The full range of Siretta SNYPER-LTE signal analysers, associated antenna and accessories are available online at www.theiotgateway.com.



NEW UNIVERSAL ENCLOSURES

FROM **CAMDENBOSS**
ELECTRONICS & ENCLOSURES

CamdenBoss, provider of performance engineered interconnection and enclosures, has launched a new range of Takachi high quality flanged comms boxes featuring removable end panels and added more sizes to two other Takachi lines.

The stylish new 94 series flanged comms boxes are available in 24 case sizes offering both low and deep profiles and are designed for surface mounting communications equipment such as WiFi routers, access points, measuring equipment and controllers. Moulded in off-white, UL94-V0 flame resistant ABS, the 94 series enclosures offer IP40 protection and feature built-in bosses for PCB mounting. Each standard unit includes top cover, flanged base, two detachable panels and four self-tapping screws. Operating temperature range is -10 to +60°C.

Sizes range from 67.3 x 124.3 x 22.5mm up to 240.5 x 270.5 x 60mm and CamdenBoss can provide additional customisation services such

as CNC milling, drilling and cutting, silk-screen and digital printing, external painting, surface finishing and EMC shielding.

CamdenBoss has also announced new sizes for two further Takachi product lines. The 92 series comms boxes feature over 20 additional models taking the total available to 30 while the 91 series IP67 heavy duty enclosures series expands with 10 new options.

92 series comms boxes are stylish ABS plastic cases available in off-white or dark grey UL94-V0 flame resistant ABS. Supplied with four rubber feet, these universal enclosures are suitable for applications such as free-standing WiFi access points, measuring equipment, controller and communication products. The new sizes extend the range which now encompasses dimensions from 67 x 100 x 22.5mm up to 240 x 240 x 60mm.

The Takachi 91 series heavy duty range offers high quality low profile IP67 waterproof enclosures that are ideal for use in tracking/

monitoring applications in harsh and outdoor environments. White enclosures are moulded from ASA UL94-HB plastic for high UV resistance while dark grey models are made from ABS UL94-V0 for high flammability rating. The 10 new sizes extend the range to 16 in total now covering 65 x 52 x 18mm up to 175 x 135 x 30mm. Standard units include lid, base, gaskets and fixing screws. A new size mounting kit option has also been added enabling smaller 91 series enclosures to be fixed to poles, pillars, posts and lamp posts.



EXPANDED LINE OF HIGH AIRFLOW MOTORIZED IMPELLERS



Orion Fans' expanded series of AC motorized impellers provide high airflows up to 1900 CFM and maximum static pressure of 5.4" H2O.

Designed for cooling industrial automation, building automation, commercial refrigeration, telecom, base station, kiosks and digital signage applications, Orion Fans ships the required capacitor with all impeller models for additional cost savings.



EASY ACCESS SLIDE & HINGED LOUVRED FILTER FAN KITS



The industry's lowest cost louvred filter fan kit now includes easy access slide and hinged guards for installing and replacing filters.

Louvred Filter Fan Kits offer an IP54, IP55 or IP56 rating and are used to reduce contaminants and prolong operating life in Process Control, Industrial Control, Instrumentation & Automation equipment. The heavy-duty LFGS Series slide and LFGH Series hinged louvred fan guards reduce maintenance time and cost.

Distributor and Supplier Focus

UK expansion offers buyers stability



Ansmann UK has added another warehouse to the five units it already owns, effectively increasing its available warehousing space by 33 per cent. With Brexit ever closer and a trade agreement with Europe still up in the air, this bold expansion will offer clients several benefits.

Not only will customers have access to increased stock levels, with the aim of providing the

stock they need when they need it, buyers will also see stable pricing, due to increased ordering from the Ansmann logistics centre in China.

Ultimately, Ansmann believes the move reflects the key values on which its success depends: fast deliveries and great customer service, along with high quality, reliable products.

www.ansmann.co.uk

Distributor and Supplier Focus

Perfect your balancing act

Without battery balancing, the weakest cell in a multicell battery always determines the capacity of the entire system. Since individual cells age differently, however, it is impossible to ensure that all cells have the same capacity, even with careful selection.

Lithium-ion batteries also present challenges. Like other battery types, they are subject to a process of wear and tear during charging and discharging, due to chemical changes.

Battery management systems can help. They are used to control and monitor the charging and discharging process of high-performance battery packs in autonomous power electronics applications such as electric and hybrid vehicles, or robotics. Their main task is to ensure that each individual cell does not exceed or fall short of a defined state of charge limit for the application, both during loading and unloading.

schurter.com



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As of January 1, 2017, Multi-Contact conducts its business and services as Stäubli Electrical Connectors.

www.combitac.com

Multi-Contact



STÄUBLI

Investing in speed and agility

A rapid response is critical in today's market. Here contract electronics manufacturer, Wilson Process Systems, explains how investment in kit and capabilities underpin its responsive operation

Key to Wilson Process Systems' service is a policy of continual investment in new equipment, which helps the company keep pace with customer demand and maintain competitiveness. In 2017, this saw further additions to the plant list, with investment in additional automated optical inspection and selective soldering equipment, as well as increased surface mount capacity.

Prioritising quality

At the heart of the company's offering, the surface mount factory contains four lines, giving a capacity of over 200,000 component placements per hour. This area also features automated optical inspection, with post-reflow 3D and 2D AOI to inspect every board, post surface mount. Expertise in through-hole LED assembly is supported by automated insertion equipment that delivers consistent assembly performance. Hand assembly is also available, with over 60 trained operators on the shop floor offering all the skills necessary to meet certified quality standards.

Overall, the company currently employs approximately 100 personnel. It boasts 37 years' experience in total and specialises in sub-contract printed circuit board assembly. Drawing on these resources, WPS can deliver anything from bare PCBs to fully tested, electro-mechanical assemblies from its 30,000ft² production facilities. It supplies a range of industries including consumer, industrial, entertainment, medical, rail, defence, highway and urban signage, lighting and power generation.

Embracing automation

To meet the demands of these diverse industries, many of which require equipment to operate in extreme environments, WPS has invested in the latest coating equipment. This enables the company to offer intelligent selective conformal coating alongside existing resin encapsulation services. Automatic conformal coating delivers precision and throughput rates that cannot be matched by hand application. With over 25 years of encapsulating experience, WPS can offer encapsulants for a variety of applications. Its capabilities include working with UL approved polyurethane or silicon resins, epoxy or polyurethane resins, in-house mould making and oven curing.

In addition to these services, WPS also offers electro-mechanical assembly, which includes full turnkey box-assemblies, wiring harnesses and enclosures.

Once the assembly request has been fulfilled, WPS can carry out testing to client specifications. Finally, WPS offers a packaging service, as well as worldwide shipping.

Effective outsourcing can deliver exceptional value and reduced risk, which is why Wilson Process Systems also extends its strategy into the procurement process. The company's materials and procurement specialists boast years of experience and a network of trusted, franchised vendors and distributors to source the right components, at the right time, and at the right price.

With the latest surface mount, automated through-hole and hand assembly capabilities in place, alongside its sourcing and procurement skills, WPS caters for a variety of customer needs, from prototype through to high-volume batch quantities.

www.wps.co.uk



The WPS purchasing team can suggest component suppliers, arrange samples and flag up long lead-times



Selective soldering facilities



WPS can deliver anything from bare PCBs to fully tested assemblies from its 30,000ft² production facilities

WILSON

PROCESS SYSTEMS

ELECTRONICS MANUFACTURING SERVICES

In-house processes including:

Oversized PCB Capability

Automated SMT/Through-Hole Assembly

Hand Assembly/Box Build

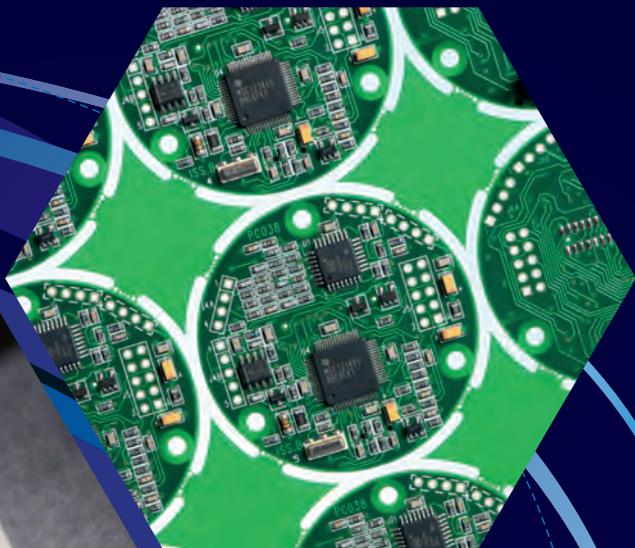
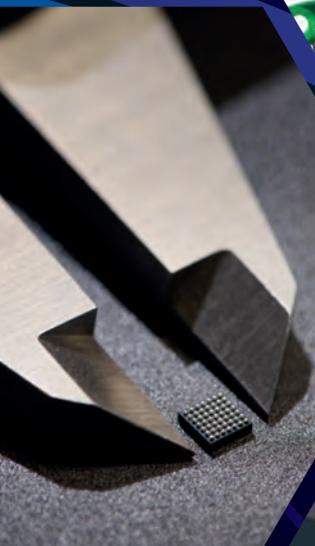
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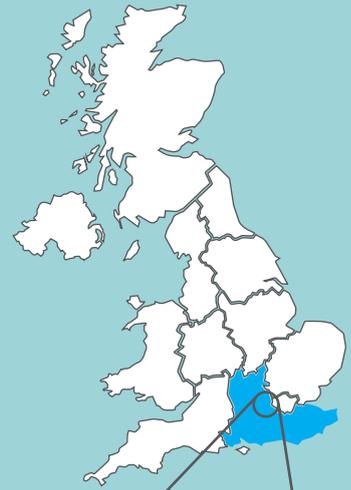
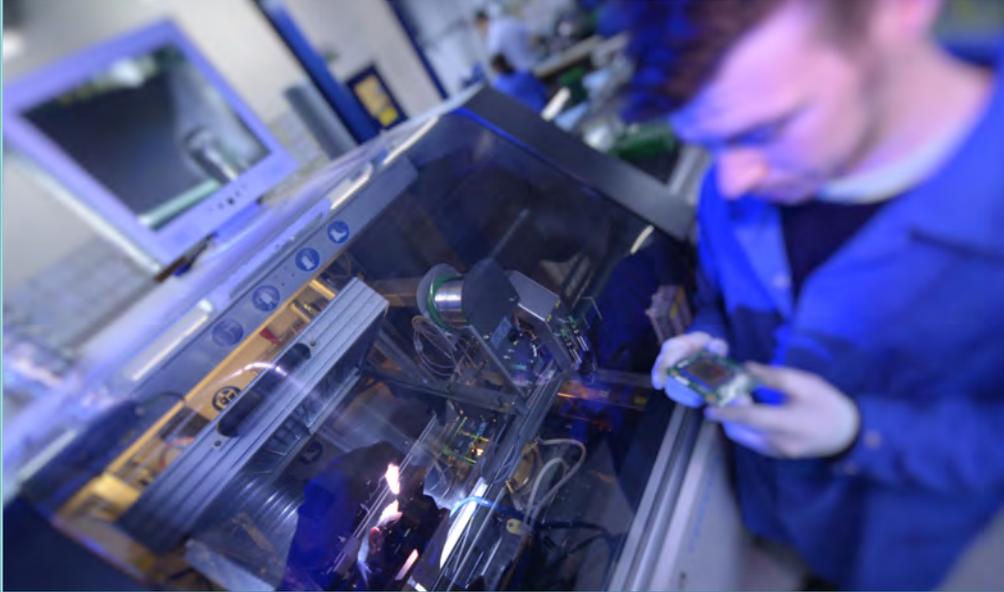




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- PCB & Functional System Test
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Rugged tablet withstands heavy use

Built for maximum resilience, Display Solution's latest tablet computer provides stunning graphics in tough environmental conditions

Designed to perform at maximum capacity under rugged conditions, Aaeon's RTC-1200SK, a multifunctional, military grade tablet computer, provides protection and resilience for industrial heavyweight machinery and equipment.

With operation temperatures from -20 to 60°C, the 11in RTC-1200SK is built to withstand rugged environments. The tablet boasts a wide voltage range of 19V DC, 3.42A and excellent wireless communication via base-centric routing, along with full I/O.

Near field communication is embedded within the tablet, supporting contactless tap-and-go connections to expedite processes and workflows. Visually, the RTC-1200 is designed to provide stunning graphic display support, with an output of 1000 nits. This sunlight readable unit also incorporates an RGB feature that enables users to adjust the vividness of the display.

Product manager for AAEON's rugged mobile division, Cindy Lu, said: "We've placed emphasis on providing an all-around solution with the RTC-1200SK, which is why we've

rolled out a complete family of accessories for this rugged tablet.

"Every manufacturer's first and foremost concern is to lower back-end customisation costs and ensure seamless integration with existing systems, which we provide with the RTC-1200SK family of products. Application wise, it's your best choice for heavy-duty vehicles such as industrial trucks, construction machinery, and military equipment."

www.displaysolutions.co.uk



NFC is embedded within the RTC-1200SK, supporting contactless tap-and-go connections



Every manufacturer's first and foremost concern is to lower back-end customisation costs and ensure seamless integration with existing systems

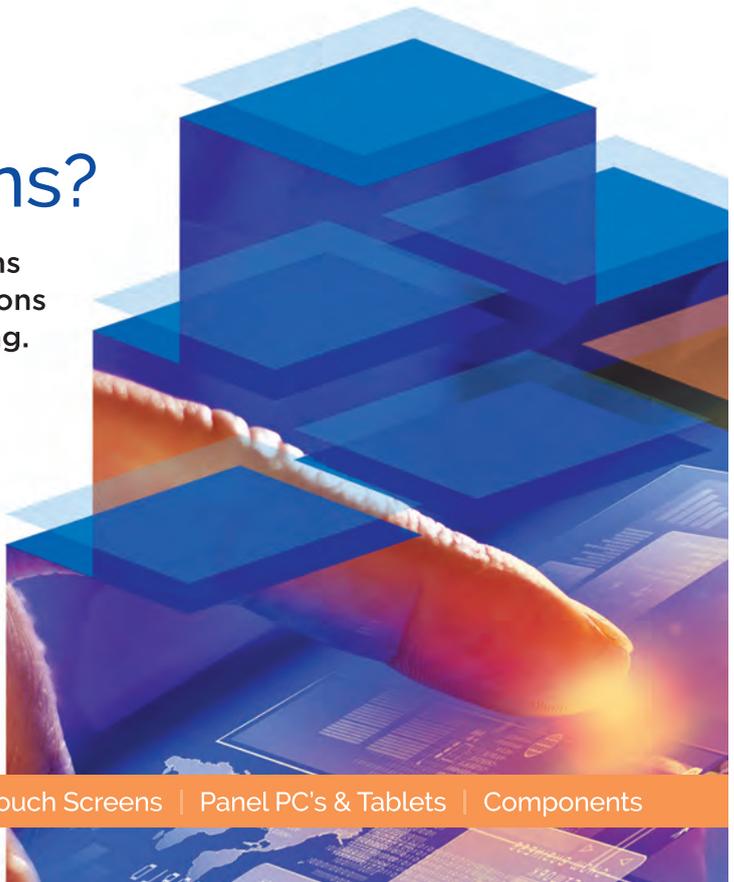
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Agreement has magnetic appeal

A new distribution agreement will see Jauch Quartz UK extend its custom magnetic capabilities in 2018, backed by the expanded logistics facilities it established last year

In a move designed to support the growing product and logistics requirements of an increasingly demanding and diverse customer base, Jauch undertook an exciting expansion last year. Backed by growth rates

of over 15 per cent compared to the previous year, the business moved into bespoke new premises dedicated to its UK and Ireland business.

Managing director, Nicholas

Ribton, said: “The investment will directly benefit our long-term partner franchises, Jianghai Capacitor and NIC Components.”

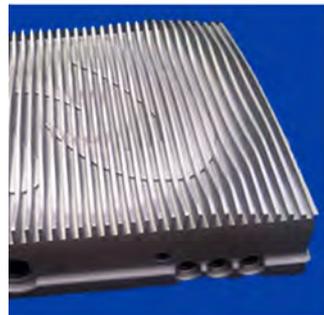
This was followed by the announcement of a new,

exclusive UK distribution agreement with Superworld Electronics; an agreement which fulfilled the company’s sustained search for a first-class custom magnetics design partner.

Nicholas Ribton continued: “Superworld brings innovative products in the areas of wireless charging and local area network magnetics, as well as comprehensive custom transformer manufacturing capability and broad coverage in magnetic and EMC components. Offered alongside Jauch Quartz UK’s technical and logistics skills, I’m confident the UK and Ireland customer base will be excited about this partnership.”

Superworld Electronics’ senior sales manager, Asia and Europe, Edwin Chan, added: “Our portfolio enables us to match the right products and solutions to customer’s specific needs. This exclusive agreement enables us to leverage Jauch’s formidable field application team in the UK, together with our prototyping and manufacturing resources, to bring these benefits to many more customers in UK and Ireland.”

jauch.co.uk



Jauch Quartz UK invested in bespoke new premises dedicated to its UK and Ireland business



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- MEMS oscillators
- Battery packs
- Lithium batteries
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Making the right connections

Independent franchised distributor, Rhopoint Components, recently added connector products to its line-up, adding to existing expertise in precision components and sensors

The international marketplace for precision electronic components and sensor products has exacting requirements; demands that **Rhopoint Components** has been meeting since 1975. Last year, **Rhopoint Components** expanded its expertise by becoming an authorised supplier of connector products. As an independent franchised distributor of specialist precision electronic components, sensors and connectors, Rhopoint represents more than 20 different manufacturers.

The company aims to offer the highest level of technical field and internal office support for its entire product range, backed

by an efficient stocking and distribution operation. Extensive product knowledge reflects the expertise of its manufacturing partners, enabling a quick response to technical questions.

Focused on design-in and logistics support, Rhopoint serves a variety of industry sectors. The company's offering includes: resistors, capacitors, relays, JFETS, high temperature semiconductors, digital isolators, magnetic sensors, NTC thermistors, pressure and temperature sensors and connectors.

Rhopoint Energy was created to serve the oil and gas, subsea and renewables industries,

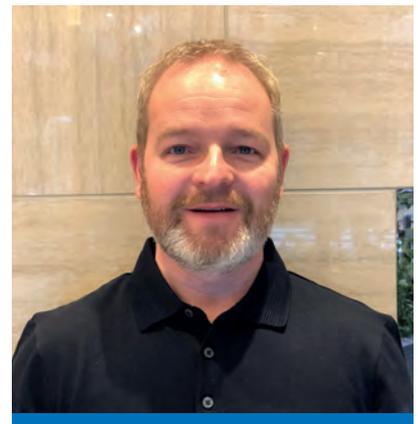
offering a range of products for today's demanding needs. It also boasts access to expertise in pressure and temperature sensors, as well as high temperature components designed especially for these sectors.

To complete the picture, **Rhopoint Sourcing** was founded in 2010 as a support service for purchasing teams. Covering many industry sectors, it can help with lead time, obsolete and otherwise hard to find electronic component issues.

www.rhopointcomponents.com
www.rhopointenergy.com
www.rhopointsourcing.com



Head of Sales, Components Division, Omer Mirza



Head of Sales, Sensor Division, David Beatson

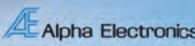


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Room for growth

Overseas manufacture can offer cost advantages, but demand for reliability and flexibility means UK manufacturing continues to grow. CML believes it's the buyers prerogative to choose the best option

For over 50 years, CML has been designing and manufacturing lighting components and systems. Its engineering team has developed products for a range of industries including automotive, industrial, military and aerospace. To provide customers with the services they require, CML utilises its manufacturing facilities in both the UK and the Far-East.

With the cost advantages of Far-East manufacturing well documented, many will wonder why the company continues to develop its UK facility. Commercial manager, Roger Neal, explained: "Some customers are surprised that we still have a volume

manufacturing facility in the UK. With increasingly discerning markets, however, the demand for reliability and flexibility means local manufacturing support remains a key factor for many UK businesses."

Focus on flexibility

Benefits of UK manufacture include shorter lead times and minimum order quantities, particularly on customer specific items. CML's engineering team can rapidly adapt existing products to give customers the solution they require. Recent examples include bi-colour panel mount indicators, custom lead-wire attach and indicators for non-standard voltages.

The UK option also enables CML to respond rapidly to evolving product designs and delivery schedule changes. CML operations manager, Kevin McInerney, continued: "Fifty years of meeting automotive industry demands has seen us develop lean manufacturing processes that we can apply to other industries. With a stable, flexible, multi-skilled workforce, CML can respond to rapidly changing customer demand with a 'right first time' philosophy."

High volume items are still intrinsically suited for manufacture in CML's Far-East facility, but this does not mean a decrease in quality. All activities are controlled in



Benefits of UK manufacture include shorter lead times and minimum order quantities

accordance with an ISO9001/TS16949 automotive quality management system and with a history of supplying the aerospace sector, CML is also equipped to meet demanding traceability requirements.

Operations manager at EAO, Richard Humphreys, commented: "CML has been manufacturing for EAO for over 10 years. Whether our requirements are for established products or new opportunities, CML always delivers."

www.cml-it.com



High Quality Panel Mount Indicators

CML IT continues to be the number one supplier of panel mount indicators, LED lamp replacements and LED tower lamp solutions.

PMI highlights include:

- Plastic and metal bezels with a wide range of options in stock.
- IP40 and IP67 ratings.
- Development of custom solutions.
- UK manufacturing facility.



Contact our Customer Services department to discuss your requirements today.



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Visit our website at: www.cml-it.com



Build custom hi-rel connectors online

Lane Electronics has added to its online connector offering. Customers can now purchase a selection of standard 8D series/38999 connectors for same day dispatch, as well as 'building' custom solutions from Lane's connector piece parts inventory.

High density, 8D series/38999 threaded coupling connectors are available in a range of shell materials including aluminium, composite, marine bronze and stainless steel. They can also be supplied in different finishes, including RoHS compliant, black zinc nickel, nickel and olive-green cadmium. The connectors are manufactured by Souriau, for which Lane is an assembling distributor.

Several contact types can be supplied including: signal, power, high power, coax, triax, quadrax or Elio fibre optic. To complete the solution, Lane Electronics offers a range of accessories including plug caps, receptacle caps and gaskets, with a choice of plating options and steel wire rope or nylon cords.
www.fclane.com



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New housings extend oxygen sensor options

SST Sensing has introduced two new housings for its LuminOx range of sensors to address ambient and flow-through applications.

LuminOx factory-calibrated oxygen sensors measure oxygen levels using the principle of luminescence quenching. This non-depleting technology with in-built pressure and temperature compensation means LuminOx devices claim longer lifetimes than conventional oxygen sensors, as well as higher accuracy and virtually no cross sensitivity to other gases.

The new LOX-02-S sensor is a similar diffusion type to the original LOX-02, however it has a sealed base that is gas-tight, meaning only the face of the sensor with the protective membrane needs to be in the sample gas environment.

LOX-02-F sensors feature a flow-through type housing with 4.5mm outside diameter push-fit tubing interconnections. This allows a clean gas sample stream to be drawn into the sensor for a faster response and the option to remove the sensor completely from the process environment if required.
www.sstsensing.com



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From design to reality

Currently celebrating its tenth anniversary, Trizo highlights its investment strategy and future-focussed ethos as a fundamental basis of our success

During ten years of business Trizo has evolved into a dynamic manufacturing business, offering contract electronics manufacturing services to a range of industries throughout the UK. The company is proud of its track record of organic growth and sustained profitability, highlighting quality standards as fundamental to its success; Trizo gained AS9100 accreditation in 2009, which underlines the quality of the products it manufactures, many of which are life critical.

Thanks to this level of service, Trizo has many satisfied customers, with whom it works closely to identify their requirements and to deliver their products on time and at a competitive price.

Expanding capabilities

In order to better meet their needs, at the end of 2015, Trizo relocated to a larger, purpose built facility in Bridgwater. This enabled Trizo to expand its workforce and invest in new manufacturing equipment

to broaden its production capabilities.

Managing director, Michael Nicholson, remarked: "We have achieved this milestone through the hard work and dedication of our staff and our ethos of delivering quality products with a professional service to our customers."

Constantly looking to the future, Trizo is now focussed on the next decade and has begun implementing plans to deliver substantial additional services and innovative electronics manufacturing technologies. In September 2017 Trizo took delivery of a new Europlacer iineo II+ surface mount line to support its current SMT equipment and to offer greater flexibility for customers.

Future investment

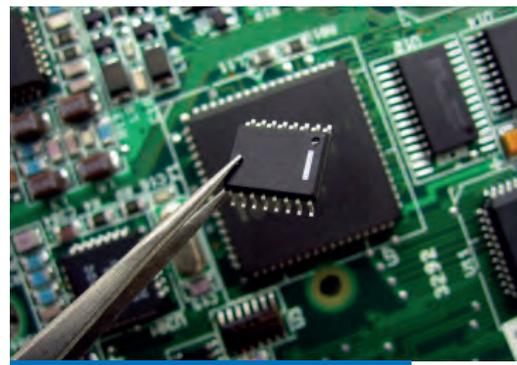
As this addition to the production area demonstrates, Trizo is committed to investing in high technology equipment, ensuring the company thrives in the contract electronics manufacturing industry for many years to come.

Selecting Trizo as a contract manufacturing partner can therefore help ensure clients' drawing board designs become a reality. Trizo employs a skilled team, dedicated to building product right first time, backed by a purchasing team of strategic buyers who work with approved supply chain partners to achieve competitive prices. The company also aims to achieve the highest quality in every procedure it undertakes, providing customers with a high calibre manufacturing solution.

As it embarks on its second decade of business, Trizo looks to the customers that have grown with it over the last ten years, heralding a new chapter of continued support, as well as working with new clients. With this in mind, the company has unveiled a new brochure reflecting its ambition to expand its presence and highlighting the future strategic direction for the next era of success.

www.trizo.com

A new Europlacer iineo II+ surface mount line offers greater flexibility for customers

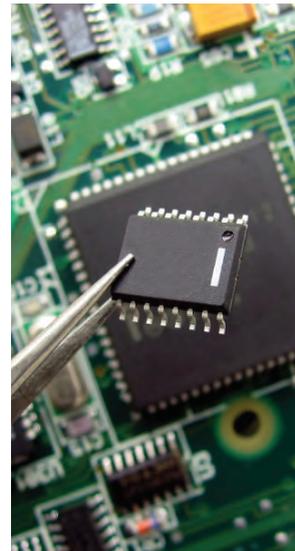
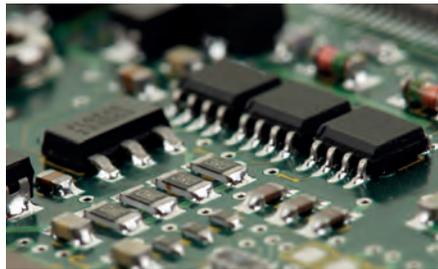


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Together we can create sustainable business

Sustainability is as important as quality, explains PCB specialist, NCAB Group. Social, environmental and ethical responsibility are key to sustainable success

From as far back as 2014, the NCAB Group has embraced a sustainability strategy that commits to a responsible approach in every aspect of its operations — socially, environmentally and ethically. Today, NCAB is working to improve its sustainability based on three groups of stakeholders: the supply chain, employees and customers.

One major initiative designed to address sustainability in the supply chain was the appointment of Jenny Zhang as permanent sustainability manager in China. Jenny enables NCAB to focus on sustainability issues more proactively and in close dialogue with partner factories.

Strategic purchasing manager at NCAB Group, Anna Lothsson, explained: “We conduct sustainability audits at our main factories in China every two years, with a follow-up within six months to verify that improvements have been implemented.”

A sustainability audit also forms part of the evaluation process for potential new partner factories. Anna continued: “Sustainability is from the outset, an integral part of our factory evaluation process. Meeting our requirements in this area is equally important as meeting quality requirements.”

On-site expertise

Having local employees on the spot in China is vital to ensuring that thorough evaluations are carried out. Anna explained: “At our audits, Jenny can read original documents, conduct interviews and talk with factory employees in their own language.”

As head of sustainability for NCAB in China, Jenny is responsible for controlling compliance with NCAB’s sustainability requirements. She conducts audits, as well as checking to ensure that factories comply with the REACH and RoHS environmental regulations.

Jenny added: “I help our factories address areas such as labour and working conditions, health and safety, environment and chemical management. Recently, we have updated our audit template to monitor a greater number of items and obtain a better overview of the factories’ sustainability work.”

As its framework for sustainability, the group applies ISO 26000, an international standard providing guidance on social responsibility, which covers several aspects of sustainability. NCAB has integrated ISO 26000 into its internal audit system and performs an annual declaration of compliance with the standard, which is verified by a certified body.

So, what does a sustainability audit entail? First, NCAB goes through documentation such as policy, goals, activities, performance reports and improvement plans. Documents covering working time, salaries, education and safety are also checked.

Sustainability manager, Jenny, continued: “I also carry out inspections on site. For example, I make certain they don’t employ child labour, that they have fully functioning fire safety systems, personal protection equipment and first aid.



Left: Strategic purchasing manager, NCAB Group, Anna Lothsson
Right: Chief operations officer, NCAB Group, Chris Nuttall

These should be documented and receive regular service checks. I also verify how chemicals are handled, transported and stored and scrutinize waste and sewage treatment, as well as ventilation systems.”

Value of compliance

Looking at the cost of this sustainability work, NCAB group chief operations officer, Chris Nuttall, explained how it helps to generate income. He commented: “Our efforts provide a doorway for new customers. The equation adds up thanks to the priority customers put on secure deliveries and ensuring that the partner they work with will be around in the long term.”

Accordingly, NCAB has noticed growing interest from customers around these issues. Anna Lothsson concluded: “Questions about how we work with sustainability are increasingly part of customers’ evaluations. We are all part of a supply chain and together we can create a sustainable business.”

www.ncabgroup.com



NCAB is working to improve its sustainability based on three groups of stakeholders: the supply chain, employees and customers

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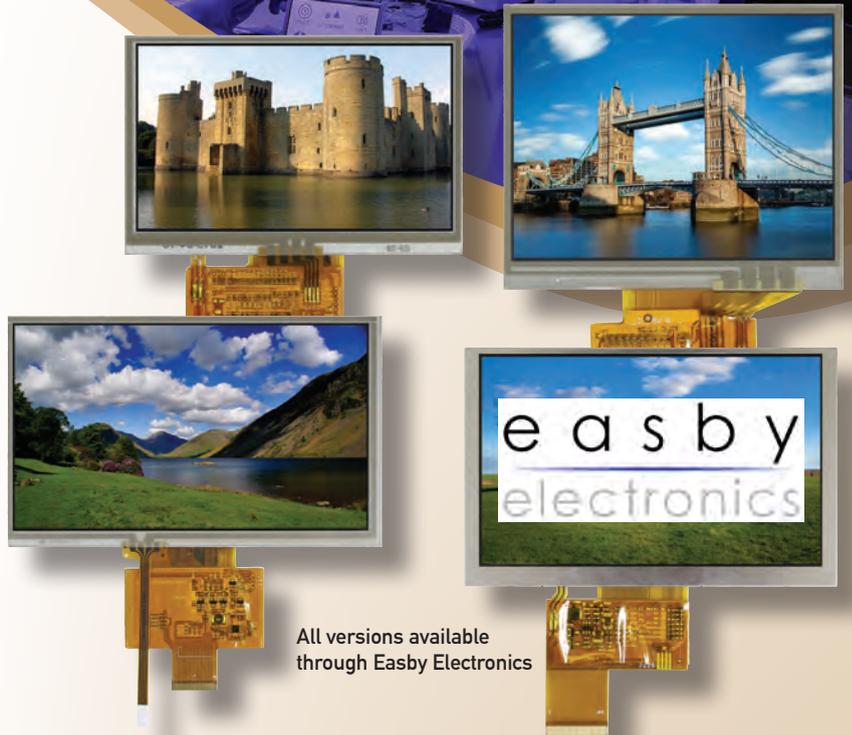
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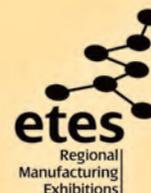
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Cable glands improve electrical security

Optimas has boosted its portfolio with the addition of cable management solutions from Wiska.

First to be added is the Wiska vented cable gland range, which features ingress protection up to IP68 and IP69K as well as a pressure equalising venting membrane that helps avoid condensation. For maximum flexibility, the range includes application specific membranes with different air flow rates and properties such as resistance to UV, salt water and aggressive chemicals.

Completing the new cable gland line-up is the stainless-steel HAT gland, a high-performance gland aimed at supporting electrical applications in hygienic environments. This gland offers IP68 and IP69K ingress protection, delivered by a silicone seal to ensure that water and dust cannot compromise equipment integrity. The smooth design offers easy cleaning, while stainless steel construction provides corrosion and chemical resistance. This is ideal for applications where high pressure washdowns are required, such as food processing lines or laboratories.
www.optimascomponents.com



Expanded industrial Ethernet choice

Now available from Aerco, AlphaWire has added 10 new industrial Ethernet products to its Alpha Essentials range, including CAT 5 Profinet, CAT 5e, CAT 6, and CAT 7 options. These cables are ideal for discrete and process manufacturing, such as applications within the robotics, medical, and automation industries.

The expanded range is designed to offer improved component integration and bandwidth up to 10Gbps. All new constructions are compatible with RJ45 connectors of either T-568A or T-568B pin assignments.

Highlights of the expanded offering include a CAT 7 construction that enables customers to future-proof their industrial network. Part number 74010 is a CAT 6 PVC-jacketed Ethernet cable in a flat construction, ideal when space is at a premium.

There are also seven new CAT 5e cables, including two built to Profinet industry standards plus one CAT 5e LSZH construction suitable for the medical and transportation industries.

All cables in the Essentials Ethernet line feature jacketing material of ZH-PUR, PVC, and TPE ideal for harsh environmental conditions. Cables can withstand -40 to 90°C, with varying flexibility and approvals.
www.aerco.co.uk

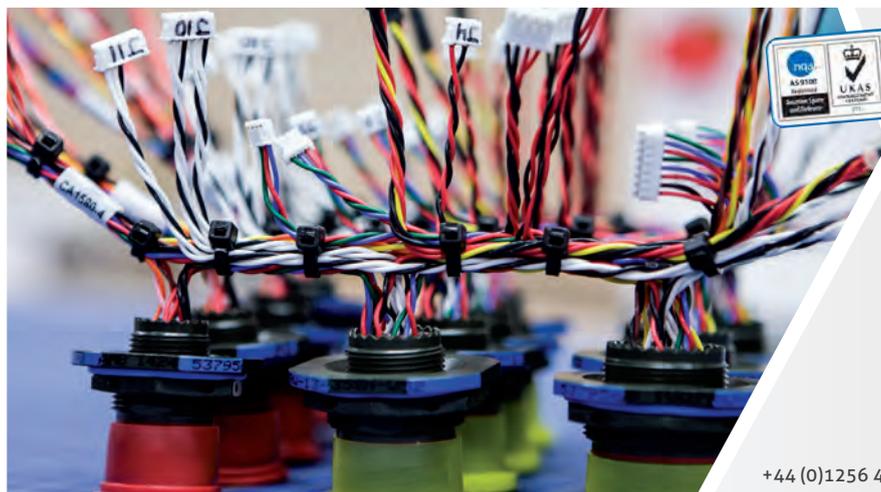
E-paper points the way for digital signage

Flat panel display specialist, Crystal Display Systems, is offering an environmentally friendly display technology that can be used in various applications including retail and transport, for things like bus stops and rail information boards.

Unlike traditional back lit flat panel displays that radiate light, e-paper displays work with reflected light and can be operated without power for a period, which opens many new uses.

The e-paper display system can be powered by a solar panel and/or battery, with a wireless broadband connection for a remote signage solution in otherwise inaccessible places. In the event of power loss, the bi-stable technology will keep the current message on the display. When implemented correctly, CDS claim the technology can use up to 99 per cent less power than a TFT and could be self-reliant for months or even years.

Ideal for transportation signage, benefits include: excellent clarity, instant updates and minimal power usage. They are readable in bright light as well as semi-darkness and can withstand all weather conditions.
crystal-display.com



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Optimise logistics with supplier know-how

With access to own brand products and key suppliers, Telegärtner UK utilises its experience to provide vendor reduction and controlled logistics along with technical expertise



As part of the German Telegärtner Group, Telegärtner UK not only has access to the company's coax and datavoice components, but also to the group's worldwide support network. In addition to advice on complex technical problems, Telegärtner UK can use group production facilities including turning metal parts, plastic moulding and fibre cable assembly.

These facilities support the company's role as a supplier and distributor in the resale market, with years of experience supplying to the professional electronics industry. Besides Telegärtner's own coax and datavoice components, the company also represents a selection of German manufacturing companies such as Binder, FCT, Provertha, Hummel, Pei Tel and Pro Car.

Drawing on this experience in supplier relationships, Telegärtner UK uses its industry knowledge to offer

Telegärtner UK's one-stop-shop solution can help customers optimise their supplier base and logistics

vendor reduction services. It can also utilise various methods to control stocking and shipping of components, including kanban or buffer stock arrangements, consolidated or split shipments, forecast or call-off orders.

With the help of an extensive product range across interconnect components and cable assemblies, both resale components and in-house manufactured cable assemblies, Telegärtner UK's aim is to offer a true one-stop-shop solution to help customers optimise their supplier base and logistics. Look out for Telegärtner UK at Southern Manufacturing 2018 for a more in-depth discussion of these services.

www.telegaertner.co.uk

Flange sockets support secure EMC connection

Binder UK has introduced a new M16 flange socket featuring a ground pin designed to give the connectors a secure electromagnetic compatible connection on printed circuit boards. The Series 680, 723 use a standard M16 panel cut-out and are intermateable with all M16 plug and cable components.

With versions rated to IP40 and IP67, these female mass contact connectors are rated at three to 7A. Binder UK can supply the M16 flange sockets with three to 12 contacts and termination is dip solder. www.binder-connector.co.uk



Shocking colour choices

CamdenBoss has announced shockproof covers and new sizes for its Takachi 87 series of hand held enclosures.

Hand held enclosures in the 87 series are ideal for measuring instruments, test equipment, wireless communications and medical devices. Moulded from high impact UL94-V0 flame retardant ABS, the basic enclosure features a removable end panel and recess for keypads or labels. The new shockproof silicone covers are available in five standard colours and nine sizes fitting tightly over the base, sides and around edge of the lid. Standard colours are green, orange, navy blue, light grey and dark grey, with pantone matched custom colours available for minimum order quantities of 500.

The three new sizes in this range measure 145 by 96mm, in heights of 20, 27 and 35mm. Offering IP40 protection, 87 series hand held enclosures are suitable for use between -10 and 60°C. www.camdenboss.com

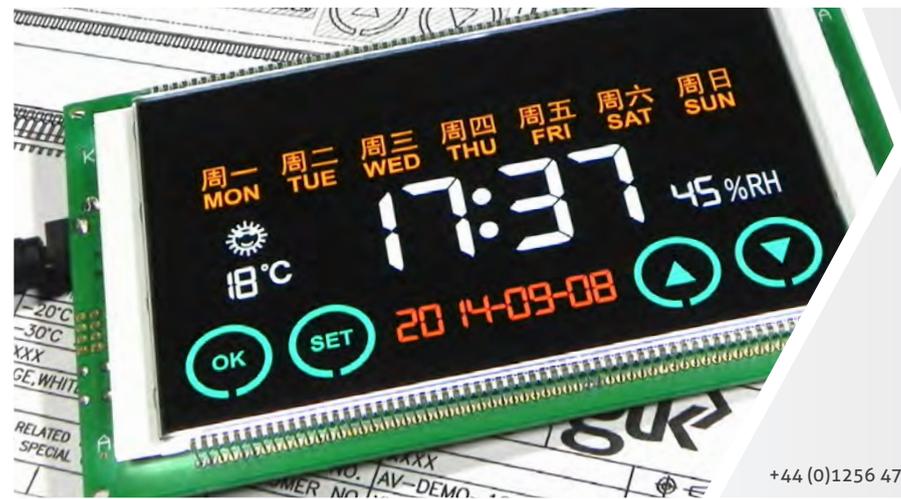
Laser diodes maximise optical power

The Optoelectronics Company states that USHIO's new high-power laser diodes are now in mass production. As laser projection equipment and laser TVs get smaller, these two new diodes are said to offer the massive optical power output required to facilitate better image quality, more vivid colour and greater clarity.

The HL63283HD is a visible wavelength laser diode in a nine millimetre diameter CAN package, said to offer high heat dissipation and wall plug efficiency of 40 per cent. It offers 1.2W optical output power at a typical centre lasing wavelength of 637nm at 25°C. Typical operating voltage is 2.3V, LD reverse voltage is 2V with a typical threshold current of 340mA and operating current of 1,300mA.

Housed in the same size and type of package, with identical efficiency, the HL63290HD offers even more optical output power of 2.2W CW at a typical centre lasing wavelength of 638nm at 25°C. Typical operating voltage is 2.4V, LD reverse voltage is 2V with a typical threshold current of 600mA and operating current of 2.4A.

Managing director of the Optoelectronics Company, Tony Pope, said: "These two new USHIO red laser diodes enable overall output power to be maximised without increasing the number of components." www.oe-company.com



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Expect 5% growth in European semiconductor market in 2018

Chip sales growth won't be as strong as 2017, but demand for integrated circuits from automakers and their suppliers and from industrial equipment manufacturers will continue to be robust



James Carbone

The growth rate of the European semiconductor market will slow in 2018 after a year of strong sales growth driven by healthy demand for chips by the automotive, industrial, communications and industrial segments and higher prices for many semiconductors.

Semiconductor sales in Europe increased 18 per cent in 2017, according to researcher IC Insights. "We saw exceptional growth in 2017 in Europe, much like what we saw across the broader global semiconductor market," said Brian Matas, vice president of market research for IC insights. Growth will continue, but at a slower rate. European IC sales will rise 5 per cent to \$34.3 billion in 2018 and increase to \$35.7 billion in 2021, he said.

"That's still pretty solid growth for Europe," said Matas. He noted that in 2016 sales in Europe increased just 1.7 per cent before growing 18 per cent in 2017.

In fact, semiconductor sales in Europe have a pattern of

increasing one year and then falling the next. For instance, in 2008, European chip revenue increased about 10 per cent, but then fell 25 per cent in 2009, said Jim Feldhan, president of Semicore Research. In 2010 sales increased 4 per cent and then declined 3.5 per cent in 2011 before increasing again in 2012 only to be flat in 2013, said Feldhan.

In Europe the automotive sector is a big driver for semiconductor sales. "For 2017, we have the automotive IC market in Europe growing 21 per cent," said Matas. "That's exceptional growth although there was also strong growth in the consumer and communications segments," said Matas.

He added that over the next five years automotive will be "near the top" in terms of driving European IC sales growth. More cars are being equipped with safety features such as collision avoidance, rear window cameras, and lane change warning features, which require a variety of semiconductors.

In addition, electric vehicles (EVs) and the continuing development of autonomous cars will further drive chip demand over the next five years. EVs require more semiconductors than a conventional car and EV sales are increasing. For instance, a gasoline-powered vehicle contains on average of \$330 of semiconductors. Hybrid EVs contain \$900 worth of chips and standard EVs have more than \$1,000 of semiconductors, according to market research firm McKinsey.

Semiconductor manufacturers are also bullish about the electric vehicle market because sales of EVs will grow over the next 10 years. In 2016, EVs accounted for less than 1 per cent of vehicle sales. By 2020, EVs could represent 5-10 per cent of vehicles sales because expected advancements in battery charging and reduction of battery costs will make them more affordable. By 2030, 35-50 per cent of vehicles could will be electric, according to McKinsey.

As a result, electric vehicles are a focus for many semiconductor

manufacturers, including STMicroelectronics, based in Geneva, Switzerland.

A clear growth driver

Electric vehicles represent "a clear growth driver for our industry in the next few years, with car electrification semiconductors growing more than three times faster than the average semiconductor," said Carlo Bozotti, president and chief executive officer of ST.

He said ST is ramping up production of its silicon carbide (SiC) MOSFETs used in electric inverters of EVs. It is also supplying new 1200V SiC diodes in electrical-vehicle charger platforms.

The chipmaker is also seeing growth in demand for its automotive microcontrollers used in body and gateway applications and in onboard charging applications and ignition systems.

Automotive is helping ST grow its sales in Europe and other regions. The chipmaker said it had 25 per

By the Numbers



\$8.6 billion

The size of the analog semiconductor market in Europe in 2017

Source: Semicore Research



\$35.7 billion

The size of the European IC market in 2021

Source: IC Insights



18%

The growth rate of the European semiconductor market in 2017

Source: IC Insights



\$6.2 billion

The forecasted size of the European memory IC market in 2018

Source: Semicore Research



5.3%

The compound annual growth rate of the European integrated circuit market from 2016 to 2021



Carlo Bozotti, president and chief executive officer of ST



Electric vehicles represent “a clear growth driver for our industry in the next few years, with car electrification semiconductors growing more than three times faster than the average semiconductor”

cent increase in sales in Europe through late 2017 and expected to post 18 per cent revenue growth globally for the year.

“It seems like Europe is always at the forefront of a lot of automotive innovation,” said Matas. “Audi and Daimler-Benz are very innovative, forward thinking when it comes to electronics in automobiles,” he said. Because of government mandates, consumer demand and the transition to more autonomy in vehicles the outlook is positive “for future demand of ICs in vehicles,” he said.

Double-digit growth through '21

In fact, automotive IC sales in Europe will grow 14 per cent in 2018 and have a compound annual growth rate of 12.5 per cent through 2021, according to IC Insights.

That is of course good news for ST and other European chipmakers including NXP and Infineon, the two top automotive IC manufacturers in the world. Forty-five percent of NXP’s product revenue is from automotive. The company makes microcontrollers and microprocessors, power management ICs, sensors and other ICs for the auto industry. Its automotive business increased about 11 per cent year-to-date through October. Infineon, which makes ICs for

alternators, airbags and engine control, is also the leader in high IGBTs for hybrid electric cars. Automotive represents 42 per cent of its business.

The industrial segment, which includes factory automation, industrial Internet of Things, infrastructure and lighting controls also has had a positive impact on sales in 2017 and will continue to help drive revenue 2018, said Feldhan.

The industrial segment drives sales for wide range of semiconductors including analog chips.

“The analog market in Europe is \$8.6 billion,” said Feldhan. “That’s probably the largest” semiconductor category in Europe. Analog chips are needed in a wide range of electronics equipment, not just smart phones and computers. “Industrial is where analog shines,” said Feldhan.

Large electronics market segments such as computers, mobile phones also will continue to drive semiconductor sales. While shipment unit growth of computers and phones grew modestly in 2017, volumes are high. For instance, about 1.6 million smart phones shipped in 2017, up from 1.49 million in 2017. Computer sales slipped to 443 million in 2017 from 452 million

in 2016, but will increase to 450 million in 2018, according to IC Insights.

Of course, computer and smart phones are packed with a wide variety of semiconductors, including microprocessors, power management ICs, discrete semiconductors and memory chips.

Strong memory IC growth in Europe

With memory, electronic OEMs are using more higher value memory devices which help contribute to memory IC revenue growth. For instance, the European memory IC market grew 52.7 per cent to \$6.1 billion in 2017 and will rise to \$6.2 billion in 2018, according to Semico Research.

Strong demand and limited capacity resulted in higher memory tags as average selling prices for DRAM increased 74 per cent compared to the previous year, said IC Insights. Prices could also increase in 2018 although not as much as last year as DRAM bit shipments should rise about 25-28 per cent and NAND flash bit shipments should rise 35-40 per cent, said Matas.

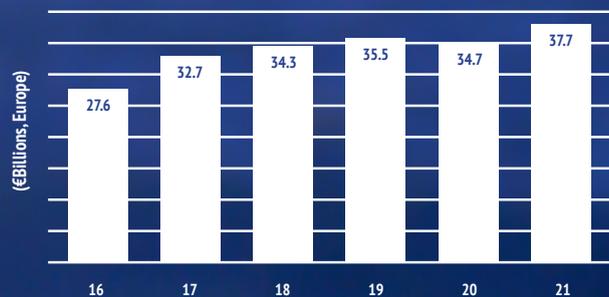
One reason that demand is growing for memory ICs is greater demand for servers by large global enterprise companies such as Google, Facebook and Amazon among others. Such companies need servers for cloud computing and big data storage center.

About 10.8 million servers shipped in 2017, up from 10.2 million in 2016. Next year, 11.5 million will ship, said Matas.

Such servers use fast microprocessors and need high-end memory, said Matas. “That’s where most of the memory IC manufacturers are saying demand is coming from,” said Matas.

The good news for memory IC buyers is that the memory chipmakers, including Samsung, SK Hynix and Micron are starting to add capacity which should improve DRAM and flash supply. Those three companies have been very careful about adding capacity in recent years, but apparently now believe that strong demand for memory will continue.

European IC market to post 5.3% annual growth



The European IC market will grow from \$27.6 billion in 2016 to \$35.7 billion in 2021
Source: IC Insights

Commit to safer battery choices

With demand for lithium-ion batteries growing, purchasers have a duty to ensure safety, without compromising product performance, advises president of Memory Protection Devices, Tom Blaha

Rechargeable lithium-ion battery technology continues to improve, with new products offering extended lifelong operation. In order to increase battery runtime, however, more active materials are packed into each cell, resulting in greater energy density. As a result, separators are becoming thinner, which increases the risk of foreign particles contaminating the battery cell.

If enough microscopic metal particles converge, an electrical short circuit can result in a current flow between the positive and negative plates, causing temperatures to rise. If this leads to thermal runaway, one failing cell can cause a chain reaction that impacts surrounding cells. For this reason, many Li-ion battery packs contain dividers that help protect adjacent cells.

Battery chemistries

Understanding the various battery chemistries helps purchasers make appropriate choices. Along with cobalt, manganese is one of the main types of lithium-ion chemistry. It offers superior thermal stability and features low internal resistance to deliver high current on demand, ideal for power tools and medical devices. The trade-off, however, is lower energy density, with a pure manganese cathode offering about half the capacity of cobalt.

Often the two metals are mixed, with safety enhanced by limiting the amount of active materials and by including additional safety protection: an electronic protection circuit that inhibits

high current surges; a circuit interrupt device that opens the electrical path if a high charge voltage raises internal cell pressure to 10Bar; and a vent that allows a controlled release of gas in case of a rapid rise in cell pressure.

Safety risks

Other safety concerns involve static electricity or poorly made faulty battery chargers that can destroy the protection circuit. Cold temperature charging presents further potential problems, as consumer grade Li-ion batteries cannot be charged below 0°C. Although they may appear to be charging normally, the anode can become covered in a permanent metallic lithium plating. Repeated cold charging can compromise the safety of the pack, which is even more vulnerable to failure if subjected to impact, crush, or high rate charging.

To combat this issue, industrial grade Li-ion batteries are now available that can be recharged and discharged at extremely cold temperatures with up to 5,000 recharge cycles.

Holder design

Battery holders can be an integral part of battery safety. For example, purchasers can now specify holders that accommodate the extended length of a cylindrical cell with built-in PTC. Custom battery holders are also available to accommodate circuit protect modules that are not integrated into the battery.

End-users can add to the risks. Problems often arise, for example, when hobbyists

try to assemble their own battery packs or when consumers manipulate cell phone batteries to extend



operational life. For this reason, many laptops contain embedded code that only allows OEM-approved battery packs.

To support increased safety, procurement professionals need to be wary of specifying inferior quality Li-ion batteries that may contain impurities or lack properly designed safeguards. With battery safety a growing concern, especially for airplane travel, the smart decision is to specify a Li-ion battery with built-in PTC protection and keep it properly secured with the right battery holder.

www.memoryprotectiondevices.com



Li-ion batteries often include additional safety protection

Repeated cold charging can compromise the safety of the pack

Battery holders can be an integral part of battery safety



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Expand without the hassle

Growth doesn't have to involve costly investment in extra in-house manufacturing. Managing director of Offshore Electronics, Steve Marshall, explains the advantages of outsourcing for SMEs

If they are trading successfully, there will inevitably come a time when small and medium-sized electronics manufacturers face a critical dilemma. As sales grow and production reaches capacity, they will have to choose whether to expand the manufacturing operation or outsource to a reputable sub-contractor.

Often underestimated, it is a serious decision that can make or break a business. The Institute of Manufacturing at Cambridge University says: "Make-or-buy decisions are often made reactively, purely on the basis of cost. This reactive 'mode' does not allow people to review other relevant factors. Decision-making based purely on cost can be risky. Using a structured process to review all relevant factors objectively reduces the likelihood of making expensive mistakes."

Beyond cost

The implications of deciding to expand production do not rest solely on the cost of materials; SMEs will also have to invest in factory space, machinery and extra staff. Relinquishing control may also seem difficult for a self-sufficient company with intimate knowledge of its products, but it makes sense in several ways.

For example, in an electronics start-up, the majority of expertise will be in design. The value of the company lies in its skilled staff and the intellectual property they have generated. A good sub-contractor, on the other hand, is focused purely on manufacturing: it will have specialist staff and machinery, manufacturing capacity, buying power and, crucially, expertise in compliance to ensure the final product is up to standard.

Companies with valuable IP always fear patents being copied, however, choosing a reputable sub-contractor that respects non-disclosure agreements should banish this fear. Offshore Electronics is purely a contract electronics manufacturer. It produces no products of its own and is dedicated to realising other people's designs as a manufacturing partner. Working on behalf of customers, it manufactures industrial and scientific machinery, including industrial controllers and medical equipment.

SME benefits

Interestingly, contract electronics manufacture is often perceived as a resource solely for larger companies but, in fact, it can be very beneficial for SMEs, to help

them get their products into the market. Indeed, SMEs often experience greater benefits from CEM services.

For example, SMEs working in a small facility, making products by hand, may not be getting the repeatability and product quality needed. They may also be too small to handle the necessary ISO accreditations, or meet strict compliance rules in an environment where it is challenging to meet increasingly tough regulations.

Thanks to the CEM's economies of scale, it can handle multiple tasks — everything from buying components to assembling products, and testing and shipping the finished goods. Naturally, a good sub-contractor does more than just 'follow orders.' Offshore Electronics, for example, complements this with a prototyping service that helps designers remove complexity, over-engineering and cost from a project.

As these factors indicate, expansion is not the only route to growing a business and it's important to consider outsourcing before making a final decision.

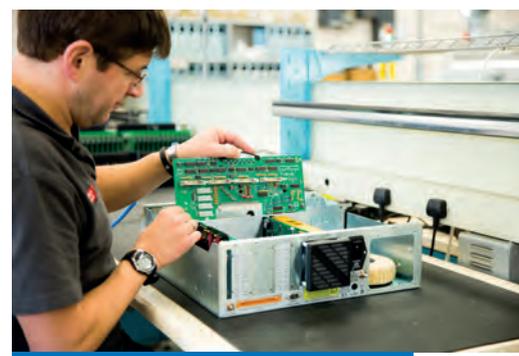
www.offshore-electronics.co.uk



A sub-contract manufacturing partner can provide the repeatability and product quality needed



A sub-contractor will have specialist staff and machinery



Outsourcing provides access to expertise in compliance



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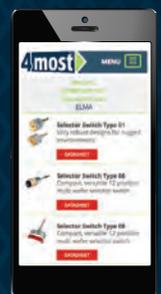
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Configurable housings cut development costs

Pentair has launched a new modular design concept enabling customers to quickly create customized solutions to house small form factor boards while minimising development costs and time. Buyers can specify their enclosure, cooling, peripheral components and mounting method based on application requirements, resulting in a customised solution ready for manufacture.

Designs start with Pentair's Schroff Interscale enclosure, which features integrated electromagnetic compatibility protection, requires only two screws for assembly, and has flexible height, width and depth. For customers working with Industrial PC board standards such as MinilTX, ATX and embeddedNUC, the cut-outs have been pre-populated to save time.

Conduction and convection cooling options are both available. Flexible heat conductors provide conduction cooling, with options for heat sink height and orientation. For convection cooling, one and two fan configurations are available, with a variety of fan location and perforation options.

schroff.pentair.com



Teaming up to deliver graphics performance

To meet growing demand for compatibility with the embedded DisplayPort interface standard, Review Display Systems introduces the Tianma NL192108AC18-01D 15.6in display, with eDP interface.

Designed to facilitate a compact design, the eDP interface directly connects the LCD module and graphics processing board. It also boasts a higher transmission speed than a conventional LVDS interface, making it popular in gaming and audio applications, or in industrial display applications, where it results in a compact outline for high resolution displays.

The NL192108AC18-01D features a 1,920 by 1,080 resolution and provides 400cd/m², with a contrast ratio of 750:1 and wide viewing angles. Together with the D3434-S motherboard from Fujitsu, it can be used to build a reliable embedded system for current and emerging graphics-rich applications.

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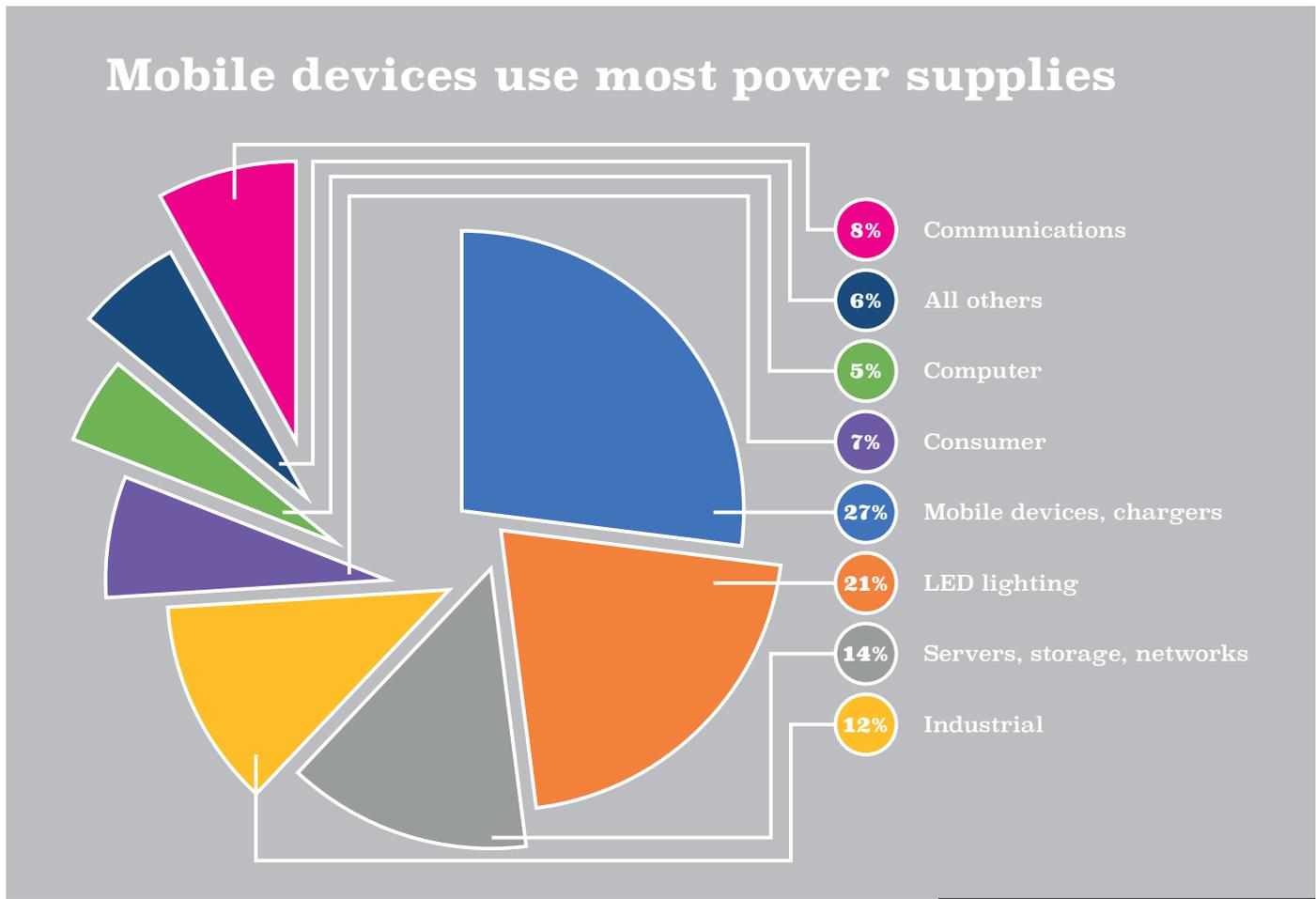


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What buyers need to know about power supplies

Despite strong demand, buyers can expect ample supply, reasonable lead times and declining prices for power supplies over the next five years

By James Carbone



The global power supply market will post 5.6 per cent annual growth through 2021 when power supply revenue will total \$30.9 billion, up from \$23.5 billion in 2016, according to researcher IHS Markit.

However, while overall demand and revenue for power supplies will rise, there will be a significant change in which customer segments will drive power supply demand in revenue. In addition, demand for non-commodity power supplies will grow at a faster rate than commodity products.

While mobile phones and chargers were the largest customer segment for power supplies in 2016, that will change over the next five years. The mobile phones segment, which is a high-volume, low-margin business, was the largest market for both AC-DC and DC-DC power supplies in 2016, accounting for 27.3 per cent of power supply revenue, according to IHS Markit. However, power supply sales revenue from mobile phone and charger manufacturers will decline from \$6.4 billion in 2016 to \$6 billion in 2021, said Victoria Fodale,

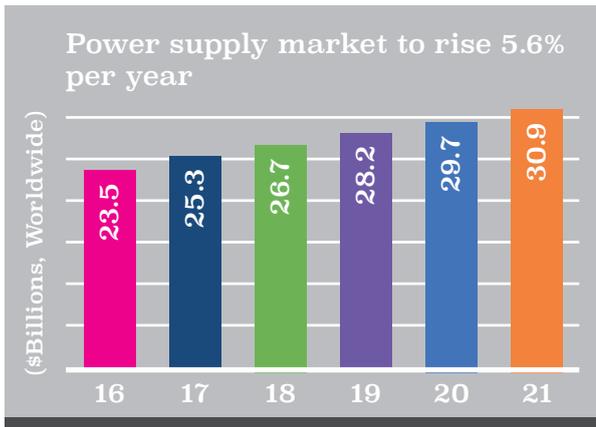
senior analyst, power supply intelligence service IHS Markit. As a result, cell phone chargers will represent only about 19.6 per cent of the power supply market in 2021, down from 27.3 per cent, according to IHS.

Mobile devices and charger sales will fall because of a decline in shipments of key applications. For example, the cellular infrastructure market is forecast to decline because of a changing product mix from macro cells to lower power, small cell equipment.

▶▶ (continued on page 86)

Mobile phones and other portable devices and charges account for 27 per cent of the power supply market

Source: IHS Markit



Global power supply revenue will grow from \$23.5 billion in 2016 to \$30.9 billion in 2021 *Source: IHS Markit*

► “One of the biggest stories is the decline in (power supply) revenue from cellular infrastructures,” said Fodale. “Cellular infrastructure networks have matured and 5G has not ramped up yet. What is happening is smaller cells are being used instead of the larger macro cells,” she said. Larger macro cells require more power supplies than smaller cells.

Power supply demand brightens

At the same time, demand for LED lighting systems will grow and so will the need for power supplies for this segment. As a result, sales revenue from light emitting diode applications will rise from \$4.9 billion in 2016 to \$11.9 billion in 2021, a compound annual growth rate of 19.3 per cent. In fact, LED lighting will be the fastest-growing application by revenue from 2017 to 2021, said IHS. In 2016 LEDs accounted for 20.9 per cent of total power supply revenue. By 2021, that percentage will increase to about 38 per cent.

“LED luminaires is an interesting market because the power supply for luminaires is very specialized,” said Fodale. “You won’t see a networking power supply vendor have the same expertise as a power supply manufacturer that specializes in lighting,” she said. “The power supply vendors that specialize tend to be smaller.”

Growth in LED lighting systems is driving revenue for AC-DC non-commodity power supplies. The product segment is forecast to be the fastest growing segment from 2016-2021, said IHS. In fact, sales for the AC-DC non-commodity power supplies surpass revenue for the AC-DC commodity market. AC-DC non-commodity power supplies are now the largest merchant power supply segment.

Fodale said that non-commodity power supplies are typically used in high-end networking equipment, medical equipment, LED luminaires and other specialty applications. Average selling prices range from the high 20 dollars to low 30 dollars. Commodity power supplies typically are used in consumer electronics equipment, low-end PCs and tablets and the mobile phones.

Revenue for the AC-DC commodity market peaked in 2015 as demand declined in key commodity applications such as computers and office equipment and mobile devices and chargers, according to IHS.

Revenue for the DC-DC converter market declined by 4.1 per cent in 2016. Growth is predicted to be flat from 2017 to 2021 as demand for some segments of end-equipment market soften, particularly cellular

infrastructure and storage, said IHS.

From a unit perspective, commodity power supplies in 2016 accounted for 43.3 per cent of power supply shipment, while non-commodity represented 56.7 per cent of shipments. By 2021, those percentages will change as commodity power supply shipments will fall to 31.4 per cent of all unit shipments while non-commodity will grow to 68.6 per cent.

Competing for business

The good news for buyers is despite healthy growth and demand for power supplies, there continues to be competition in the power supply market for business. Delta Electronics holds 15.5 per cent of the global power supply market and is the largest power supply manufacturer. However, Delta has plenty of competition, including Artesyn, Lite-On Technology, Mean Well, Salcomp, Chicony Power, TDK-Lambda, Acbel Polytech and Murata among many others. Major manufacturers, other than Delta and Artesyn, all have 4 per cent or less market share and compete fiercely for business.

Because there is healthy competition, power supply average selling prices tend to decline year-over-year. “Average selling prices are interesting,” said Fodale.



What is helping is doing business with our distribution partners that are investing heavily in inventory

- Christoph Wolf, president of power supply manufacturer RECOM

Delta is the top power supply manufacturer

2015 market size: \$21,913.7 million
2016 market size: \$23,600.7 million

Source: IHS Markit

		2015	2016	Difference 2015/2016
1	Delta Electronics	15.5%	15.5%	0.0%
2	Artesyn	8.5%	7.5%	-1.0%
3	Lite-On Technology	4.0%	4.5%	0.5%
4	Mean Well	3.0%	3.5%	0.5%
5	Salcomp	3.0%	3.0%	0.0%
6	Chicony Power	2.5%	2.5%	0.0%
6	Acbel Polytech	2.5%	2.5%	0.0%
7	TDK Lambda	2.5%	2.0%	-0.5%
7	FSP Group	2.0%	2.0%	0.0%
7	Murata	2.0%	2.0%	0.0%
	Others	54.5%	55.0%	0.5%

“What drives price is wattage.” The higher the wattage the higher the price. A rule of thumb is \$1 per watt, but it often depends on the volume of power supplies being purchased, she said. “Prices will also vary based on shortages and the negotiating power of OEMs,” said Fodale.

“Prices always go down,” said Christoph Wolf, president of power supply manufacturer RECOM, based in Arvada, Colo. “We have to watch closely what other people are doing and what people are willing to pay,” he said.

New power supply products often mitigate the impact of price erosion because newer products have higher prices than older established products and there are always new products being introduced.

Despite price erosion power supply manufacturers enjoyed healthy sales growth in 2017. The global power supply market was expected to finish 2017 growing 7.7 per cent to 25.3 billion, according to IHS Markit.

“In the Americas, our sales increased 28 per cent, said Wolf, whose company makes AC-DC and DC-DC converters, switching regulators as well as LEDs drivers. “I think we are outperforming the market.” He noted that sales in 2017 were actually stronger than 2016 when business increased 15 per cent.

Expecting steady growth
Wolf noted that sales growth is impacted by GDP “GDP growth is about 2-3 per cent, but growth in electronics is more like 8-10 per cent,” he said. RECOM expects “steady growth” next year because the economy is healthy and there are always new electronics products designed and manufactured that need power supplies, said Wolf. “I don’t see a reason why this growth should slow down.”

He added that industrial Internet of Things (IoT)

and LED lighting controls is helping drive power supply growth because IoT and LED applications require components as well as power supplies and demand for IoT and LED products continues to grow.

With healthy growth and demand for power supplies, lead times have stretched by a couple weeks because some components have been in short supply.

“There only needs to be one component that has a long lead time” to impact the lead times of power supplies, said Wolf. However, the increases in lead times have not been drastic. Lead times for RECOM have stretched from 6 to 8 weeks to 8 to 10 weeks, said Wolf.

“We are seeing substantial growth which means our factories are pretty busy these days,” he said. “On the other hand, we have seen extended lead times for certain components” and the only way to mitigate that is to that is by “proper planning.”

Part of that planning involves distributors. “What is helping is doing business with our distribution partners that are investing heavily in inventory,” said Wolf.

Demand for power supplies in the Americas rises

Asia-Pacific will remain the largest market for power supplies over the next five years, although it will have a slower growth than the Americas and Europe.

The Asia-Pacific power supply market totaled about \$15.7 billion in 2016 and the region accounted for 64.3 percent of the market, according to researcher IHS Markit. By 2021, the APAC power supply market will grow from to about \$19 billion as sales grow annually in the range of 3-6 per cent. Asia Pacific will have the slowest growth rates because of the decline of revenue for commodity applications in AC-DC markets.

The Americas had power supply sales of close to \$5 billion in

2016 and revenue increase to about \$7 billion in 2021. The sales growth rate in the Americas vary from a low of about 1 per cent in 2018, but grow to more than 11 per cent in 2021, said IHS.

The Americas was the second largest market for power supplies in 2016, accounting for 20.4 per cent of revenue and 13.2 per cent of unit shipments.

Power supply market growth rates for Europe, Middle East and Africa will range from 9 per cent in 2017 to 13 per cent in 2018. By 2021 the EMRA growth rate will be about 9 per cent and sales will total nearly \$6 billion, according to IHS.

By the Numbers

\$23.5 billion

The size of the global power supply market in 2016

5.6%

The forecasted compound annual growth rate of the power supply market

\$30.9 billion

The size of the global power supply market in 2021

20.4%

The percent of global power supplies that were sold in the America in 2018

\$19.8 billion

The size of the non-commodity power supply market in 2021

11%

The expected growth rate of the power supply market in the Americas in 2021

4%

The growth rate of the Asia-Pacific power supply market in 2021

New venue, new technology, new buzz

Buyers will find the latest components, production techniques and subcontract services at Southern Manufacturing and Electronics, held this year in the new Farnborough International exhibition centre

This year, the *Southern Manufacturing and Electronics Show* marks its 20th anniversary with a move to a new permanent venue at Farnborough. The annual electronics and industrial technology show will be the first major exhibition to be held at the new £30m conference and exhibition centre in Hampshire.

Described as the largest exhibition venue to be built in the UK for two decades, the 20,000m² centre is expected to become one of the most important international showcases for UK manufacturing expertise — not least the UK's £20bn aerospace sector and the supply chain that supports it, a substantial chunk of which is based around Farnborough.

While the surroundings may be new, it is business as usual for the *Southern Electronics* show itself. Electronics will occupy roughly half the show floor, covering its customary selection of components, production and test and subcontract services. The show's steady growth since moving to Farnborough in 2008 has made it increasingly attractive to overseas and domestic firms and that trend continues for 2018 with an impressive number of international companies taking part.

International innovation

German firms exhibiting in 2018 include connector manufacturers, ODU and Yamaichi Electronics Deutschland, power supply makers, Cosel Europe, and environmental test equipment manufacturer, Binder. From the Netherlands, Rebo introduces

its new SMS R1 colour sign and labelling system. Swiss ceramics expert, Cermaret, returns with a range of ceramic insulators and specialist components for automotive and industry applications in materials such as ZrO₂, Al₂O₃, Si₃N₄, Sic, industrial ruby and sapphire. From even further afield comes Shenzhen X-Mulong Circuit Co and Taiwan's KS Terminals.

There are also several European electronics manufacturing services providers exhibiting this year, including CICOR Romania, which operates as part of an international network to offer production capabilities in printed circuit board assembly, system assembly and box build. From Lithuania comes Volburg SIA, an EMS company with more than 20 years international experience and accredited to ISO 9001:2008, ISO 14001:2004, ISO/TS 16949 and IPC-A-610F. Also from Lithuania, Seltika is an established manufacturer offering EMS services as well as the design and development of custom test equipment and products.

UK ingenuity

Closer to home, a significant cross-section of the UK electronics business will be present at Southern Electronics. Many familiar names return for 2018, including Easby Electronics, Camden Boss, Midas Components, North Devon Electronics, Sinclair and Rush, Würth Electronics, European Circuits, Lemo, Fischer Connectors, Harwin, Habia Cable and many others. Service providers and CEMS include JJS



Manufacturing, Bytesnap Design, SouMac Assembly Services, Turner Electronics, York EMC and Wrekin Circuits amongst hundreds of others.

There's also a wealth of production hardware from firms such as Pillarhouse International, PACE Europe and Automated Cable Solutions, which is launching no less than five new machines at the show. These, of course, are just a few of the companies taking part. A full categorised list of participating firms can be found at exhibitors.industrysouth.co.uk. Visitors registering online for free tickets also receive a free 12-page preview magazine to help plan their visit.

Inspiring ideas

Another popular feature returning for 2018 is the technical seminar programme, with sessions dedicated solely to electronics running over the three days. Topics for 2018 include developments in lithium-ion batteries, implementing lean



A significant cross-section of the UK electronics business will be present at Southern Electronics



The 20,000m² centre is expected to become one of the most important international showcases for UK manufacturing expertise

and the role of collaborative robots in manufacturing.

The General Data Protection Regulations come into force on 25th May 2018 affecting all personal data, introducing new requirements and huge fines for transgressions. Corpdata's Dave Smith will

share essential knowledge to keep your organisation compliant and safe. There will also be two separate sessions where delegates can gain an overview of the various aspects of intellectual property law; what can be protected and what tangible value IP protection adds to businesses.

In total, the seminar programme for *Southern Manufacturing and Electronics 2018* includes an impressive 34 sessions, all of which are free to visitors and exhibitors. A complete listing and pre-registration form can be found online.

With *Southern Manufacturing and Electronics 2018* running from 6 to 8 February and show admission free, it's time to book your ticket and get ready to feel the buzz.

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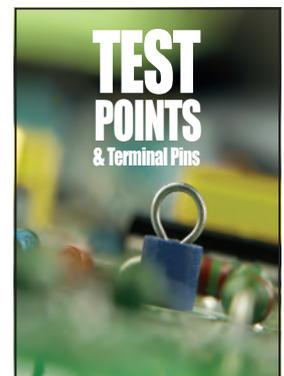
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Bosch CDS
Bosch Connected Device Solutions
Bosch Sensortec
Bourns, Inc.
Brad Harrison - a Molex company
Bridgelux, Inc.
Broadcom Limited
Buchanan Terminal Blocks /
TE Connectivity
Bud Industries, Inc.
Bulgin
Burr-Brown (Texas Instruments)
Bussmann (Eaton)
C&D Technologies (Murata Power
Solutions)
C&K
Caddock Electronics, Inc.
Cal Test Electronics
Califia Lighting (Bivar)
Calmark / Pentair
Cannon
Cantherm
Capital Advanced Technologies, Inc.
Carclo Technical Plastics
Cardinal Components
Carling Technologies
Carlo Gavazzi
Catalyst Semiconductor /
ON Semiconductor
CEL (California Eastern Laboratories)
Central Semiconductor
Cera-Mite / Vishay
CGS Resistors / TE Connectivity
CH Products
Chemi-Con
Chemtronics
Cherry Americas
Cherry Switches (ZF Electronics)
Chip Quik, Inc.
Cicoil
CII / TE Connectivity
Cinch Connectivity Solutions
Cirronet / RFM (Murata Power
Solutions)
Cirrus Logic
Citizen Electronics Co., Ltd.
Citizen Finedev 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
Conec
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
Crowd Supply
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
Dielectric Laboratories (Knowles)
Digi International
Digilent, Inc.
Digital View Inc.
Diodes Incorporated
Displaytech
DLI
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 ICC)
FCT Electronics - a Molex company
FDK America
Fedco Batteries
FERROXCUBE
Finisar Corporation
FIT (Foxconn Interconnect Technology)
Flamar - a Molex company
Flambeau, Inc.
FLIR
Formica 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
H.G. Schaevitz, LLC / Alliance
Sensors Group
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
Intermatix
Interconnect Systems -
a Molex company
E-Switch
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
Judco Manufacturing, Inc.
Keil (ARM)
KEMET
Kennedy Labs
Kester
Keystone Electronics Corp.
Khatod
Kilo International
Kilovac Relays / TE Connectivity
Kingbright
Kings (Winchester Electronics)
Kionix
Klein Tools
Knowles
Knowles DLI
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
Lantronix
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
 Master Appliance Corp.
 Matrix Orbital
 MaxBotix Inc.
 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)
 METZ CONNECT
 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
 Monnit
 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
 Neosnode
 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
 O.C. White Co.
 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 Tympany
 Pentair
 Peregrine Semiconductor
 Pericom Semiconductor Corp.
 (Diodes Incorporated)
 Pervasive Displays
 PIHONG 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 Brighttek
 Quadcept
 Qualcomm
 Qualcomm (RF360 - A Qualcomm &
 TDK Joint Venture)
 Qualtek Electronics Corp.
 Quatech / B+B SmartWorx
 Rabbit Semiconductor
 (Digi International)
 Radial Magnet, Inc.
 Radiocrafts
 RAF
 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
 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
 Silego Technology
 Silicon Labs
 SINE Systems / Amphenol
 Siretta
 SiTime
 SkyTek
 Skyworks Solutions, Inc.
 SL Power Electronics - Manufacturer
 of Condor / Ault Brands
 SMC Diode Solutions
 Soberton, Inc.
 Socle Technology Corporation
 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
 Taiwan Semiconductor
 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
 Techspray
 TechTools
 Telcodium
 Teledyne LeCroy
 Telit
 Temp-Flex - a Molex company
 Tensility International Corporation
 Terasic Technologies
 Test Products International (TPI)
 Texas Instruments
 t-Global Technology
 Thales Visionix, Inc.
 Thermometrics / GE Measurement
 & Control
 ThingMagic
 Thomas Research Products
 TinyCircuits
 TOKO / Murata
 Torex Semiconductor Ltd.
 Toshiba Memory America, Inc.
 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

TSC (Taiwan Semiconductor)
 TT Electronics
 TT Electronics / BI Technologies
 TT Electronics / IRC
 TT Electronics / Optek Technology
 TT Electronics / Welwyn
 Tuchel / Amphenol
 Twin Industries
 TXC Corporation
 Tyco Electronics
 Tympany (Peerless by Tympany)
 U.S. Sensor/Littelfuse
 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 Tympany)
 Viking Technology
 Virtium Technology Inc.
 Vishay
 Vishay / BCcomponents
 Vishay / Beyschlag
 Vishay / Cera-Mite
 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
 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
 Wolfsspeed - 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)
 Zetex 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											
FTDI	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/TKD	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											
ALPHA WIRE	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	26,919	N/A	£0	97.04%	150	3500+	Y
CINCH CONNECTIVITY/Bel	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	31,120	N/A	£0	78.21%	150	3500+	Y
CUI INC	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	17,410	N/A	£0	92.21%	150	3500+	Y
DELTA PRODUCT GROUPS	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	3,215	N/A	£0	99.95%	150	3500+	Y
KEystone ELECTRONICS	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	6,315	N/A	£0	95.17%	150	3500+	Y
Laird	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	15,187	N/A	£0	97.20%	150	3500+	Y
Murata	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	66,179	N/A	£0	99.79%	150	3500+	Y
OMRON ELECTRONICS INC-EMC DIV	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	74,369	N/A	£0	95.47%	150	3500+	Y
Panasonic	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	154,777	N/A	£0	94.42%	150	3500+	Y
TDK	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	60,769	N/A	£0	99.20%	150	3500+	Y
TE	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	338,106	N/A	£0	79.40%	150	3500+	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											
ALLEGRO MICROSYSTEMS, LLC	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	3,090	N/A	£0	87.22%	150	3500+	Y
Altera	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	1,600	N/A	£0	60.00%	50	1,500+	Y
ALTERA	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	10,901	N/A	£0	84.86%	150	3500+	Y
ANALOG DEVICES INC	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	52,308	N/A	£0	73.79%	150	3500+	Y



**MOUSER
ELECTRONICS**



**TEXAS
INSTRUMENTS**

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
ICs & SEMICONDUCTORS (continued)											
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
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
AVAGO TECHNOLOGIES US INC	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	16,512	N/A	£0	91.38%	150	3500+	Y
Broadcom	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	100	N/A	£0	69%	50	1,500+	Y
Cirrus Logic	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	300	N/A	£0	80.00%	50	1,500+	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
CYPRESS SEMICONDUCTOR CORP	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	27,423	N/A	£0	92.54%	150	3500+	Y
DIGI INTERNATIONAL	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	4,355	N/A	£0	95.30%	150	3500+	Y
Diodes Incorporated	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	1,600	N/A	£0	98%	50	1,500+	Y
DIODES INCORPORATED	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	38,292	N/A	£0	90.02%	150	3500+	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 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	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	100	N/A	£0	97%	50	1,500+	Y
FTDI	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	569	N/A	£0	100.00%	150	3500+	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	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	28,850	N/A	£0	93.70%	150	3500+	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
ISSI	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	700	N/A	£0	98.00%	50	1,500+	Y
Laird	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	15,187	N/A	£0	97.20%	150	3500+	Y
Lattice	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	700	N/A	£0	69%	50	1,500+	Y
LINEAR TECHNOLOGY	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	37,479	N/A	£0	77.62%	150	3500+	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
MAXIM INTEGRATED	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	68,021	N/A	£0	78.22%	150	3500+	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 TECHNOLOGY	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	86,517	N/A	£0	86.12%	150	3500+	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
NEXPERIA USA INC	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	23,513	N/A	£0	99.29%	150	3500+	Y
NXP	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	3,900	N/A	£0	91%	50	1,500+	Y
NXP USA INC	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	36,258	N/A	£0	93.55%	150	3500+	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	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	87,298	N/A	£0	85.61%	150	3500+	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	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	55,139	N/A	£0	99.85%	150	3500+	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
Samsung	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	37,336	N/A	£0	100.00%	150	3500+	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 INC	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	19,667	N/A	£0	96.54%	150	3500+	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
STMicroelectronics	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	4,500	N/A	£0	99%	50	1,500+	Y
STMICROELECTRONICS	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	39,201	N/A	£0	97.79%	150	3500+	Y



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ICs & SEMICONDUCTORS (continued)											
TDK	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	60,769	N/A	£0	99.20%	150	3500+	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	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	180,012	N/A	£0	91.94%	150	3500+	Y
Toshiba	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	500	N/A	£0	100.00%	50	1,500+	Y
Vishay	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	581,798	N/A	£0	87.71%	150	3500+	Y
XILINX INC	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	8,213	N/A	£0	51.46%	150	3500+	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	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	3,100	N/A	£0	16%	50	1,500+	Y
3M	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	62,421	N/A	£0	93.42%	150	3500+	Y
Amphenol	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	25,600	N/A	£0	53%	50	1,500+	Y
AMPHENOL RF DIVISION	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	443,368	N/A	£0	75.92%	150	3500+	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
CINCH CONNECTIVITY/Bel	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	31,120	N/A	£0	78.21%	150	3500+	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
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 Electronics	0800 587 0991	www.digikey.co.uk	Y	37,215	N/A	£0	90.98%	150	3500+	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 Electronics	0800 587 0991	www.digikey.co.uk	Y	5,109	N/A	£0	84.32%	150	3500+	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, LLC	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	120,034	N/A	£0	97.98%	150	3500+	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
PHOENIX CONTACT	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	54,845	N/A	£0	99.99%	150	3500+	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
SAMTEC INC	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	427,448	N/A	£0	99.99%	150	3500+	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	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	338,106	N/A	£0	79.40%	150	3500+	Y
TE Connectivity	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	30,900	N/A	£0	40%	50	1,500+	Y
OBSOLESCENCE / HARD TO FIND											
	America II Europe	01462 707070	www.americaii europe.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



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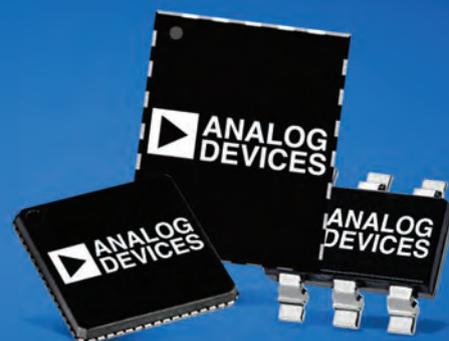
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Buyers' Guide

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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
Diallight	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											
ABRACON LLC	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	41,991	N/A	£0	100.00%	150	3500+	Y
AVX	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	70,700	N/A	£0	58.00%	50	1,500+	Y
AVX CORPORATION	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	70,131	N/A	£0	89.28%	150	3500+	Y
Bourns	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	49,500	N/A	£0	98%	50	1,500+	Y
BOURNS INC	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	59,314	N/A	£0	82.47%	150	3500+	Y
CINCH CONNECTIVITY/Bel	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	31,120	N/A	£0	78.21%	150	3500+	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
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 MICROELECTRONICS & PRECISION SENSORS	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	28,560	N/A	£0	89.87%	150	3500+	Y
Kemet	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	135,800	N/A	£0	93%	50	1,500+	Y
KEMET	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	101,257	N/A	£0	91.57%	150	3500+	Y
KOA Speer	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	107,900	N/A	£0	82%	50	1,500+	Y
Laird	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	15,187	N/A	£0	97.20%	150	3500+	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 INC	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	59,517	N/A	£0	91.54%	150	3500+	Y
Murata	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	66,179	N/A	£0	99.79%	150	3500+	Y
Murata	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	67,300	N/A	£0	99%	50	1,500+	Y
Nichicon	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	21,600	N/A	£0	47.00%	50	1,500+	Y
NICHICON	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	39,747	N/A	£0	96.70%	150	3500+	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	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	154,777	N/A	£0	94.42%	150	3500+	Y
Panasonic	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	67,900	N/A	£0	69.00%	50	1,500+	Y
Rohm	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	55,139	N/A	£0	99.85%	150	3500+	Y
Samsung	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	37,336	N/A	£0	100.00%	150	3500+	Y
Taiyo Yuden	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	6,400	N/A	£0	82%	50	1,500+	Y
TAIYO YUDEN	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	21,540	N/A	£0	99.97%	150	3500+	Y
TDK	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	60,769	N/A	£0	99.20%	150	3500+	Y
TDK	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	25,300	N/A	£0	85.00%	50	1,500+	Y
TE	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	338,106	N/A	£0	79.40%	150	3500+	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	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	581,798	N/A	£0	87.71%	150	3500+	Y
Vishay	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	119,800	N/A	£0	76%	50	1,500+	Y
Würth Electronics	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	4,500	N/A	£0	63%	50	1,500+	Y

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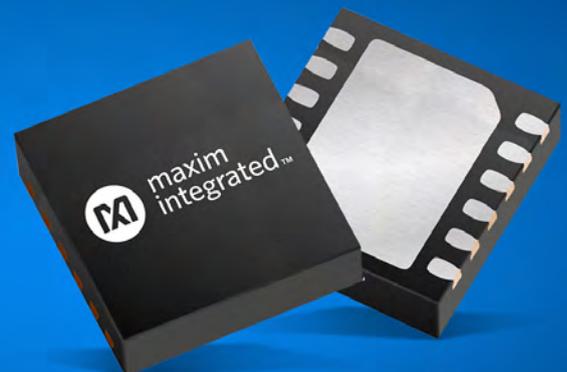
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PASSIVES (continued)											
WURTH ELECTRONICS INC	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	23,733	N/A	£0	100.00%	150	3500+	Y
Yageo	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	45,300	N/A	£0	99%	50	1,500+	Y
YAGEO	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	147,833	N/A	£0	84.31%	150	3500+	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											
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
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



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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
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 / Luminit / 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		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

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
CML Innovative Technologies (uk) Ltd	01284 714700	WWW.CML-IT.com	£12M	UK/EU/China	65		ISO9001 TS16949 UL	N	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
CSI EMS Ltd	01376 500050	www.csiems.co.uk	£5m	Essex	50	3	ISO 9001, UL, IPC610	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

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Contract Manufacturers Buyers' Guide (continued)

Manufacturer	Telephone	Website	Turnover	Location	Employees	Number of Surface Mount Lines	Approvals	BCA Capacity	Lead Free Manufacturer	Prototyping	Design Capability	Full Turnkey	Cables and Harnessing
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, ISO 13485, UL	Y	Y	Y	Y	Y	Y
Electronic Technicians 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, IPCA-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 Class 3	Y	Y	Y	Y	Y	Y
Industrial Electronic Wiring Ltd.	+44(0)1793 694033	www.iiew.co.uk	£4.5 m	Swindon, UK	60	N/A	ISO9001:2008, IPC610, IPC620	N	Y	Y	N	Y	Y
Jaltek	01582578170	jaltek.com	£8m	UK	80	3	AS9100, ISO9001, ISO13485, IPC-A-610 Class 3, Certified IPC Trainer (IPC-A-610 J-STD-001 & J-STD-001, Spare Addendum)	Y	Y	Y	Y	Y	Y
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, TUV, UL	Y	Y	Y	Y	Y	Y
Protronix EMS	01582 418490	www.protronix.co.uk	£2.5m	Luton	10	2	UKAS ISO9001:2008, IPC-A610	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	£1.2m	Bedfordshire	25	2		Y	Y	Y	Y	Y	Y
Simtek EMS Ltd	01843 233120	www.simtekems.co.uk	£6m	SE	60	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	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

PCB Buyers' Guide

Manufacturer	Telephone	Website	Service Provided (i.e. Broker/Manufacturer &/or Repair)	Location	Approvals	Volume - Small, Medium, Large	Double-sided	Multi-Layer 4-10/10-20-30	Metal PCBs	Flex / Flex-Rigid	Obsolescence Solutions	Modifications	Prototyping
ABL Circuits Ltd	01462 894312	www.ablcircuits.co.uk	M	SE	ISO 9001:2008	SML	Y	4-10	Y	Y	Y	Y	Y
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 742 4058	www.ccs-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
DK Thermal Ltd	+44(0)1992 514200	www.dkthermal.co.uk	M/R	UK, Europe, Asia, USA	UL, ISO9001:2008, TS16949:2009	SML	Y	N	Y	N	Y	Y	Y
GSPK Circuits Ltd	+44(0)1423 321100	www.gspkcircuits.ltd.uk	M/R	UK, Europe, Asia	BS EN 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 II/III, UL	SML	Y	4-48	Y	Y	Y	Y	Y
Stevenage Circuits Ltd	01438 761811	www.stevenagecircuits.co.uk	M/B	UK/China	ISO 9001:2008, ISO 14001, EN9100:2009, UL, JOSCAR	SML	Y	4-44+	Y	F, F/R	Y	Y	Y
Tate Circuit Industries Ltd	01889 583627	www.tatecircuits.com	B	UK/China	ISO 9001:2015, UL	SML	Y	4-20	Y	Y	Y	Y	Y
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

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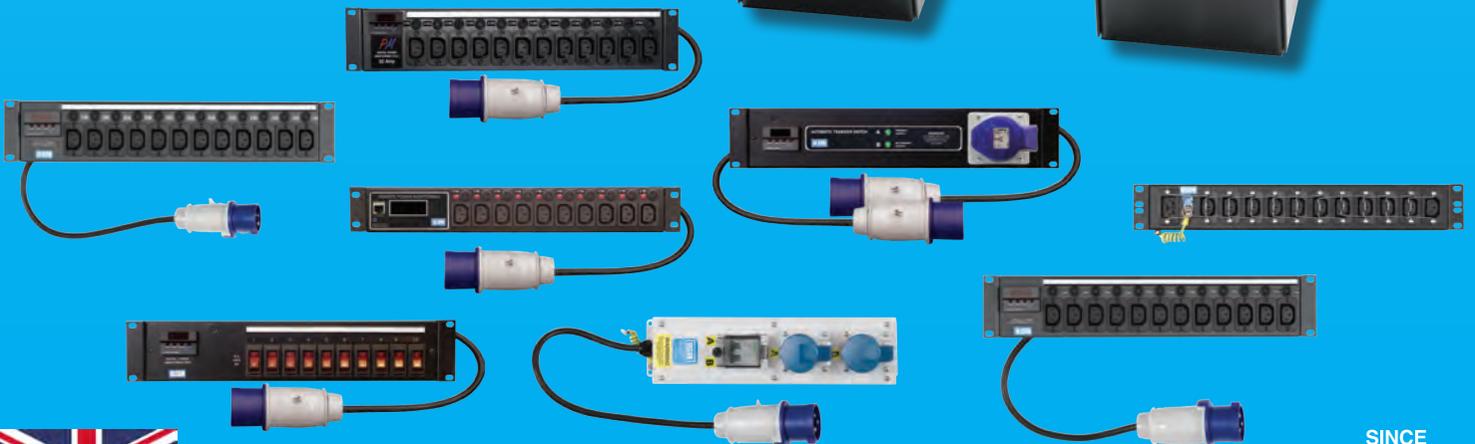
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