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Buyers' Guide

All the facts and figures to help you buy

Editor's Word



Right to repair. Wrong to repair

I recently read how groups around the world are pushing for 'right to repair' legislation which would force product manufacturers to make it easier for consumers to repair those products outside their warranty period.

As a qualified designer with: 35-years engineering experience; a significant collection of hand and machine tools; and a desire to 'see how everything works', you would imagine I'd be a massive supporter of people's rights to repair. Sadly, at this stage, I'm not.

I could come at this subject from 100 different angles, but for *Electronics Sourcing*, I'll choose the bathtub reliability curve, obsolescence and counterfeiting as three hurdles.

Firstly, the bathtub reliability curve. In essence products tend to either fail immediately after you buy them due to a manufacturing fault or after many years of use due to a combination of ageing and wear. Between these extremes they are typically reliable. The warranty will cover the first peak so the 'right to repair' will normally be invoked to deal with ageing and wear.

So why do PCBAs age and wear. Two reasons are corrosion and thermal cycling. Before effecting a repair you need to identify which component(s) has failed. Good luck with that. Then try de-soldering a dead component and re-soldering a new one on a heavily oxidized PCB where the pads are lifting. Hmmm.

But would you be able to buy the component in the first place. In our industry, age equals obsolescence, equals counterfeiting. So, if you find the part it's likely to be a little more expensive than you first thought and might be a substandard copy.

As the devil's advocate I would love 'design for repair' to be added to the existing long list of 'design for X' requirements for no other reason than seeing what innovations would emerge.

Jon Barnett

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www.electronics-sourcing.co.uk



Target edge devices

Mouser Electronics is now stocking Microchip Technology's SAM R34 LoRa sub-GHz system-in-package family, designed to deliver low-power performance for a range of internet of things applications. The family integrates a 32-bit microcontroller, software stack, and sub-GHz LoRa transceiver in a six by six millimetre package.

The new SAM R34 SiPs incorporate a Microchip SAM L21 microcontroller based on a 32bit Arm Cortex-M0+ core with up to 256Kbytes of flash and 40Kbytes of RAM. The onboard UHF transceiver supports LoRa and FSK modulation and covers frequencies from 137 to 1,020MHz with maximum transmit power up to +20dBm without external amplification.

To extend battery life and conserve power consumption in smart devices, the SiPs offer sleep modes as low as 790nA. This ensures the SAM R34 SiPs are suitable for a variety of battery-powered and sensor-based connected applications, including smart agriculture, smart city devices and tracking devices for supply chain management.

www.mouser.com



Replacement power supplies improve ROI

Powerstax's form-fit-and-function replacement power supplies are ideal for users of legacy equipment or those involved with repair or refurbishment of critical or capital systems. Replacements incorporate the latest technology and can provide major increases in reliability and efficiency.

One recent example involved the recommissioning of an ion implant system



New power franchise agreement

Fidus Power has signed a pan-European franchise agreement with Murata Power, enabling the three-year old Aldermaston-based distributor to supply Murata's range of medium and high power DC/DC and AC/DC products.

Technical power supply distributor, Fidus, will enhance its core strengths regarding product knowledge and design-in support, with the new deal providing access to Murata's full suite of technical support resources.

Director of Fidus Power, Larry Tracey, commented: "Two recent examples of technology leadership from Murata Power are the compact 1U D1U86P-W-220 AC/DC 2.2kW front end, and the PQC250 250W convection-cooled switching power supply, which is also space-saving."

www.fiduspowers.com

used in semiconductor device fabrication. Replacing the existing power supply, which was over 20-years-old, without modifying the system chassis or control systems, required a custom designed power supply.

The replacement product utilised an efficient AC/DC brick module with an additional current limit circuit. It also featured an external output voltage adjustment circuit via a 10-turn potentiometer fitted to the front plate, allowing it to function exactly like the original power supply. Furthermore, the new supply has a 90 to 253V AC universal input, allowing the original input voltage select link to be removed and providing an output of 48V DC at 7.5A.

Chief executive officer of Powerstax, Tim Worley, commented: "Our expertise ensures critical and capital equipment can continue in service for many more years improving return on investment and avoiding unnecessary replacement costs."

www.powerstax.com

Get your TI Chips at Mouser



Mouser is an authorised distributor with the largest selection of Texas Instruments' chips in stock
[mouser.com/ti](https://www.mouser.com/ti)



In Brief

Forum tackles counterfeits

The **Anti-Counterfeiting Forum** will hold its 10th annual seminar on Wednesday 20 March at BAE Systems in Farnborough. The event will focus on current trends and new developments in combating counterfeits, including emerging threats to the supply chain and developing best practice for counterfeit management and detection. There will also be opportunity for questions and discussion.

www.anticounterfeitingforum.com

Electrolube achieves AS 9100

Electrolube has achieved AS 9100, the quality management system standard for the aerospace, aviation and defence industries. Electrolube has served the aerospace market for decades with its electro-chemicals expertise. Achieving AS 9100 validates the company's standards and assures aerospace customers of the high level of reliable electronics protection solutions available. Certification will strengthen existing relationships with commercial and military aerospace customers and supports growth strategy.

www.electrolube.com

Connect with UK stock

Conec connector users in the UK may want to take advantage of the product knowledge and stock held by distributor, In2Connect UK, which has worked closely with all departments of Conec in Germany for many years. As a franchised distributor, In2Connect UK can often provide a more competitive package than going direct. Unlike Conec, it is happy to hold UK stocks against customers' call-off orders.

www.in2connect.uk.com

Thermal specialist created

Laird Thermal Systems is now a fully-operational, independent business owned by Advent International. Its portfolio, technical expertise, global manufacturing footprint and lifecycle services aim to solve complex thermal challenges in the medical, analytical, telecom, industrial and consumer markets. Products range from components and subsystems to full turnkey cooling solutions with multiple thermal technology options.

www.lairdthermal.com



Lock up your Pi

Premier Farnell has announced a global distribution agreement with US-company Zymbit, a developer of hardware security modules that ensure the physical and digital security of internet of things devices. These include the Zymkey 4i security module which delivers professional grade security to the Raspberry Pi family of single board computers.

The Zymkey 4i offers a plug-in security solution to protect data, credentials and intellectual property contained in IoT products deployed beyond the security of firewalls and physical infrastructure. Current applications include the monitoring of oil-pipelines and industrial machinery, smart energy grids, digital forensics appliances, physical access control points and signing of immutable sensor data.

Global head of single board computers for Premier Farnell and Farnell element14, Pete Wenzel, explained: "As the leading distributor of the Raspberry Pi, we are seeing a growing number of customers purchasing the product for professional applications."

Chief executive officer of Zymbit, Phil Strong, added: "Our customers are diverse, but they share a common need to secure their products, which often contain millions of dollars of software intellectual property, together with critical credentials that enable access to sensitive cloud services."

www.premierfarnell.com

Space and power

RS Components is stocking the Bosch Sensortec BME680 four-in-one environmental sensor and associated shuttle board designed to simplify product creation. The sensor integrates temperature, humidity, pressure, and gas sensing for energy-conscious, cost-sensitive and space-constrained applications.

Measuring three by three by 0.93mm, the BME680 minimises average power consumption by combining an energy-efficient active mode, called forced mode, and a low-power sleep mode that draws only 0.15µA. In forced mode, the sensor performs one cycle of temperature, pressure, humidity, and gas measurements before automatically returning to sleep.

By providing accurate and linear responses, the BME680 serves applications such as air quality measurement or weather monitoring,

Shorter lead times may cause price instability

Anglia Components is advising customers that lead times on chip resistors and passives are now reducing, some to as little as 12 to 13 weeks. According to the distributor, however, improved availability may lead to price instability.

Commenting, chief executive officer, Anglia Components, Steve Rawlins, observed: "Weak iPhone demand and a softening of the Chinese economy in the face of sanctions are two of the factors behind this. We believe we are in an inventory correction period as many customers have had to purchase in large quantities to secure components."

Steve Rawlins believes that although improved availability is good news in some ways, there is likely to be price instability as this material is worked through. He said: "Massive lead time swings don't do anyone favours in the long term as it becomes difficult to predict demand for both the distributor and the customer. We all want growth but in a measured way, so everyone can plan material and deliver to the end customer on time."

"Anglia will use this opportunity to rebuild inventories that we've been using to keep customers supplied during the shortages. We are working closely with customers to understand their demand going forward, to put in place the right stock profile and keep supporting them whatever the market does in the longer term."

www.anglia.com



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www.rs-online.com



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uk.rs-online.com/services





Kick-off

Preparation has started for MMG Publishing's popular *Electronics Sourcing Annual Five-a-Side Football Tournament* scheduled for Thursday 23 May, 2019 at Lancing Sussex FA Headquarters stadium, West Sussex.

I invite you to enter a team of five, six or seven players to represent your company in this tournament which is always played in good spirit. The event is also a great networking opportunity as teams represent electronics distributors, OEMs and CEMs.

Anyone involved in the electronics industry is welcome to spectate or enter a team. Organiser, and publisher of *Electronics Sourcing* magazine and *eBOM.com*, MMG Publishing, provides complimentary refreshments throughout the day, starting with bacon rolls and coffee on arrival.

Entry is free, however we appreciate if teams could make a small donation to our preferred charity Albion in the Community at www.justgiving.com/fundraising/guyanddanny2019

In past tournaments players have represented companies including G English, Digi-Key, Mouser, ETI, Esprit Electronics, Napier Partnership, ECSN, Photronix, 4 Star Electronics, GTK, Astute, Kentech, Harwin, Rutronik, Farnell Element 14, CCL, NCAB, Camden Boss, Avnet, AVX, Computer Components, Rapid, Yaimaichi Connectors, GB Electronics, Publitek and eBOM.

GELEC and ECSN get a special thank you for their continued sponsorship of the tournament.

Games start at 10am and the day finishes around 3pm. We recommend teams play in their own branded kits to maximise the post event publicity. Individual players are welcome and we will allocate you to a team.

Individuals and teams can enter the 2019 tournament by contacting Mark Leary at sales@mmgpublishing.co.uk.

Following the tournament, the annual ECSN industry dinner takes place during the evening in Brighton. Keynote speaker Brian Wood's engaging and inspirational talk takes you into the battlefield during his experiences in the British Army. The evening includes an auction of football memorabilia with proceeds going to Albion in the Community.

To book tickets for the ECSN dinner please contact Jill Waite at enquiries@ecsn-uk.org

The *Electronics Sourcing* and MMG Publishing team look forward to another fun tournament which brings everyone together. We look forward to seeing everyone on 23 May in Lancing and Brighton.

Please see pictures and video footage from the 2018 tournament below -

www.electronics-sourcing.com/industry-football-match-2018

Mark Leary
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www.gelec.co.uk

ecsn
Electronic Components Supply Network

Voice activation is ready to grow

Acoustic sensor developer, Vesper, has added Digi-Key Electronics as one of its worldwide distributors. As an authorized global, full service distributor, Digi-Key will supply Vesper's microphones as the start-up scales.

Products include a wake-on-sound MEMS microphone designed to bring voice activation to battery-powered devices of all kinds. Digi-Key's global reach and synergistic product line will support Vesper's rapid growth, following on from the start-up's series B round of funding and two new office openings in Asia.

Chief executive officer of Vesper, Matt Crowley, commented: "The potential to be embedded in everyday smart devices is endless. Partnering with a number one catalogue distributor like Digi-Key is essential to fuel the rising global trend of voice as a user interface."

www.digikey.com



Halo indicators ready to ship

TTI is now offering APEM QH series halo LED illuminated indicators, designed to give focused interaction between human and machine. Panel sealed to IP67 as standard, the QH series is available in a choice of colours, using hyper-bright LEDs. Suitable for use where functions need to be clearly visible, the series is ideal for professional electrical appliances, automotive and off-road vehicles and process controls.

QH series illuminated halo indicators are available in single, dual and RGB colours, with frosted white or tinted lenses. Bezels are either black or yellow. Products are designed to integrate with 16, 19 and 22mm panel cut-out switches and other APEM indicators. The 22mm version also integrates with APEM's range of emergency stop switches. All models feature a 120deg viewing angle to further enhance visibility.

www.ttiurope.com

Unlocking obsolete passives



The specialist approach to sourcing obsolete passives

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How Charcroft finds an alternative to an obsolete capacitor or resistor

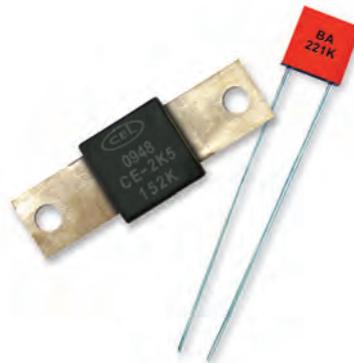
- Identify the product description from a part number, or the part number from a product description
- Confirm the specification using a library of legacy catalogues
- Check for the original part under a different manufacturer
- Look for existing alternatives with other manufacturers
- Liaise with customer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

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Adding value through technical focus

Electronics Sourcing asked managing director of Solid State Supplies, John Macmichael, how the company has evolved its service offering to cater for changing buyer requirements

Q How does Solid State Supplies describe its offering to purchasers?

Solid State Supplies is a technically-focused, value-added, franchised distributor that forms part of the distribution arm of Solid State. Pacer Components forms the other part, focusing on the sale of optoelectronic products including displays, with an advanced facility capable of complex builds. Other trading arms include Steatite Batteries, which produces complex lithium battery pack solutions; Steatite Antennas, which manufactures microwave

antennas; and Steatite Computers, which produces ruggedized computers and server systems.

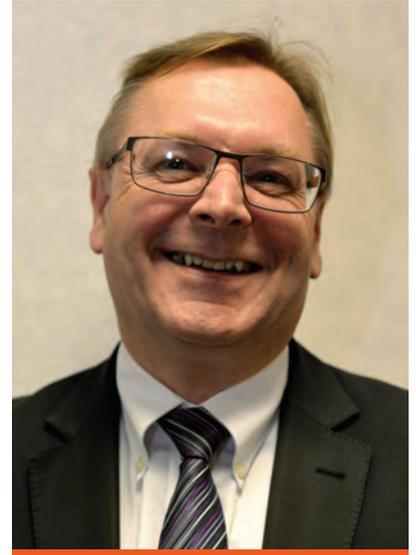
Q How have sourcing trends changed over the last ten years?

Traditionally, the mil/aero sector has been an important part of the business, leading to business process improvements through the implementation of AS9120 and AS9100. While this sector is no longer dominant, the business has become increasingly agile in response to the ever-growing number of start-up businesses and the demands of buyers in the

industrial sector.

Q What new value-added services have been introduced?

Over the last ten years, Solid State Supplies has evolved in many ways to accommodate buyers' changing needs, from accommodating complex sourcing requirements, such as testing hard-to-find devices to guarantee authenticity, to providing simple operations, such as bake and seal of moisture-sensitive products. Other services include tape and reeling of bulk products, through to complex programming operations.



Managing director of Solid State Supplies, John Macmichael

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SOLID STATE SUPPLIES

In every case, our value-added services allow products to go straight from the customers' goods-in to the production line without further processing. Recent collaborations with Pacer Components have also increased the range of services offered to include complex opto design, clean room assembly services and bespoke sensor design.

Free technical training at Solid States' Redditch facility ensures engineers are kept up to date, whether that be basic FPGA programming or complex issues surrounding secure embedded solutions design with Android. Field based technical support ensures customers' issues are resolved quickly and that engineers are knowledgeable on the latest developments from franchised suppliers.

Q How has Solid State Supplies tackled extended lead times to ensure smooth supply?

In recent times, product availability has become an issue with extending lead times on chip capacitors, memory and some processors, which also affects the availability of modules using these devices. Solid State's role as a distributor is to ensure that customers are unaffected by these shortages, and to this end, stock holding has increased by close to 30 per cent in the last six months.



Supply chain technology will continue to evolve and online sales will continue to increase, but ultimately people will still buy from people

Q How do you foresee the electronics supply chain evolving in the next five years?

Looking into the future has never been easy; recent events with Brexit have forced us to look more seriously—and positively—at overseas markets. With logistics centres in Ireland and the USA, the distribution business is well set to avoid the pitfalls that Brexit may bring.

The next five years will undoubtedly see continuous change within the industry as well as more distributor and component manufacturer consolidation. Frankly though, the basic need for specialist distributors doesn't change much. Customers, irrespective of their size and turnover, need access to products, value-added services and support.

Supply chain technology will

continue to evolve and online sales will continue to increase, but ultimately people will still buy from people. Distributor relationships provide the support that customers need, when they need it. In short, Solid State will continue to be a trusted advisor, to both engineers and buyers alike.

www.sssltd.com

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Investments in people, parts, and locations help distributors meet strong component demand

Distributors are investing in inventory and new facilities to help ease shortages and grow sales



James Carbone

Many electronic component manufacturers say investments in new production capacity for multilayer ceramic capacitors (MLCCs), chip resistors and discrete semiconductors will boost supply and help alleviate shortages in 2019.

That is good news for buyers at small to medium-size OEMs and electronics manufacturing services (EMS) providers, who have been affected by long lead times and allocations of parts over the past 18 to 24 months. Buyers at smaller electronics companies, who buy most of their components from distributors, have had to scramble to source hard-to-find parts because their authorised distributors did not have them in stock. Buyers bought parts on the open market from independent distributors to keep production lines running.

Buyers at large OEMs, who purchase directly from chipmakers and other component manufacturers, were impacted less by the shortages because of long-term contracts they had with component makers.

The good news for buyers at smaller electronics manufacturers is that while component manufacturers have invested in new capacity, many authorised distributors have also made

investments to increase inventory, open new offices and hire more personnel to service OEM and EMS buyers.

"We increased inventory about 25 per cent in North America in 2018," said Don Akery, president, TTI Americas, based in Fort Worth, Texas. He added that over the last two years, TTI's inventory increased 40 per cent. "Our model is built on inventory," said Akery.

TTI's inventory investments have been made in all product categories and enable TTI to "service our customers more assuredly than most other sources," said Akery.

TTI has invested in "people, parts and locations," he said. "During 2018, TTI Americas added more than 200 people throughout the country. The majority of those are not in the warehouse. Most are in our branches," said Akery.

The largest investment was in TTI's sales organisation and customer facing positions. "We added almost 100 to our sales and service organisation," he said. TTI plans to add 75 more people in 2019.

Akery said TTI has also invested in facilities. Beginning in 2014 "we made the largest single capital investment in the history



Karim Yasmine, corporate vice president strategic supplier development for **Future Electronics**

"As we expect to grow revenue in 2019, we will manage our inventory growth and turns in line with those growth expectations"

of our company with our new Fort Worth distribution center," said Akery. TTI completed its move to the new distribution center in 2018.

"Additionally, we recently announced a 30 per cent expansion that will take place over the two years," said Akery. "We have also expanded many branch office locations across the country and around the world."

TTI's investment in inventory and facilities is part of the reason the distributor had robust sales growth in 2018, which marked

the fourth year in a row that the distributor gained market share, said Akery. "If we had not made those investments our growth probably would have been hindered in 2018 because we would have run out of space," he said.

Of course, TTI is not the only distributor that invested in inventory and new facilities. "Future is constantly investing in our physical assets," said Karim Yasmine, corporate vice president strategic supplier development for Future Electronics, based in Montreal. "We opened some





new sales offices in 2018. We also continued to invest in our globally integrated distribution centers," he said. Investments were also made to manage the global trade issues that became a factor in our industry in 2018. Yasmine said.

More demand, more investment

He added that Future has also invested in inventory because of growing component demand from multiple customer segments. "Our inventory investment was planned since the end of 2016 as we were prepared for a two-year year cycle the industry has gone through" Yasmine said.

The distributor increased its inventory for parts that were in short supply, such as MLCCs, chip resistors and other components. "Indeed, we increased our inventory significantly. This was in line with significant growth achieved on a regional and global basis," he said.

Yasmine added that Future is "committed to a differentiated inventory model based on a high

available to sell inventory level backed by industry leading supply chain programs. "As we expect to grow revenue in 2019, we will manage our inventory growth and turns in line with those growth expectations," he said.

Besides inventory, Future invested "significantly in customer facing resources in 2018 and will continue to do so in 2019," said Yasmine

The distributor expanded its global sales force, opening new offices in South America and expanded its centers of excellence in Europe, Middle East and Africa (EMEA). Future also opened a new state-of-the-art facility in Shenzhen, China, which is staffed with 500 customer facing executives.

"We also continued to expand our engineering specialist teams focused on areas such as connectivity, analog and power, lighting and embedded processing," he said.

Future will also hire more people in 2019 and "expand our team

"We've made huge investments in inventory"
 - Mark Burr-Lonnon, senior vice president EMEA, Asia and global service at Mouser Electronics

of customer facing executives. "We have open requisitions in all regions both on the sales and engineering side. Future remains in investment mode going into 2019," said Yasmine.

Such investment will help Future meet customer requirements for on-time delivery, continuity of supply and flexible inventory solutions, he said.

"Huge" inventory investments made

Increasing inventory has been a focus of Mouser Electronics' investment plans. "We've made huge investments in inventory," said Mark Burr-Lonnon, senior vice president EMEA, Asia and global service at Mouser Electronics, based in Mansfield, Texas. Mouser has added more stock and increased its breadth of inventory by manufacturer. Some distributors have a very narrow range of inventory, he said. "Our stocking policy is to have the widest range," said Burr-Lonnon. He said the idea is to provide as much choice as possible for Mouser's customers. For instance, when a customer is looking for a Texas Instruments, they can find a similar part from ADI or other component manufacturers.

Mouser recently announced it is expanding its headquarters' distribution center and will add more than 127,000 square feet at the center. The distributor had also expanded its facility two years ago. It also plans to construct a building to house customer service teams.

The expansion is needed because of strong product demand and a growing customer roster.

Kevin Hess, senior vice president of marketing for Mouser, said the distributor is expanding globally and has opened offices in Canada and Poland and plans to open office in Vietnam, the Philippines and Brazil.

Enlarging its footprint

Another distributor that is expanding its facilities and boosting inventory levels is Digi-Key, based in Thief River Falls, Minn. The distributor is building a new \$300 million facility that will increase Digi-Key's footprint by 3.5X, according to Dave Doherty, president and chief operating officer.

"The building will be 1 million square foot on the ground and will have a little more than 2.2 million usable square feet," he said. The expansion means Digi-Key can stock more products and product lines.

"This will be our next big step up in capacity to serve the growing market. There will also be more automation so we can do it more efficiently," said Doherty.

The new facility should open in 2021. The outer shell of the expansion has just been completed and the crews are currently working on the interior.



A new \$300 million facility "will be our next big step up in capacity to serve the growing market. There will also be more automation so we can do it more efficiently"

Dave Doherty, president and chief operating officer for Digi-Key

High-tech recovery remains strong

Despite the uncertainties facing the electronics sector, UK and Ireland component sales continue to increase, indicating that the high-tech manufacturing recovery is on course for continued growth

The UK and Ireland electronic component market will grow between 3.4 and 8.5 per cent in 2019, according to forecasts from the manufacturers' authorised distributor group of the Electronic Components Supply Network. The forecast also revealed that the market is likely to have grown by 9.2 per cent in 2018, with distribution's share of the total available UK market expected to grow to about 41 per cent. Overall, this indicates that the recovery in the high-tech manufacturing sector will remain strong and despite the many uncertainties, is likely to outperform the macroeconomic environment.

Positive outlook

According to ECSN market analyst, Aubrey Dunford, the market grew strongly throughout 2018: "Every quarter of 2018 saw sales growth compared to the same quarter in 2017. Billings remained high in the second half of the year, so we must expect that the growth rate will slow a little as we enter 2019, but our members are forecasting a further four quarters of growth at least."

The outlook for 2019 is positive and although the rate of growth might dip in the second quarter, it will pick up again during the second half. Dunford predicted: "The global electronics market is set on an expansion path with automotive systems and new mobile standards such as 5G leading the way, but these will all need a huge investment in infrastructure which is where UK companies can really make a mark."

Members of the manufacturers' authorised

distributor group, AFDEC, remain confident that there are opportunities for further growth in 2019, despite numerous factors that simply cannot be predicted, not least Brexit and continuing trade wars. He concluded: "Whatever the final outcome of our Government's negotiations with the EU, we are certain that UK companies will be preparing to participate fully in that growth."

Sustained growth

This positive outlook comes on the back of sustained previous growth. Aubrey said: "We've now achieved ten quarters of continuous growth and are forecasting that we'll achieve fifteen quarters of growth by the end of 2019, a performance unseen since we started collecting data back in 1984."

"It's clear that there are a number of factors behind the upswing, predominantly the upturn in the global electronics markets. The seed change in electronics markets has enabled more competitive pricing of manufactured goods in export markets now that the use of electronic systems has finally come into economic use enabled by the internet of things and inexpensive WiFi connections."

According to Dunford, UK companies are ideally positioned to capitalise on these opportunities, although this global growth has also caused lead times to extend on some product lines, especially in commodity areas.

A 5G future

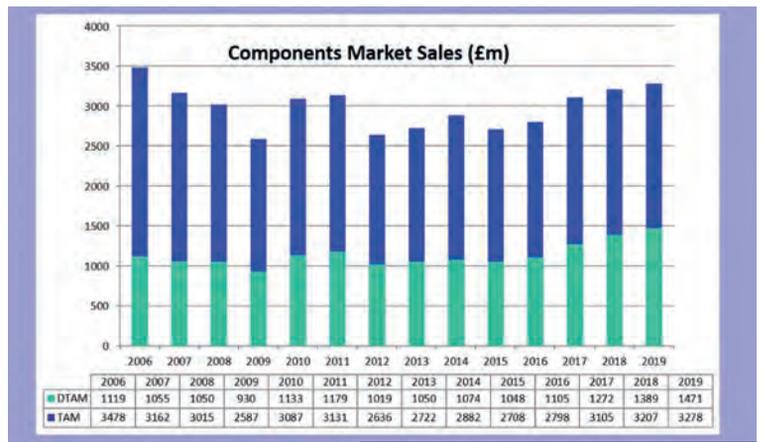
Commenting on the 2019 forecast ECSN and AFDEC

chairman, Adam Fletcher, welcomed the growth trend, which he believes will surge as 5G is rolled out.

Adam explained: "Underlying growth has become the new normal, but it will probably not be linear and we must anticipate the odd bump along the way. I've been predicting that the growth curve will adopt a hockey-stick shape towards the end of 2019 and into



ECSN market analyst, Aubrey Dunford



Distribution's share of the total available UK market is expected to grow to about 41 per cent

2020, causing further supply network problems as component manufacturers scramble to keep up with increased demand.

"Manufacturers are desperately filling gaps in their portfolios to address the emerging technology needs in high growth markets, including 5G infrastructure, industry 4.0 and automotive, but they continue to be conservative in adding manufacturing capacity."

www.ecsn-uk.org



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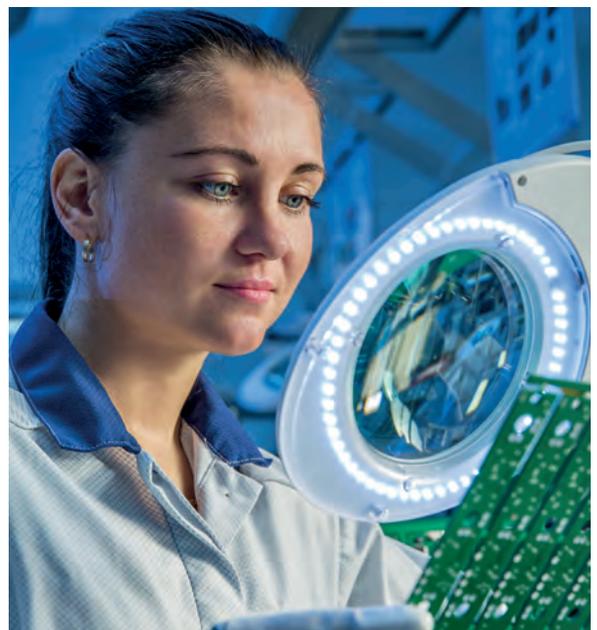
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Connector sourcing challenges tougher than ever

Demand for increased data speeds and greater functionality in smaller spaces means sourcing ruggedized connectors is ever-more challenging, as specialist distributor, Aerco, explains

Aerco's core focus is supplying ruggedized components for harsh environment applications based on an expert understanding of key performance requirements in diverse industry sectors, from military and aviation, through to oil and gas, rail and mass transportation. Its approach offers invaluable support to those that require a tough interconnect solution because although the definition of ruggedized refers to hard wearing or shock resistant equipment, in electrical connector selection, the parameters can be much more wide ranging.

Rugged requirements

Connectors in extreme environments need to cover many bases. Typically, they need to prevent dust and moisture ingress, either from weather exposure or submersion under water. They may need to survive extreme temperatures, potentially down to -50°C, or as high as 260°C. They may also need to resist shock, such as flying ballast on rail applications, or the debilitating effects of vibration, which can impact on coupling integrity, leading to severe fretting of the contacts.

And it doesn't stop there. Metal shells may need protection from degradation through specialised plating or, as in marine environments, extra tough materials such as an alloy of nickel-aluminium-bronze to resist corrosive salt spray. With multiple high speed data links and high power circuits all in close proximity, it may also be necessary to protect against

electromagnetic or radio frequency interference. Finally, remember these are not 'fit and forget' applications. Coupling methods and interfaces must maintain performance upwards of 1,000 mating and un-mating cycles.

Sourcing challenges

Connectors capable of meeting these requirements have been around for many years, but sourcing challenges have changed in the last 10 years thanks to two significant factors. First, the relentless drive to feed ever increasing amounts of data at ever increasing speeds through constantly shrinking spaces. Second, the demand for greater functionality, whereby both electrical power and a myriad of miniature signals are carried within a single connector. These demands pose a major challenge involving a trade-off between rugged performance and size reduction.

Solutions do exist and distributor expertise can be key. Aerco brings together technologies from manufacturers such as TT Electronics, TE Connectivity and Smiths Interconnect. Choice is also essential, so access to a range of ruggedized connectors based on, or derived from, proven military specifications is invaluable.

Rigorous standards

Mil-DTL-38999 includes a ratchet design anti-vibration coupling nut, EMI grounding ring, interfacial and rear seals, and a range of tough shell materials including stainless steel, marine bronze

and lightweight composite plastic. Numerous contact layouts provide signal, power or high speed data, with up to 128 contacts in a single shell, making this a 'go to' connector for rugged interconnects across many industries.

Other examples include Mil-DTL-5015, which has been enhanced by TT Electronics to meet critical rail industry performance requirements. Benefits include RoHS compliant platings, low halogen insulators and a bayonet coupling with an 'anti-wear' stainless steel pin for extra secure mating. And with on-train demand for ever more data, these connectors now incorporate co-ax, triax, twinax, Quadrax and the new Octrain contact for data speeds of up to 10Gbase-T.

Assembling solutions

The variation afforded by these ranges reflects the diversity of today's rugged applications and the complexity of the circuitry within. To offer a truly effective, consistently available, solution distributors need to provide an assembly service and Aerco has consistently committed to this, assembling both Mil-DTL-5015 bayonet and Mil-DTL-38999 III as well as Mil-DTL-26482 and various rectangular connectors from Smiths Interconnect. Thus, Aerco can provide 'off the shelf' solutions, but also react quickly to rapidly enhance it's offering as applications in the field demand new contact layouts or plating finishes.

www.aerco.co.uk



Access to a range of ruggedized connectors based on, or derived from, proven military specifications is invaluable



**Solutions
do exist and
distributor
expertise can
be key**

Band together for savings

An ability to source a compatible connector, backshell and termination band in one place could reduce your supplier base and the costs involved, says NYKCS

With connector and backshell options finalised, it's time to consider how to terminate cable shielding. One of the most common methods today is termination bands. Termination bands are known by many in the industry as 'Band-It' straps, in a similar way that every vacuum cleaner is known as a Hoover, but there are in fact direct alternatives available from other manufacturers.

NYKCS stocks Compaero termination bands, which are available to mil-spec and German military VG standards. The bands are also

available as a commercial part, with the mil-spec part numbers being the driving force behind Compaero's offering.

Made from 300 series stainless steel, the bands have either a one-step stamped buckle or a two-step welded buckle fastening to terminate the shielding to the backshell. Bands are available in standard or micro widths, standard or extended length and either flat or pre-coiled. They are also compatible with current tooling, using a single tool to tension, terminate and cut off excess band length.

Decrease costs

By specifying these Compaero bands, which are available from stock, NYKCS suggests purchasers could reduce costs over their current solution provider.

This is because Compaero's value add approach to manufacturing MIL and VG approved products is claimed to help maintain competitive prices and short lead times for a range of products. Coupled with this, NYKCS holds a large volume of the extensive Compaero range including adapters, protective covers, cable clamps,



NYKCS can supply a variety of approved components with short lead times



One of the most common termination methods today is banding



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termination bands and other connector accessories, from simple strain reliefs to submersible EMI/RFI shielded backshells for use in harsh environments.

Shrink supplier base

According to NYKCS, this ability to provide the connector, backshell and termination band from a single source can also help reduce a purchaser's supplier base and the costs involved.

To support this offering, NYK Component Solutions is fully approved to AS9100 Rev D, which covers the value-

added assembly of aerospace and commercial connectors in accordance with OEM documentation, techniques and piece parts. It can also assemble MIL-DTL-38999 III components for Conesys and is approved to AS9120 Rev B, which covers sales, logistics and distribution of electromechanical interconnect components for the aerospace, military, oil and gas markets. Furthermore, NYKCS is approved to ISO9001 2015, having successfully gone through this transition with the BSI.

All this enables NYKCS to supply a variety of approved components with short lead times, efficiently meeting customer specific needs for connectors, backshells and connector accessories by supplying approved products such as MIL-DTL-38999 Series III, MIL-DTL-26482, MIL-DTL-83723, EN2997, ESC10, MIL-DTL-5015 and hyperboloid contacts and connectors.

www.nykcs.com



NYKCS holds an extensive range of Compaero connector accessories



The bands have either a one-step stamped buckle or a two-step welded buckle fastening to terminate shielding to the backshell



NYK Component Solutions is fully approved to AS9100 Rev D, which covers the value added assembly of aerospace and commercial connectors in accordance with OEM documentation, techniques and piece parts



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New insulator expands suitability

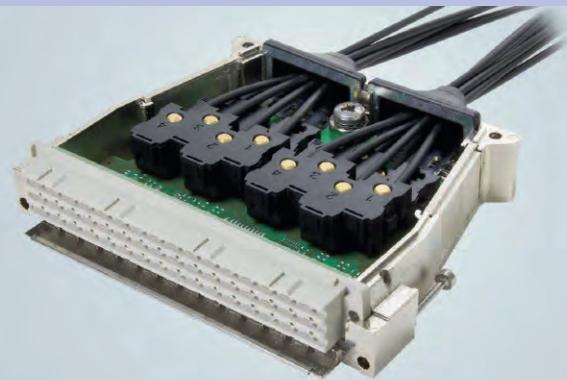
AVX has added a new insulator to its 9176-800 series 2.55mm profile insulation displacement connectors. The ability to accommodate an additional wire gauge will expand application suitability, providing reliable performance in space-constrained, harsh-environment applications such as industrial, medical and transportation.

Now available in one to four positions in each of four wire gauges, the series' redundant, fatigue-resistant phosphor bronze contacts provide gas-tight, cold-welded connections for discrete 22, 24, 26, and 28 AWG solid and stranded wires. They are also compatible with potting and overmoulding encapsulation processes for environmental protection.

In addition to connecting leaded components to PCBs, the series can also be used to connect PCBs together in a daisy chain configuration.

Every connector in the series is rated for three-cycle durability and current ratings are reliant upon AWG; the 22 AWG connectors are rated for 6A, the 24 AWG for 5A, the 26 AWG for 4A, and the 28 AWG for 3A.

www.avx.com



Weight saving solutions are rail ready

Harting has introduced a number of connector solutions targeted at the rail industry, focusing on weight reduction and increased data throughput.

Weight reduction is increasingly important in rail vehicle construction and connectors can make a measurable contribution with the transition from metal to plastic connector housings. Harting has therefore extended its Han-Eco plastic connector series by adding housings in Han B size which are plug-compatible with Han connectors in metal housings and offer additional installation flexibility.

By using smaller connectors, including modular types, more functions can be combined in a smaller space, which also reduces connector weight. Harting's High Pressure Railway housing series has been designed to fit more connector modules into a single housing. The Han 34 HPR, for example, can accommodate up to four 650A high-current contacts or 12 Han-Modular single modules. Previously, two housings each had to be equipped with six Han-Modular individual modules to supply a comparable data volume.

www.harting.com

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M85049/128-3	CPTB-111	VG95319-1015A001	A10089	600-052	A10089	BA1-01	-	BND-1425S
M85049/128-4	CPTB-111-1	-	A10088	600-052-1	A10088	BA1-11	-	BND-1425P
M85049/128-5	CPTB-221	VG95319-1015A103	-	-	-	-	S3175-3	-
M85049/128-6	CPTB-221-1	-	-	-	-	-	S3175-3C	-
M85049/128-7	CPTB-121	VG95319-1015A003	A31189	600-057	A31189	BA1-03	-	BND-0812S
M85049/128-8	CPTB-121-1	-	A31188	600-057-1	A31188	-	-	BND-0812P
	CPTB-122	VG95319-1015A004	A31089	600-083	A31089	BA1-05	-	-
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Circular connectors offer cross-manufacturer compatibility

Phoenix Contact is launching a new series of circular connectors designed to offer uniform solutions for signal and power transmission with a fast Oneclick locking system. The M17 to M40 PRO series provide cross-manufacturer compatibility for access to suitable cable and device connectors all over the world.

The range includes cable and device connectors in size M23, each with female or pin contacts. Cable connectors are available with a standard or fast locking system and device connectors are all compatible with both versions.

For signal transmission, versions with six to 19 positions are available for currents up to 20A and voltages up to 300V. The power transmission range includes versions with five to seven positions, with an additional protective ground for currents up to 30A and voltages up to 630V.

www.phoenixcontact.co.uk

A powerful performance

Hirose has introduced its EF1 series to meet demand for smaller yet higher performing power connectors in industrial applications. The series consists of a DIN rail mount in-line receptacle and plug and a panel mount in-line receptacle and plug. Both accept high power crimp contacts with the capacity to handle up to 160A current rating.

Crimped cable can be inserted into the connector housing in a one-step operation and the crimp contact can be terminated to the cable with a standard JIS C 9711 hand tool.



Hybrid connector streamlines automotive connectivity

Molex has launched its stAK50h Unsealed Connection System to deliver both signal and Ethernet connectivity in applications such as automotive body electronics, safety and driver assist, comfort and infotainment devices and modules.

Incorporating through-hole unsealed headers and hybrid connectors, the single- to multi-bay stAK50h connector system meets industry-standard footprints based on 0.50, 1.20 and 2.80mm terminal sizes widely used in automotive applications. The hybrid system is available with 12 to 56 circuit receptacles and can be used in applications ranging from low-current signal to high-power applications.

The USCAR-2-compliant stAK50h system is also designed to expedite validation time for tier one automotive manufacturers with a stackable header design, which eliminates the custom tooling, engineering and validation time typically required in multi-bay automotive device and module configurations.

Global product manager, Molex, Scott Marceau, explained: "By eliminating the need for two separate connection systems for signal and Ethernet, the new hybrid stAK50h connector system optimizes space and design flexibility."

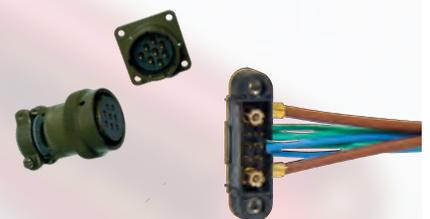
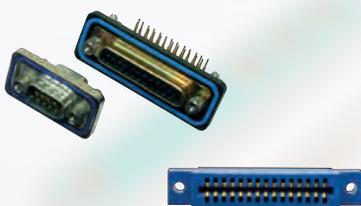
www.molex.com

During use, a snap-in lock provides a positive tactile sensation to confirm correct mating engagement and secure connection. Thereafter, the internal spring contact and contact points are said to provide optimum contact force to maintain a reliable connection.

To prevent incorrect mating when multiple connectors are used, four different mating keying styles are available. Applications for the series include power controllers, inverters, storage batteries, medical devices and robot controllers.

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Can kitting sidestep sourcing stress?

SeSemi provides a range of kitting and supply chain services. Electronics Sourcing asked the company to explain just how purchasers can benefit

Q What advantages does kitting provide for sourcing professionals?

SeSemi Electronics provides a cost effective approach to kitting and supply chain management. We deliver a production ready kit of materials direct to clients or their manufacturing facility. This takes away the time-consuming process of requesting multiple quotations, raising multiple orders, receiving multiple deliveries and being invoiced by multiple suppliers.

All kits are provided with custom labelling and we can support one-off kits or long

term schedules, allowing clients the added benefit of flexibility. We offer bill of materials management for all scheduled kits and can provide technical support on obsolescence.

Q What information do you require when you first engage with a new client?

The first thing we require is a bill of materials, which can be submitted easily via a BOM upload tool on our website. We then request key information regarding quantities, timescales and production/packaging requirements. Depending on

the complexity of the BOM or schedule, our team usually provides a quotation within one to three days.

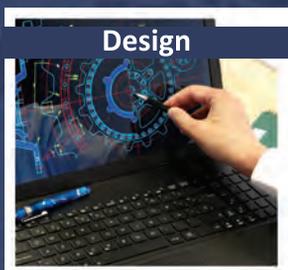
Q Is it normal for clients to source components or does SeSemi provide this service?

This can vary from kit to kit as some clients have customer specific products that they free issue to us, however, 90 per cent of kits are purchased solely by the SeSemi team. We also have several approved PCB manufacturers that we have worked with for many years, allowing us to supply PCBs for all kitting contracts, if



SeSemi takes away the time-consuming process of requesting multiple quotations, raising multiple orders and receiving multiple deliveries

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required. This is an added benefit as we can become a single source for the entire bill of materials.

Q Does SeSemi provide kitting services to UK sites only or is this a global service?

The majority of our contracts are with UK OEMs and CEMs, however we deal with several different divisions within some of our larger OEMs resulting in orders from European and Scandinavian sites. We are happy to help clients no matter their location.

Q How can SeSemi resolve obsolescence headaches?

For regular customers, our BOM management service checks availability across an entire bill of materials. This highlights any vulnerable products that could be subject to allocation, extended lead times or obsolescence.

For our scheduled kitting contracts, it's important that we can provide long term support, so we offer this service free of charge. If we identify a product that could be at risk of obsolescence or allocation, we will highlight this and make suggestions to avoid any production delays such as a form, fit and function replacement or long term storage.

Q How do clients want kitted components supplied?

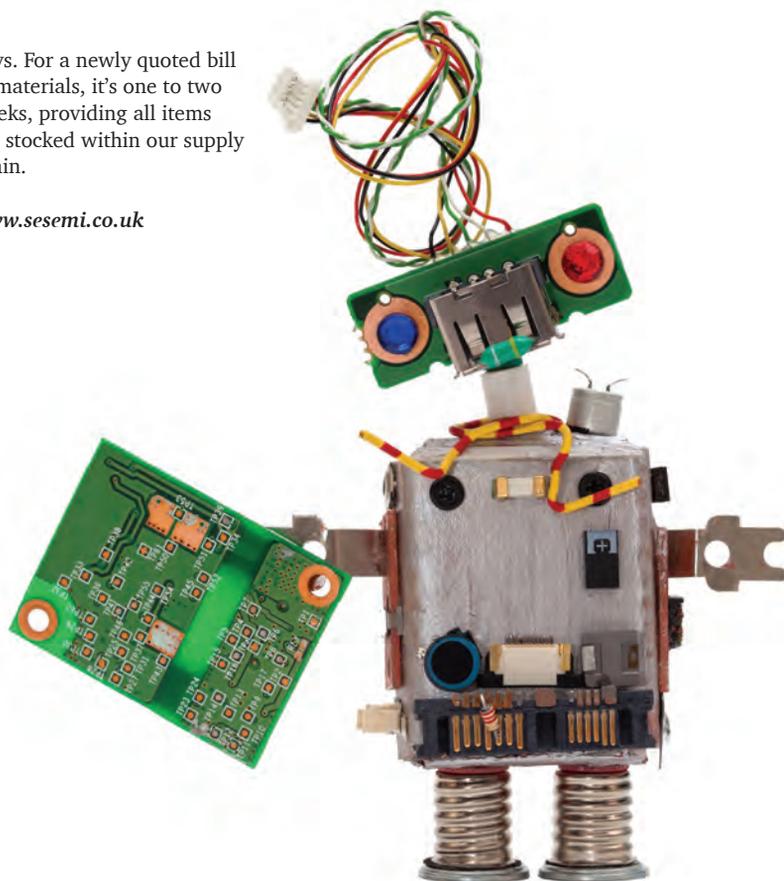
The majority of our clients prefer items to be taped and reeled. We generally purchase full manufacturers' reels so this is rarely an issue, but we also offer a reeling service. We always note how each item will be packaged on our quotations.

Q How fast can you fulfil an order?

Our standard turnaround for a stocked kit is one to three

days. For a newly quoted bill of materials, it's one to two weeks, providing all items are stocked within our supply chain.

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Putting patient safety first



Keeping patients and operators safe is key for all kinds of medical technology. A laser focus on reliability and strict adherence to relevant standards can help minimise the risks

Safety is paramount in medical applications, particularly for electrical equipment connected to the regular power supply, which may also be in direct contact with patients. Even minimal leakage currents can be life-threatening for weakened patients, but it's also important to protect medical personnel, who could be put at risk through the unintentional transmission of electrical power.

Medical electrical equipment used to diagnose, treat or monitor patients, must fulfil extremely high safety requirements. In the third edition of the international IEC 60601-1 standard, which has gradually been enforced since 2006, these requirements were increased. Focus intensified regarding protection from electric shock, basic resistance against thermal and mechanical stress and risk management.

The IEC 60601-1 obligates manufacturers of medical electrical equipment and systems to ensure that devices are completely fail-safe in their use and work reliably. This can be ensured by themselves or in collaboration with suppliers, with the latter named in the standard as being responsible amongst others for protection from electric shock. Potential suppliers include connector providers,

whose products represent central elements for the transmission of electrical power, data and signals.

Smaller, safer devices

Continuous performance, maximum reliability and intuitive handling are of essential importance in medical technology. Whether in doctors practices, at home or in hospitals, reliable and robust components are a basic prerequisite.

The trend to increasingly compact medical devices must also be considered by manufacturers and suppliers. Interfaces specifically must be reliable and may not permit any sources of malfunction. Potential influences such as disinfectants, bacteria or spray water must be considered during design and incorporated into the selection process for components and materials.

Ultimately, medical equipment must be self-explanatory and convenient for both medical personnel and patients. General electrical safety is vital, particularly in applications located in direct proximity to patients and operators and this is regulated in the IEC 60601-1 standard.

Patient proximity

Medical applications require the highest degree of precision, dependability

and user protection in every component. Home care, ambulant treatment and diagnostics each present specific requirements that must be taken into account by medical equipment manufacturers. One such factor is protection from electric shock, as defined in the IEC 60601-1 in point of care scenarios where medical devices are placed right next to a patient.

Today, medicine is strongly dependent on electrical equipment and because these

Precision, dependability and user protection are essential in every component



Medical applications require the highest degree of precision



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systems are normally connected to the public electricity supply network, products pose a latent risk for patients and operators. In these networks, power is transmitted at voltages ranging from 230 to 250V and at 50Hz AC, which could trigger cardiac irritations. Lightning can also present risks if it strikes into or next to a cable, leading to dangerous temporary over-voltages of several thousand volts.

Electrical equipment in the medical sector must therefore be well protected. This primarily applies if equipment will come into contact

with patients, such as in sonography devices, dental drills or electric blankets, but also in point of care applications characterized by a distance to the patient of less than 1.5m.

In order to guarantee the highest possible level of protection, the IEC 60601-1 defines both general and technical requirements which must be fulfilled by the manufacturers of medical electrical equipment and systems.

Safe by design

An important part of the general requirements concerning electrical medical equipment is

basic safety. Accordingly, equipment must not have sharp edges, excessively thin or insufficiently resilient mechanical insulation, or loosely fastened cables which can easily be pulled out. Further aspects include resistance against chemical substances, high and low temperatures and electromagnetic radiation.

Further application-specific performance characteristics are also defined to guarantee the reliable function of devices such as pumps from heart-lung machines, cooling devices for blood bags or timers on x-ray apparatus.

Finally, manufacturers of electrical equipment and systems must establish a management process for the assessment of potential risks. Prior to the third edition standard, all safety-relevant aspects had to be investigated, but until now, the question of how manufacturers reached their results was left open. With the latest version of the IEC 60601-1 they are obliged to keep records every step of the way, resulting in substantially more complex approval procedures.

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Ultra Electronics Receives MedAccred Printed Circuit Board Assembly Accreditation



MedAccred recognizes Ultra Electronics for its commitment to continual improvement in medical device quality

Ultra Electronics received MedAccred Printed Circuit Board Assembly accreditation for demonstrating their ongoing commitment to quality by satisfying customer requirements and industry specifications.

“Achieving MedAccred Printed Circuit Board Assembly accreditation is not easy: it is one of the ways in which the medical device industry identifies those suppliers who provide superior critical manufacturing processes for the production of medical devices. Companies such as Ultra Electronics work hard to obtain this status and they should be justifiably proud of it,” said Joe Pinto, Executive Vice President and Chief Operating Officer at the Performance Review Institute. “PRI is proud to support continual improvement in the medical device industry by helping companies such as Ultra Electronics succeed and we are committed to continuing to assist the industry.”

Richard McKay, General Manager at Ultra Electronics Weymouth described the achievement. “We are incredibly proud to gain this accreditation from such a prestigious body as the Performance Review Institute (PRI) and it is an honour to be the first organization in the UK to achieve this. Gaining this status further demonstrates our total commitment to the highest standards in quality and Weymouth as a Centre of Manufacturing Excellence. MedAccred complements our existing accreditations like NADCAP 7120 for PCBA, Cable Harness, Box Build, Special Coatings (Conformal & Parylene Coating) and AS9100.

Almost all of the products Ultra produce for Aerospace, Automotive, Military/Defence, Nuclear, Oil & Gas are either safety or mission critical. The UK medical sector is an exciting area for growth as more electronics are incorporated into products by OEM's. This coupled with our new Rapid Prototype line (PCBA), in-house special coatings like Parylene, Cable Harness Assembly & Box Build positions Ultra strongly for the future across multiple market sectors.”

About Ultra Electronics

The Ultra Electronics Group manages a wide range of specialist capabilities, generating highly-differentiated solutions and products in the Defence & Aerospace, Security & Cyber, Transport and Energy markets. We meet customer needs by applying electronic and software technologies in demanding environments and meeting critical requirements. Ultra's deep understanding of its specialist capability areas combined with knowledge of the customer environment is a key factor in delivering innovative solutions to meet customer needs.

For more information about Ultra Electronics Group please visit <https://www.ultra-electronics.com/>

About MedAccred

MedAccred is an industry managed supply chain oversight program that reduces risk to patient safety, assures quality products and compliance with requirements as they apply to critical processes used in the production of medical devices. The program is administered by the not-for-profit Performance Review Institute. PRI is a global provider of customer-focused solutions designed to improve process and product quality by adding value, reducing total cost and promoting collaboration among stakeholders in industries where safety and quality are shared goals. PRI works closely with industry to understand their emerging needs and offers customized solutions in response.

Learn more at <http://p-r-i.org/medaccred/> or contact PRI at MedAccred@p-r-i.org

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Americas: 2019 electronic component forecast



John Denslinger's 40-year electronics career ranges from time with passives specialist Murata Electronics, to managing manufacturing plants in Mexico. John is a trained industrial engineer

In this article, John Denslinger investigates the data underlying recent, current and potential growth in the electronics purchasing and distribution sector

Global Economy • By John Denslinger

The global results for 2018 are in and the numbers look great. For the Americas, it's even better! The electronic components industry once again put together impressive back-to-back years of growth. When finally tabulated by the industry's leading trade associations SIA and ECIA, the numbers will show Americas' semiconductor and passive 2018 year-over-year growth around 19 and 23 percent respectively. By any measure, that's truly outstanding and serves to justify the record level of capital investment as well. Congratulations to all the manufacturers, distributors and sales reps on a very successful year indeed.

But as you know, the devil is in the detail. One data set I like to look at is 'percentage change in quarterly sales performance year-over-year'. For the Americas in 2017, semiconductor Q1 growth was 22 percent trending upward each quarter finishing above 41 percent in Q4. 2018 by contrast was just the opposite: Q1 growth topped out at 35 percent and continued sliding quarterly to a low point in Q4 estimated at 10 percent. That trend doesn't bode well entering 2019. Now let's examine passives. In 2017, the picture was very flat: Q1 growth at 11 percent ending with Q4 at 12 percent; whereas 2018 Q1 showed 18 percent trending up each quarter with Q4 estimated at or above 28 percent. I can understand that's a lot of detail to digest, so allow me to simplify market conditions in one table setting up 2019's expectation:

Quarterly Sales Performance Year over Year

	Semiconductor	Passives
2017	Accelerating	Flat
2018	Deceleration	Accelerating
2019 (1st Half forecast)	Flat	Deceleration

Also of note is one curious anomaly. ECIA tracks the passives to semiconductor ratio. Historically, that data shows 3.7 capacitors sold to every 1 semiconductor. The ratio has been consistent for years. Starting Q4 2017, that ratio jumped significantly to 4:1 and continues through Q4 2018. There can be only two explanations for that much change: new product designs have radically altered the composition ratio; or capacitor shipments to the actual real demand could be over-stated by eight percent. Unfortunately, the second is the more probable of the two. I would suggest cap suppliers get ready for a modest correction as the supply chain adjusts accordingly. On the other hand, perhaps this is not all bad to those suppliers and customers tediously working daily sourcing issues. Relief might be welcomed.

So where do we stand? Well, customer demand remains vibrant, backlogs firm and lead times steady. Inventory levels throughout the supply chain seem to be reasonable except as noted on capacitors. The first half of 2019 is likely to be good but certainly not great, thanks to a 2018 tailwind. It might be a different story in the second half. No one can really predict the on-again/off-again tariff impact on supply chains, a fluid federal policy on interest rates, a potential spillover of EU discord or shortages of qualified labor. Conversely, PMI and consumer confidence remain positive at least for now.

In summary, the 2019 semiconductor forecast for the Americas appears to be around five percent. Passives could be slightly higher. Given the uncertain economic, political and social conditions here and elsewhere, look for most of the growth in the first half.



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Effective planning prevents line stops

Proactive obsolescence management helps purchasers prepare for component end of life, making line stops a thing of the past, advises senior applications manager at Astute Electronics, Andrew Parker

Continuity of supply is a critical concern for any purchaser however, guaranteeing supply on long-life cycle contracts is a challenge. Manufacturers operating in risk averse industries, have products with long life cycles that will exceed the availability of supplied products and may experience multiple cycles of obsolescence.

With the onus on availability, contracts often transfer the cost and impact of

obsolescence to suppliers, especially primes. Proactive obsolescence management, as set out in IEC 62402, is the only solution, providing an approach that can also successfully deal with production and aftermarket requirements based on legacy contracts.

Prevention not cure
Fundamentally, obsolescence management is about risk management and mitigation, whereas proactive obsolescence management means

preventing issues before they happen and managing obsolescence in the most cost-effective manner possible. To do this, a manufacturer needs: a comprehensive and relevant obsolescence management plan; accurate and reliable advanced status information on every item in the product; appropriate tools to manage data; and finally, management commitment, including the budget and resources to build and support the programme.

There are several steps involved in managing obsolescence. Not least, it requires accurate data for analysis, reporting and continuous monitoring and most importantly, this information is required early. As obsolescence occurs, mitigation costs rise, and options become limited the later the end of life event is known. Significant work is needed to develop this into a proactive obsolescence management plan. It requires a deep understanding of your

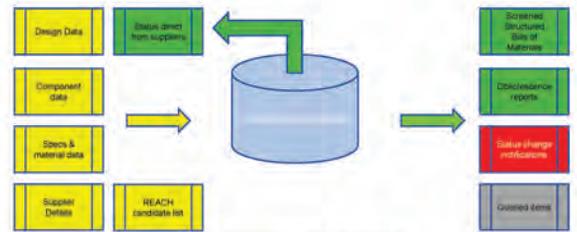


Figure 2, Building the Obsolescence Management Database



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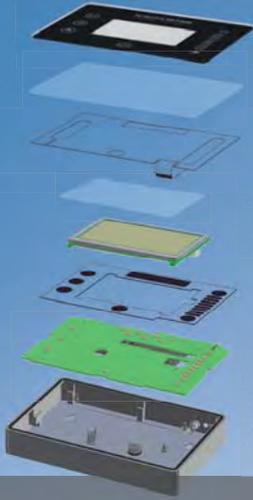
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business and the challenges that may occur. This will include the number of products and build versions, which means identifying all types of each component. It is also vital to consider key suppliers, supply chain challenges and evolving policies, looking at supplier management and how suppliers manage obsolescence. Establish, for example, whether any historic contractual deals exist and what legacy engineering databases and product line management tools are used.

Finally, find out what organisational challenges exist and assess the culture, which may present challenges to dealing with obsolescence. Typically, in many organisations there is a lack of ownership. In historic contractual programmes, obsolescence may have been neglected or poorly addressed. The advantage of proactive obsolescence management is that it can be built in to the bidding phase on new developments. Get it right here and the product is in good shape to be managed throughout its life-cycle.

Building a database

Proactive obsolescence management requires the development of a database, which will become a knowledge base for component management. This can become a differentiating value service for customers and suppliers with this service in place will see their rating increase as a result.

The final output will be an obsolescence register, which provides examples of tools to conduct impact analysis, solve problems and prevent designing in obsolescence. Effective management of any bill of materials involves knowing the status of a component on an ongoing and regular basis. This is an area where various automated

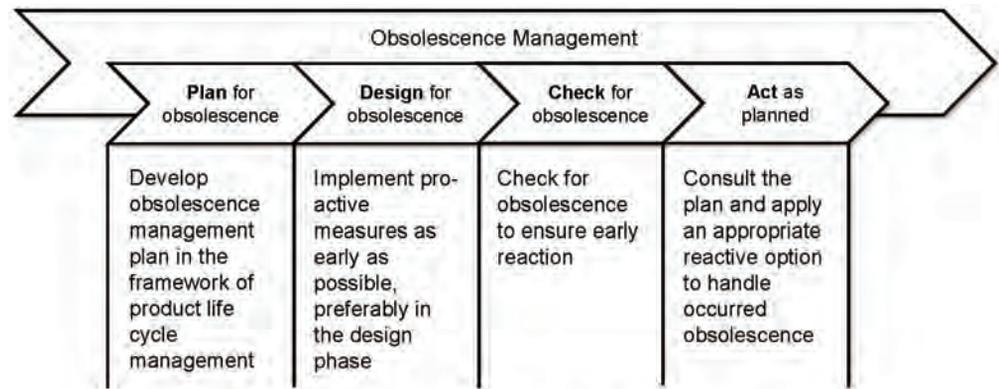


Figure 1, Obsolescence Management Planning (source IEC 62402)

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tools exist, all of which can be used as part of the obsolescence database.

Preparing a plan

The corner stone of any successful obsolescence management programme is a comprehensive plan. This must detail how obsolescence will be managed and what to do when it occurs. A thorough understanding of the needs of the business and its contractual obligations will assist in defining the scale and depth of the process developed.

In general, the obsolescence process will have several key stages. Firstly, notification which may arise from various sources such as the component manufacturer, a supplier, obsolescence tools, a contracted

obsolescence service provider or regulatory bodies. The next step is to assess the options available, working in

or alternative part, undertaking a redesign, performing a last time buy or implementing a bridge-buy.

products, obsolescence can be designed out. Ultimately, the value to an organisation will be measured in avoidance costs, demonstrated

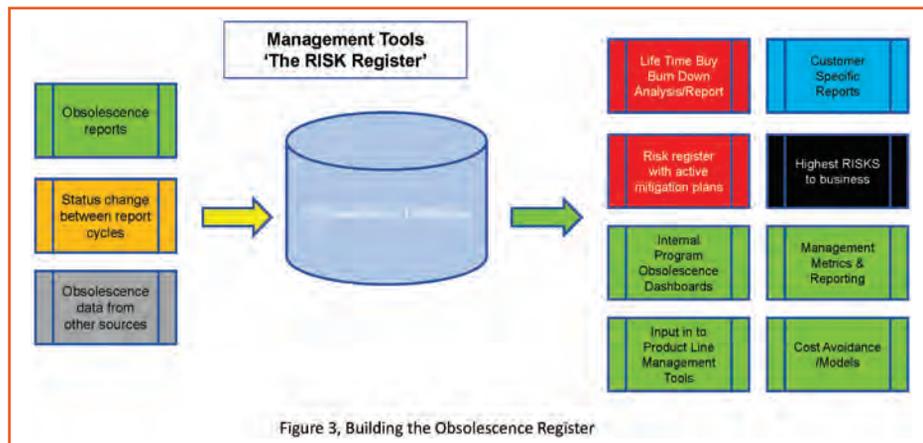


Figure 3, Building the Obsolescence Register

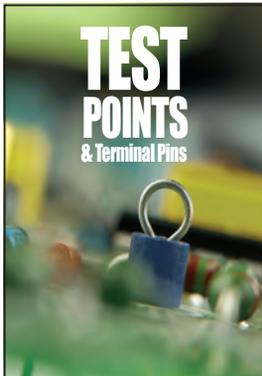
conjunction with the component manufacturer, engineering, supply chain and other stakeholders. Available options may include: introducing a direct replacement

The plan will include functional responsibilities for both organisations and individuals. It also sets metrics to monitor performance. Over time, even on legacy

through performance with key clients.

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Explore new training skills

Returning once again to Southern Manufacturing and Electronics, Advanced Rework Technology will introduce new trainers, a new European facility and promote the new services it offers

Training in the electronics industry has gone from strength to strength over recent years. Increasingly, companies see the benefit in training staff to be familiar with the latest technologies and acceptance and process documents in this ever-changing industry.

For this reason, ART has spent considerable time researching and recruiting new technical trainers to join its team.

The company also noticed a large customer base in mainland Europe and consequently, ART has now opened Advanced Rework Technology Europe, in Bergamo, Italy. This site is located to cater for Italy and the surrounding countries, to ease the time and costs associated with travel to and from UK.

Managing director, Debbie Wade, explained: "Expanding into Europe was a natural progression in aiding the industry with its consultancy and training needs. We have a great team at our new site in Italy, with very experienced master IPC trainers on board to conduct courses to the level that our customers expect, making us one of the best IPC approved training centres in the world. As our site in Italy can offer all of the courses offered by ART UK, I am more than confident that regardless of the ART facility you attend, the level of training will always exceed expectations."

In addition to the expansion into Europe, ART UK is now one of only two global IPC training centres that can offer all of the IPC training courses. This comes following ART UK's certification in 2018 to run the enhanced certified interconnect design CID+ class, which it has added to its course portfolio.

To accommodate this expansion of its course list and consultancy services, ART UK has moved into a new purpose-built facility in Witham with dedicated training rooms to suit the type and style of course being conducted. Visit stand A110 to find out more.



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Exhibition growth promotes component diversity

With new exhibitors and plenty of familiar faces, Southern Manufacturing and Electronics continues to expand, providing much to see at Farnborough this month

Following the move to an exciting new permanent location last year, *Southern Manufacturing and Electronics* returns to Farnborough from 5 to 7 February 2019. Described as a landmark in the show's 20-year track record, the move has been a driving force behind continued expansion for this year's event.

More exhibitors

Exhibitor bookings are presently around 20 per cent ahead of last year and on

course to reach the venue's maximum capacity. Several well-known companies from the electronic component arena are set to return for 2019, including CamdenBoss, Würth Electronics, Cosel Europe, EC Electronics, Lemo UK, Pace Europe, Hammond Manufacturing, Selwyn Electronics and Shenzhen X-Mulong Circuit.

There are also some prominent companies returning to the event, such as Rapid Electronics, which

will present for the first time since 2008, plus several other important former exhibitors such as Citizen, Mitutoyo UK, Schmidt Technology and LNS Turbo. This is in addition to fresh faces participating for the first time this year, including display technology specialist, Canvys.

Component diversity

The selection of components and OEM parts on show is nothing if not comprehensive. Some of the larger vendors exhibiting for 2019 include



The selection of components and OEM parts on show is nothing if not comprehensive



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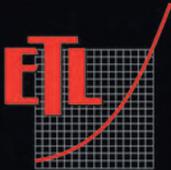
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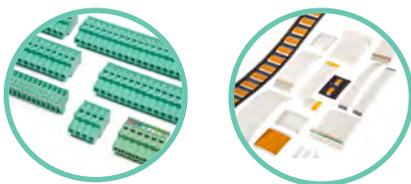


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Experts in Interconnect

Southern Electronics Preview

Easby Electronics, with its catalogue of electrical and electronic components from brands such as TE Connectivity, Samsung and Duracell. Others adding to the level of component diversity include Transfer Multisort Elektronik, which offers 250,000 products from 950 manufacturers, with a range featuring: semiconductors, optoelectronics, light sources, passives, connectors, relays, contactors, wires, cables, enclosures, automatics, pneumatics, workplace equipment and robotics.

The show's venue, Farnborough International Exhibition and Conference Centre, opened in 2018, and at 20,000m² is said to be the largest purpose-built exhibition venue to open in the UK for two decades. Now fully open, Farnborough International's amenities include a free WiFi service and quality catering outlets. The venue is conveniently positioned for the band of technology businesses situated across the South East and stretching out down the M4 corridor.

International flavour

Sharing its home with one of the UK's leading international showcases, the Farnborough Air show, has bought *Southern Manufacturing* to the attention of an ever-expanding group of international exhibitors over the last few years. That pattern has seen an encouraging, Brexit-defying upturn for 2019 with a remarkable 26 per cent surge in bookings from offshore providers, appreciably enlarging the international aspect of the exhibition and the selection of specialist skills presented. Near-shore CEMs are especially well represented, offering a mix of competitive rates and shorter supply chains.

Tailored trails

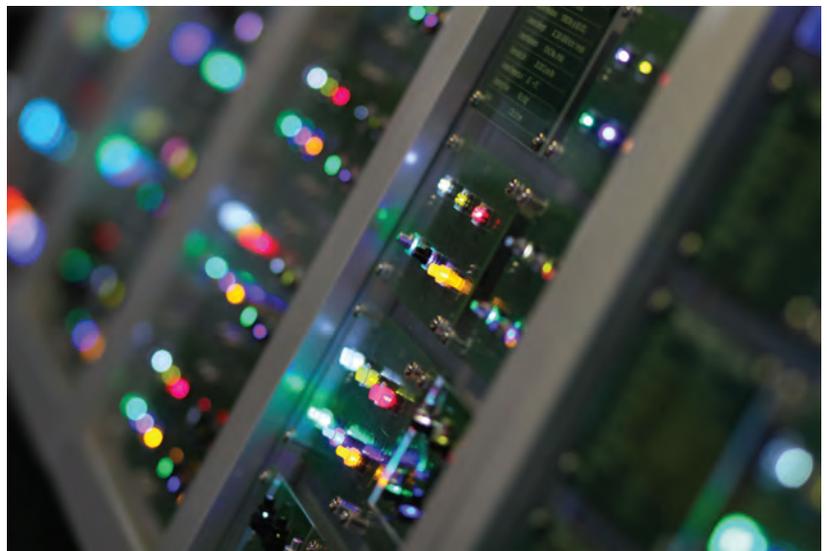
Electronics is just one ingredient of a much wider show that also features everything else relevant to manufacturing enterprise. Technology trails assist delegates throughout the show, allowing them to make the most efficient use of time at the exhibition. Specialist areas like the live machinery

demonstration zone enable visitors to expediently find what they require.

An overview of the products and services presented in 2019 includes: CNC machine tools and machining centres, CAD/CAM tools, SMT automation, advanced adhesives, fasteners and joining technology, laser cutting, packaging solutions, labelling and marking, enclosures, test equipment, coating and finishing, handling and storage solutions.

Southern Manufacturing and Electronics 2019 runs 5 to 7 February at Farnborough International Exhibition and Conference Centre in Hampshire, close to the M3 and conveniently accessed by car or public transport. Admission to the show is free and the centre offers complimentary on-site parking. Further information and event tickets are available online.

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Exhibitor bookings are around 20 per cent ahead of last year

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2019 Industry Football Tournament

After the runaway success of 2018's tournament, the Electronics Sourcing Industry Football Tournament will be returning to Lancing's Culver Lane stadium for a third year on 23rd May 2019.

This is an open invitation to those who would like to participate in a day of sports and networking. Please contact the organiser - Electronics Sourcing's founder and publisher Mark Leary - at sales@mmgpublishing.com, or call 01892 613400 to confirm your registration.

Many thanks to GELEC and ECSN for sponsoring the event.




SAVE THE DATE - 23rd MAY 2019

In the evening Electronic Sourcing readers are invited to join us in Brighton for the ecsn dinner.

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Guy Butters will provide an update on the football tournament and host an auction of football memorabilia, with donations going to a local charity "Albion in the Community"...

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Prepare to be blown away

Specialist fan and blower manufacturer, Micronel, returns to Southern Manufacturing and Electronics 2019 with several new products, including a range of rugged IP67 metal bodied DC blowers



This year's exhibition will see Micronel showcase an updated range of radial blowers, axial DC tube fans and flat ultra slim fans, including new introductions for 2019.

The range of U line radial blowers has been expanded to include more versions with built in brushless DC drivers for ease of use and 'plug and run' applications. Highlights include the U85MX blower, which can now deliver 16,000 pascals static pressure from an 85mm diameter housing with 1,000lpm free blowing airflow.

Micronel will also launch a range of rugged DC blowers aimed at industrial and process control pressure or suction/vacuum applications. U100HL DC blowers feature a 107 by 107mm aluminium IP67 housing and an efficient brushless DC motor with integrated electronic driver. Described as an energy and space saving alternative to bulky and power hungry side channel blowers, the U100HL's 24V DC 200W brushless DC motor only uses a fraction of the power of larger side channel blowers.

Other products include the economic F Line flat fan

range, which extends from the super miniature 16mm F16 fan up to the 170mm G1751 fan. Micronel also specialises in low noise, low power consumption products with a long life. The company's D Line range of axial tube fans, for example, provide more pressure capability than flat fans for applications where cooling air needs to be forced around densely packed systems. This range come in tube sizes from 24 to 80mm diameter and has been expanded to include more powerful versions with over 18,000rpm. Micronel will also showcase a new EX IEC 60529-rated version, for

use in potentially explosive atmospheres.

With products for applications such as medical, electronics cooling, personal protection, packaging, gas analysis, laboratory, transportation and process control, Micronel caters for industries with special performance characteristics. Standard items are held in stock with technical design support available for modified products and client specific designs.

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

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

Added value services cut assembly costs

In addition to the latest connection and enclosure technologies, Hitaltech will highlight its value-added services at Southern Manufacturing and Electronics, demonstrating how they can increase production efficiency

Central to the display on stand J75 will be Hitaltech's latest components designed for building automation and industrial control. These components help make managing buildings easier, or are designed to support evolving cloud computing, cyber-physical and internet of things applications. They include terminal blocks designed to meet the demands of high power interface and energy metering applications; miniature terminal blocks and board to board connectors that enable manufacturers to pack large volumes of inputs and outputs into small spaces; and modular jacks and USB style connectors for building management data and communications applications.

Hitaltech's own Conex-It range of screw and screwless terminal blocks will also be on show. These products are said to offer reliable connections, fast and accurate wiring and increased vibration resistance.

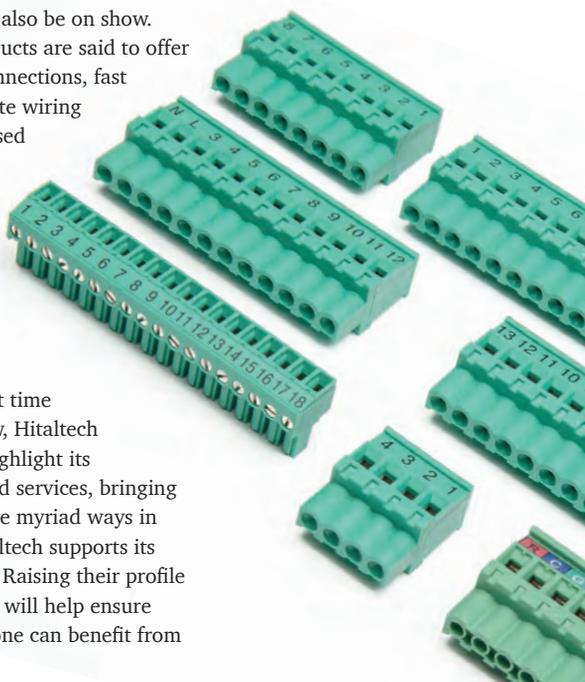
Value added services

For the first time at the show, Hitaltech will also highlight its value added services, bringing together the myriad ways in which Hitaltech supports its customers. Raising their profile in this way will help ensure that everyone can benefit from

services designed to deliver products faster, simpler and more cost effectively.

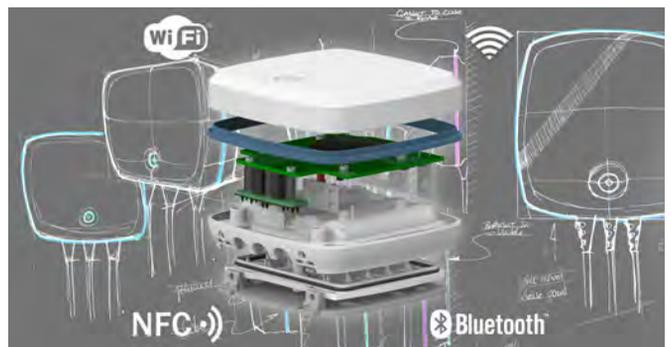
Sales engineer for the South, Jack Walker, said: "Services such as kitting, printing, wiring loom assembly, machining and more can help customers develop better-realised products that stand out from the competition. These services help refine processes, reduce assembly times and cut production costs, and we're looking forward to exploring the many ways we can tailor our services to benefit the companies attending the show."

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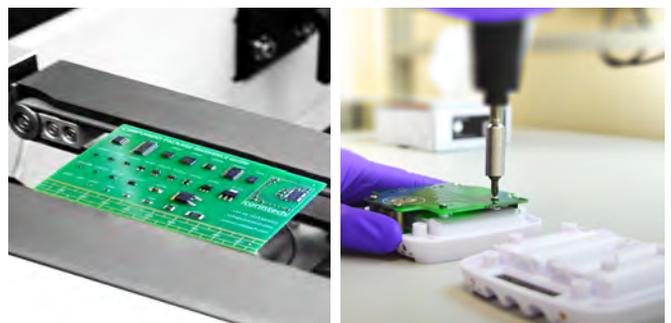
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Power management IC demand will rise but tags will stay steady

Healthy competition will help keep prices in check although PMIC unit demand will rise steadily through 2023



James Carbone

The average price for power management integrated circuits (PMIC) will remain stable for the next two years despite strong demand for the chips from a wide range of end customer segments ranging from cell phones and home security to factory automation equipment and Advanced Driver Assistance Systems (ADAS).

The average PMIC price increased 4 per cent last year to \$.21, according to researcher IC Insights. While unit demand is expected to increase by 8 per cent in 2019, the average PMIC price won't increase, the researcher said. PMIC prices will stay steady through 2020, before declining to \$.20 on average in 2021.

Prices will remain steady because of strong demand and vigorous competition for business among major PMIC manufacturers and a number of smaller PMIC companies. Major PMIC manufacturers include Texas Instruments, Analog Devices,

Infineon and STMicroelectronics. While prices will be stable, there should be enough supply so lead times won't stretch much, according to PMIC manufacturers and IC Insights.

"My sense is that supply and demand have been in balance," said Brian Matas, vice president of market research at IC Insights, based in Scottsdale, Ariz. "The main suppliers such as Texas Instruments, Infineon and Analog Devices have been pretty good about keeping supply flowing at a good level to the point where I don't think there's any supply issues."

Despite stable prices, the PMIC global market will post robust growth for years in terms of sales revenue and unit shipments, according to IC Insights. In 2019, worldwide PMIC revenue will increase to \$15.6 billion from \$14.5 billion in 2018. The PMIC market will continue to grow through 2023 when sales revenue will total about \$20.3 billion, said IC Insights.

Unit shipments will also be strong from 2018 through 2023. PMIC shipments will increase from 69.3 billion units in 2018 to 101.2 billion in 2023.

"Power management ICs continue to be one of the stronger markets in the whole integrated circuit industry," said Matas. "Last year the PMIC market grew 12 per cent to \$14.5 billion." In 2019 it will grow 8 per cent.

Less power wanted

The PMIC market is growing because of increased demand for battery-operated equipment including cell phones, wearable electronics and the trend towards lower power usage in notebooks, servers and mass storage equipment used in data centers.

One of the fastest growing segments for PMICs is automotive systems as more vehicles are equipped with ADAS and hybrid clusters. ADAS provides many safety features such as lane change warning, collision avoidance, adaptive cruise control,

and blind-spot monitoring. Hybrid clusters in vehicle instrumentation panels feature fuel efficiency readings, resettable trip odometers and oil life in their displays.

More chipmakers that produce PMICs are focusing on the auto industry. "Several years ago, we shifted our strategy to focus only on automotive, and our recent growth in PMICs was generated" by that segment, said Hiroyuki Iwata, director of strategic marketing, microcontroller and connectivity division of Cypress. "Many PMIC suppliers are shifting from consumer to the automotive market and this market is becoming more competitive," he said. "Cars are integrating more and more electronics, increasing the demands on the power supply. This market shift is driving our auto PMIC growth," Iwata said.

Prasanna Obala Bhuvanesh, product line marketing manager for Microchip Technology's analog power and interface business unit, said autonomous driving

By the Numbers



\$15.6 billion

The size of the power management IC market in 2019 Source: IC Insights



4%

The amount the average price of a power management IC rose in 2018 Source: IC Insights



21¢

The expected average price for power management IC in 2019 and 2020 Source: IC Insights



8%

The growth rate of unit shipments of power management ICs in 2019 Source: IC Insights



\$20.2 billion

The forecasted size of the power management semiconductor market in 2023 Source: IC Insights



and infotainment in vehicles is also driving PMIC demand. Use of PMICs in automotive is impacting PMIC development.

“Automotive PMICs demand higher power with robust protection features and usually need to have automotive qualification for getting designed into the application,” said Bhuvanesh. “Features such as high peak efficiency, power sequencing, EMI, wide input voltage play key roles in this space.”

Another key segment is consumer electronics equipment which needs to be connected to the Internet, said Bhuvanesh.

“PMICs in the IoT realm however, more than often drive portable, battery operated devices including wearables, security cameras, smart speakers, home automation devices,” he said.

PMICs in those applications drive lower power and are highly integrated to optimize solution size for these small form factor limited products and increase

battery footprint, according to Bhuvanesh.

One key trend impacting PMICs is the growing need for a total solution which includes the PMIC along with the processor in the application that it powers, said Bhuvanesh. The idea is to improve the customer’s time-to-market by reducing the effort of designing in the highly integrated PMIC into the end-system, he said.

Microchip addresses this through its “Total System Solution” efforts, said Bhuvanash. “In the case of PMICs, this provides customers with solutions that include the MPU and the PMIC that powers it, thereby enabling a faster time-to-market.”

Although automotive and consumer electronics are different, PMICs address the same issue that both segments face: the need for optimal integration of power circuits to reduce size and component count.

Reduction in board space is crucial to small battery-operated devices because the integration

The worldwide power management integrated circuit market will post steady growth as sales revenue increases from \$14.5 billion in 2018 to \$20.2 billion.
Source: IC Insights

PMIC market to hit \$20.2 billion by 2023



PMIC unit shipments power upward



Unit demand for power management ICs will be robust over the next four years as shipments will rise from 69.3 billion in 2018 to more than 101 billion in 2022.
Source: IC Insights

of multiple functions into a single chip results in more efficient use of space and system power, according to chipmaker Maxim Integrated. Functions commonly integrated into a PMIC include voltage converters and regulators, battery chargers, battery fuel gauges, LED drivers, real-time clocks, power sequencers, and power control, the chipmaker said. Power management chips include AC/DC converters, linear and switching regulators, voltage references, rectifiers, and thyristors.

Strong growth to continue

PMIC sales have been strong for a number of years, and will continue to remain robust, said Matas. Demand for mobile devices, smart homes and the need for battery power management has increased,” he said.

Demand for PMICs will be strong for years to come. “The end-use applications for a lot of these devices indicate that this market is going to continue to do well as we are looking at the emerging applications,” he said. Applications

such as smart homes, smart cities and other IoT type equipment mean greater connectivity and increased need to operate using less electricity.

“So, power management will be a key component in a lot of systems,” said Matas. However, there are some threats to PMIC growth as well as the overall semiconductor market. Growth of PMICs could be slowed by uncertainty concerning trade issues with China and other countries and a slowing economy.

“There’s too much uncertainty in the market,” said Matas. Uncertainty results in a lot of stalling of major purchases by companies.

“Uncertainty is the greatest detriment to growth,” he said. “If business is sour, you can plan for that. But when there’s uncertainty, it’s hard to plan.”

However, overall researchers and PMIC manufacturers say growth will continue for PMICs because the chips are being designed into more equipment.

Engineering a successful outcome

Whether sourcing one-off prototypes or fulfilling a mass volume order, finding a reliable PCB manufacturer that can meet technical requirements and stick to deadlines is essential

Printed circuit board manufacturing is engineering on a micro-scale, requiring track and gap, drilling and routing capabilities accurate to 0.1mm or even less. To achieve such minute tolerances takes skill, cutting-edge machinery and experience.

As PCB capabilities and materials evolve to meet the ever-growing demands of the tech industry, it's all too easy to be swept up by companies offering the earth, quickly, and with a small price tag. In such a specialised field,

however, it really does make sense to undertake thorough research and source PCBs from knowledgeable and experienced suppliers that understand your needs.

Technology choices

There are many types of PCB on the market, all offering different functions. Single sided printed circuit boards are the simplest technology available, containing only a single layer of conductive material. They are best suited to low density designs. Double sided printed through hole boards contain two

layers of conductive material, so are more complex than single sided boards and offer increased functionality. Multilayer boards comprise three or more layers of conductive material.

Other options include flexible printed circuits, originally designed as a replacement for traditional wire harnesses to cut down on expensive cabling costs, and flex-rigid circuits, which combine the best of both rigid boards and flexible circuits, integrated together into one circuit.



Equipment and materials are key factors in terms of quality, time and cost

Selecting a supplier

As ever, it makes sense to value knowledge and experience in a supplier and PCB sourcing is no different. If you're looking for a specialist service, such as a prototype or flex-rigid PCB, it makes sense to select a supplier experienced in those fields. The same goes for any PCB requirements because the better a supplier is at their craft, the more responsive they can be. They



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should also be able to advise on the most cost-effective solutions based on previous experience.

As well as understanding a potential suppliers' manufacturing capabilities, knowing what equipment and materials the manufacturer uses is also important as these are key factors in terms of quality, time and cost.

Establish whether potential suppliers use the latest manufacturing equipment. Investing in cutting-edge technology and employing highly-skilled staff demonstrates a commitment to progression. If not, turnaround times may be longer as older equipment can be slower. Some suppliers may even have to outsource work if the manufacturing capabilities to meet your needs are not available in-house, potentially adding both time and cost to an order.

Specify standards

Another area to investigate is whether manufacturing processes adhere to standards outlined by the International Organisation for Standardisation. Find out whether suppliers have any additional certification to provide confidence regarding the safety, performance and traceability of their products and services.

Check PCB manufacturer's websites or contact them directly for details of the equipment, software and materials they use, as well as their experience, and be wary of any supplier that isn't forthcoming with these details.

Finally, a mutually agreeable relationship is key to sourcing the best PCBs, so be sure to provide manufacturers with up-to-date and accurate data files and drawings to ensure a smooth production process.

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Many buyers turn to independent distributors for parts, services and market intelligence

Some independent distributors enjoyed a resurgence in 2018 as buyers relied on them for shortage components

Forging close relationships with key suppliers has always been a mainstay of strategic purchasing in the electronics industry.

Depending on the size of their companies' production spend, buyers have tried to develop, nurture and maintain close relationships with component manufacturers or the authorised distributors that carry the component makers' products.

Having close relationships with a supplier means an electronics OEM often gets early access to a technology that a chipmaker or other component manufacturer has been developing. It also means that the OEM can get more favorable contract terms concerning pricing and delivery. Alliances with suppliers can also mean that OEMs move to the front of the line when parts go on allocation because of unexpected higher demand.

Buyers at smaller OEMs and electronics manufacturing services (EMS) providers don't have the purchasing volumes to buy directly from major component manufacturers will often develop relationships with key authorised distributors. Distributors often try to make sure that key customers get their share of parts when components go on allocation. But close relationships don't always mean all electronics

purchasers, whether they buy directly from parts manufacturers or from authorised distributors, get all the components they need during shortages. That's why some astute purchasers at OEMs and EMS providers have also developed relationships with several key non-franchised distributors that often have hard-to-find parts in stock or know where to find them.

Shortage for the ages

Many buyers flocked to independent distributors last year because of shortages of multilayer ceramic capacitors, chip resistors, MOSFETs and other discrete semiconductors. "It was a shortage for the ages," said Tobey Gonnerman, executive vice president global trade for Fusion Worldwide, based in Boston. "There were shortages of historical proportions the likes we had not seen before. The gap between supply and demand was as large as we have seen," he said.

While shortages were the most severe for MLCCs and "were the most frequent pain points that we addressed for our customer base," demand was high and supply tight "across the board for many electronic components," said Gonnerman.

He said the shortages were so severe because of "growing technology use in more products across a

lot of business verticals" which resulted in stronger than expected demand. At the same time, component manufacturers were slow to add capacity, according to buyers.

While some buyers have partnered with independent distributors as they do with authorised distributors, other purchasers did business with independent distributors for the first time in 2018.

"Many customers had not been exposed to the open market before 2018" said Luke LeSaffre, sales manager, Americas for Fusion Worldwide.

"A lot of customers that we dealt with over the past year did not have any knowledge or familiarity with companies like us. They did not know we existed," he said. For instance, automotive customers were unfamiliar with independent distributors, he said.

However, because Fusion was able to find the parts that new customers needed, many have "invited Fusion to come back to the table to discuss how we can we grow our partnership together and what other solutions Fusion can present and how we can do more business with them," said Gonnerman. "Those conversations are becoming more frequent," he said.

Expanding customer base

Over the last 18 months, "we



There were shortages of historical proportions the likes of which we had not seen before

Tobey Gonnerman, executive vice president global trade for **Fusion Worldwide**

gained a significant number of new customers," said Paul Romano, chief operating officer for Fusion. "We are working on expanding those relationships with many of them as well as explore new avenues in the business with existing customers," he said.

Expanding relationships often involve providing services such as inventory management, supply assurance and cost savings ideas. Besides providing services buyers look to independent distributors for reliable, timely market intelligence. "Their thirst for information is insatiable," said Gonnerman.

"The desire for our customers to make their own crystal ball a little less cloudy has grown exponentially in the wake of the uncertain supply chain that they've experienced over the last year or two," said Gonnerman. Fusion

keeps its customers informed about supply conditions and publishes its “Green Sheet Monthly,” which has data about products and future usage. “It’s a value add that we present to our customers.”

Gonnerman added that helping customers deal with “severe shortages creates a sense of loyalty. It makes us very bullish about our future in terms of being able to retain our active customer base and do additional business” with new customers, he said.

Alliances pay off

Of course, Fusion is not the only independent distributor that is growing its customer base and partnering with some of them. Smith and Associates, based in Houston, Texas, also has alliances with some electronics manufacturers and credits those relationships with its strong sales growth of 2018. “Globally, Smith ended 2018 with record sales due in large part to an increase in our strategic partnerships with our existing customers,” said Todd Snow, vice president of global project development for Smith. Its sales totaled \$1.66 billion in 2018, up from \$1.5 billion in 2017.

“We also saw an increase in sales in many emerging sectors including IoT, artificial intelligence (AI), hyperscale data centers, and cloud computing,” said Snow. He said that high demand for MLCCs, MOSFETs and central processing (CPUs) contributed to sales growth.

Smith is planning for additional long-term growth by making “significant investments to further strategic partnerships with our customers,” said Snow. He said the distributor is investing more in vendor managed inventory, excess inventory solutions, hubbing, scheduled orders, and long

lead time part management.

“Continuous growth in our extensive state-of-the-art quality control, software capabilities, IT asset disposition, and artificial intelligence will be key initiatives in 2019,” he said.

Having close relationships with customers helped NewPower Worldwide boost its sales significantly over the last four years. New Power is a relatively new independent distributor. It started in November 2014 and grew its sales to \$107.3 million in 2017 and more than doubled its revenue to \$252.5 million in 2018, said Carleton Dufoe, founder and CEO of the Nashua, NH-based independent distributor.

“We have strategic relationships with customers,” said Dufoe. “The larger companies actually audit all our facilities, processes and procedures. They also get to see how our proprietary trading platform benefits their organisation on many levels. Our customer relationships are equally as important to NewPower as our supplier relationships,” he said.

Creating relationships

While the company is building its customer base, it is also establishing relationships with component manufacturers as well. “We only sell fully traceable and authentic product. We have relationships with component manufacturers and authorised suppliers around the globe,” he said.

Many buyers at OEMs and EMS providers went to NewPower last year because of shortages and some of them opted to continue to do business with the distributor. Many of those customers want services. “We’re into inventory management, a lot of consignment, kitting,

and hubbing,” said Matthew Fonstein, vice president of trading at NewPower.

Inventory management services are important because some of NewPower’s customers want the distributor to hold inventory 10-15 years, said Dufoe. “They are buying product that they’re going to have for repair service contracts for the next 10 or 15 years,” he said. “They want someone to hold inventory to make sure it’s in good condition and ready to be shipped to the repair facilities.”

Independent distributors say that the willingness of OEMs and EMS providers to do more business with them is a sign that the independent distribution channel is being accepted as an important link in the electronics supply chain.

“One of the changes in the industry for independents is our phone is ringing a lot more than it used to,” said Gonnerman. In the past, independent distributors would call potential customers and now “the communication is a lot more both ways,” he said. “Our phone rings a lot and we are invited to present solutions and asked for assistance a lot more than before,” said Gonnerman. “I think that is a bit of about metamorphosis in the independent distribution space and we are excited about that.”

Independent distributors say they are expecting robust sales growth in 2019, but it won’t be as strong as 2018 when some reported a 100 per cent increase in revenue. A lot of that sales growth was driven by strong demand, shortages and higher prices for multilayer ceramic capacitors (MLCC), chip resistors, MOSFETs, and generally tight supply of



Smith is planning significant investments to further strategic partnerships with our customers

Todd Snow, vice president of global project development for **Smith**

many electronic components.

Electronics purchasers at OEMs and electronics manufacturing services (EMS) providers who buy components directly from component manufacturers or from authorised distributors had to scour the open market last year for parts often paying premiums for hard-to-find components.

The result was record sales for some distributors. For instance, Fusion Worldwide, an independent distributor based in Boston, doubled its sales to about \$1 billion in 2018, according to the company. NewPower Worldwide, a Nashua, NH-based independent distributor more than doubled its sales (see related story page 32), while other independents had double-digit increases in revenue last year.

Independent distributors say shortage won't be as severe in 2019

Independent distributors expect sales growth to continue in 2019, although not at the same level as last year because shortages won't be as severe as 2018 because suppliers have added capacity. Still supply will remain tight and not all buyers will be able to source all the parts they need from component manufacturers and their franchise distributors.

"There are still shortages out there, although some have abated somewhat," said Paul Romano, COO of Fusion. "We certainly won't have the same level of shortages in 2019 that we did in 2018."

He said component manufacturers are "starting to catch up" and are adding capacity, but "there are still major issues out there."

Comparing shortages in 2018 to 2019, 2018 was like "Mount Everest while 2019 will be more like Mount Kilimanjaro or Mount Fuji," said Tobey Gonnerman, executive vice president global trade for Fusion. "It won't be Death Valley."

He said there is a lot of "uncertainty with supply" in certain product areas. It is "going to be a very robust year for us, but it is not going to be Everest again," he said. "There is still tremendous opportunity for us and we expect growth in a lot of areas," said Gonnerman.

He added if buyers are "looking for some light at the end of the tunnel in terms of all shortages being solved, we don't see that yet. We see a long tunnel ahead," he said.

While capacity has been added, demand for products in January remained strong, said Romano. "We really haven't heard any of our customers saying that demand for their end products has dropped at all," he said. "We still see a very robust economy."

Romano added that the abatement of shortages is due to component manufacturers increasing manufacturing capacity, not because of reduced component demand. However, some component manufacturers reported demand for some of their products weakened in the fourth quarter of 2018, said Todd Snow, vice president of global project development for Smith an Associates, based in Houston.

"However, we feel it's still early to make 2019 sales predictions. True growth projections will be reserved for after Chinese New Year," said Snow.

There have been some manufacturers who have added capacity, "but most MLCC manufacturers think that supply will still be constrained for the next 18-24 months. Some manufacturers have invested in some specific capacity to support their top tier customers," said Snow.

Snow added prices will increase for some older parts. "We foresee that legacy products where manufacturers have been holding cost points for many years will increase in price."

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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/TDK	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	5000	N/A	£0	58%	50	1,500+	Y
Littelfuse	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	35000	N/A	£0	67%	50	1,500+	Y
DISPLAYS & LEDs											
NLT Technologies Ltd	Review Display System Ltd	01959 563345	www.review-displays.co.uk	Y	All	N/A	£0	N/A	6	25	Y
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
Hammond	Switch Electronics	01482 862255	switchelectronics.co.uk	Y	500	N/A	£0	70%	2	6	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
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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
HEATSINKS											
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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
Broadcom	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	100	N/A	£0	69%	50	1,500+	Y
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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
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
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
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Microchip	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	12,600	N/A	£0	91.00%	50	1,500+	Y
Microsemi	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	400	N/A	£0	90%	50	1,500+	Y



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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)											
Monolithic Power Systems (MPS)	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	600	N/A	£0	40%	50	1,500+	Y
NXP	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	3,900	N/A	£0	91%	50	1,500+	Y
ON Semiconductor	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	5,100	N/A	£0	87%	50	1,500+	Y
Power Integrations	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	600	N/A	£0	59%	50	1,500+	Y
Qorvo	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	300	N/A	£0	90.00%	50	1,500+	Y
ROHM Semiconductor	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	1,400	N/A	£0	55.00%	50	1,500+	Y
Silicon Laboratories	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	1,500	N/A	£0	96%	50	1,500+	Y
Skyworks	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	300	N/A	£0	91%	50	1,500+	Y
Spanion 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
Texas Instruments	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	36,900	N/A	£0	41%	50	1,500+	Y
Toshiba	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	500	N/A	£0	100.00%	50	1,500+	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
Amphenol	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	25,600	N/A	£0	53%	50	1,500+	Y
Anderson Power Products	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	800	N/A	£0	50%	50	1,500+	Y
Cinch Connectivity Solutions	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	1,900	N/A	£0	82%	50	1,500+	Y
Delphi Connection Systems	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	3,300	N/A	£0	67.00%	50	1,500+	Y
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
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
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
Neutrik	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	1,000	N/A	£0	86%	50	1,500+	Y
Phoenix Contact	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	12,000	N/A	£0	99.00%	50	1,500+	Y
Polamco	Lane Electronics	01403 790661	www.fclane.com	Y	218	£146,000	£0	100%	6	38	Y
Positronic	Lane Electronics	01403 790661	www.fclane.com	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y
Souriau	Lane Electronics	01403 790661	www.fclane.com	Y	1,929	£806,000	£0	100%	6	38	Y
Switchcraft	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	2,200	N/A	£0	69%	50	1,500+	Y
TE Connectivity	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	30,900	N/A	£0	40%	50	1,500+	Y
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
Allegro Microsystems	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	299	N/A	\$250		10	400+	Y
AMD	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	4113	N/A	\$250		10	400+	Y
AMCC	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	26	N/A	\$250		10	400+	Y
Ampleon	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	133	N/A	\$250		10	400+	Y
AMS	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	11	N/A	\$250		10	400+	Y
Anadigics	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	121	N/A	\$250		10	400+	Y
Analog Devices	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	20352	N/A	\$250		10	400+	Y
Avago	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	75	N/A	\$250		10	400+	Y



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OBSOLESCENCE / HARD TO FIND (Continued)											
Cirrus Logic	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	359	N/A	\$250		10	400+	Y
Conexant	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	108	N/A	\$250		10	400+	Y
Cypress Semiconductor	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	15169	N/A	\$250		10	400+	Y
Exar	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	531	N/A	\$250		10	400+	Y
Exar	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	531	N/A	\$250		10	400+	Y
IBM	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	533	N/A	\$250		10	400+	Y
IDT	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	975	N/A	\$250		10	400+	Y
Infinion	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	7175	N/A	\$250		10	400+	Y
Intel	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	4385	N/A	\$250		10	400+	Y
Intersil	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	11675	N/A	\$250		10	400+	Y
Lattice	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	804	N/A	\$250		10	400+	Y
Lucent	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	38	N/A	\$250		10	400+	Y
Maxim Integrated	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	19304	N/A	\$250		10	400+	Y
Micro Linear	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	25	N/A	\$250		10	400+	Y
Microchip	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	6055	N/A	\$250		10	400+	Y
Micron	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	35	N/A	\$250		10	400+	Y
Microsemi	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	143	N/A	\$250		10	400+	Y
Nexperia	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	11049	N/A	\$250		10	400+	Y
NXP Semiconductor	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	30055	N/A	\$250		10	400+	Y
ON Semiconductor	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	52390	N/A	\$250		10	400+	Y
Pericom	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	50	N/A	\$250		10	400+	Y
QuickLogic	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	21	N/A	\$250		10	400+	Y
Renesas	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	13811	N/A	\$250		10	400+	Y
Ricoh	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	1217	N/A	\$250		10	400+	Y
Semtech	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	92	N/A	\$250		10	400+	Y
SI Time	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	334	N/A	\$250		10	400+	Y
Siliconix	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	8	N/A	\$250		10	400+	Y
Texas Instruments	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	93216	N/A	\$250		10	400+	Y
WeEn	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	525	N/A	\$250		10	400+	Y
Xilinx	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	711	N/A	\$250		10	400+	Y
Zilog	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	133	N/A	\$250		10	400+	Y
OPTO ELECTRONICS											
Avago Technologies	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	8,200	N/A	£0	89%	50	1,500+	Y
Cree, Inc.	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	22,500	N/A	£0	74%	50	1,500+	Y
Dialight	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	9,800	N/A	£0	99%	50	1,500+	Y
Kingbright	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	3,100	N/A	£0	100%	50	1,500+	Y
Lumileds	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	1,100	N/A	£0	99%	50	1,500+	Y
NEC	Review Display System Ltd	01959 563345	www.review-displays.co.uk	Y	200	£200,000	£0	100%	5	20	Y
Newhaven Display	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	700	N/A	£0	65%	50	1,500+	Y
Osram Opto Semiconductor	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	2,800	N/A	£0	99%	50	1,500+	Y
VCC	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	5,000	N/A	£0	92%	50	1,500+	Y
Vishay	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	3,100	N/A	£0	99%	50	1,500+	Y
PASSIVES											
AVX	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	70,700	N/A	£0	58.00%	50	1,500+	Y
Bourns	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	49,500	N/A	£0	98%	50	1,500+	Y
Coilcraft	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	10,400	N/A	£0	98%	50	1,500+	Y
Cornell Dubilier	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	33,000	N/A	£0	65.00%	50	1,500+	Y
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
Kemet	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	135,800	N/A	£0	93%	50	1,500+	Y
KOA Speer	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	107,900	N/A	£0	82%	50	1,500+	Y



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PASSIVES (Continued)											
Laird Technologies	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	1,800	N/A	£0	50.00%	50	1,500+	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
Ohmite	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	17,300	N/A	£0	99.00%	50	1,500+	Y
Panasonic	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	67,900	N/A	£0	69.00%	50	1,500+	Y
Taiyo Yuden	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	6,400	N/A	£0	82%	50	1,500+	Y
TDK	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	25,300	N/A	£0	85.00%	50	1,500+	Y
TT Electronics	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	32,800	N/A	£0	55%	50	1,500+	Y
United Chemi-Con (UCC)	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	13,900	N/A	£0	99.00%	50	1,500+	Y
Vishay	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	119,800	N/A	£0	76%	50	1,500+	Y
Würth Electronics	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	4,500	N/A	£0	63%	50	1,500+	Y
Yageo	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	45,300	N/A	£0	99%	50	1,500+	Y
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
FRIVO Gerätebau GmbH	Haredata Electronics	01423 796240	www.haredata.co.uk	Y	250 - 500	€1M	£250	100%	7	14	Y
Jauch Quartz		01276 605900	www.jauch.com			£500,000	0	95	15	130	Y
Mean Well	Ecopac (UK) Power Ltd	01844 204420	www.ecopacpower.co.uk	Y	6,000	£2M	£0	100%	8	30	Y
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
Freescall 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
Sensision	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
Carling 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



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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
SWITCHES & KEYBOARDS (Continued)											
Omron	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	900	N/A	£0	68%	50	1,500+	Y
TE Connectivity	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	400	N/A	£0	98%	50	1,500+	Y
TERMINAL BLOCKS											
Marathon Special Products	Global Supply Services	01904 436 488	www.global-supply-services.com	Y	8,000	£800,000	£100	100%	3	11	Y
THERMAL MANAGEMENT											
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		2,900	N/A	£0	N/A		1,500+	Y
Sunon	G.English Electronics Ltd	0208 855 0991	www.gelec.co.uk	Y	3,500	£1,000,000+	£0	100%	10	28	Y
Sunon	Thermaco Ltd	01684 566163	www.thermaco.co.uk	Y	3,500	£230,000	£100	100%	6	12	Y
TRANSFORMERS & INDUCTORS											
Best Windings	Best Windings	0044 (0)1394 448424	www.bestwindings.co.uk	N	300	N/A	£100	N/A	2	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
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
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
Custom Interconnect Ltd	01264 321321	www.cil-uk.co.uk	£14m	Andover (Hampshire)	130	6	ISO 9000, IPC610, ISO 13485	Y	Y	Y	Y	Y	Y
DJ Assembly	01904 436 456	www.djassembly.com	£1.25m	North Yorkshire	15	2	ISO9001:2008, IPC-A-610 Class 3	Y	Y	Y	Y	Y	Y
Dynamic EMS Ltd	01383 822911	www.dynamic-ems.com	£9m	Scotland	94	3	ATEX, ISO9001:2015, OHSAS18001, IPC-610-F class 3, ISO14001, ISO 13485, UL	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	BGA Capacity	Lead-Free Manufacturer	Prototyping	Design Capability	Full Turnkey	Cables and Harnessing
Electrica Limited	0161 343 7575	www.electricalimited.com	£1.75m	Cheshire	26	3	BSI ISO 9001:2015, IPC-A-610 to Class 3, IPC-J-STD-001, Cert IPC Trainer, UL	Y	Y	Y	Y	Y	Y
Electronic Technicians Ltd	01202 897722	www.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	£20m	UK	230	5	ISO9001, ISO13485, UL, IPC610/620 Class 3	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
Fabrinet UK	01249 814081	www.fabrinetuk.co.uk	£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, ISO14001, IPC-A-610	Y	Y	Y	Y	Y	Y
G&B Electronic Designs Ltd	01420 474188	www.gandbelectronics.co.uk	£4.2m	Hampshire	60	2	ISO9001, ISO13485, IPC-A-610, IPC-J-STD-001, IPC-7711/7721, BS EN 61340-5-1 (ESD)	Y	Y	Y	Y	Y	Y
Hallmark Electronics Ltd	01782 562255	www.hallmarkelectronics.com	£2m	M	26	2	ISO9000/UL, IPC610/D	Y	Y	Y	Y	Y	Y
Icon Electronics Limited	01423 798294	www.iconelectronics.co.uk	£6.5m	Hampshire & Yorkshire	70	6	AS9100, ISO9001, BS EN ISO/IEC 80079-34:2011 ATEX, IPC-A-610 Class3	Y	Y	Y	Y	Y	Y
Industrial Electronic Wiring Ltd.	+44(0)1793 694033	www.view.co.uk	£5.5m	Swindon, UK	60	N/A	ISO9001:2015, 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 PC Trainer (IPC-A-610, J-STD-001 & J-STD-001 Space Addendum)	Y	Y	Y	Y	Y	Y
JJS Manufacturing Ltd	01455 555500	www.jjsmanufacturing.com	£35m	Bedford, Luttermworth, (CZ)	420	3	ISO9001:2015, ISO14001:2015, IPC 610 A class 2&3	Y	Y	Y	Y	Y	Y
Lacon Electronic	+44 (0) 7836 338122	www.lacon.de/en	£50m	Germany/Romania	500	13	ISO9001, ISO14001, ISO13485, TS16949, OHSAS18001, VG96927, UL	Y	Y	Y	Y	Y	Y
Nemco Limited	01438 346600	www.nemco.co.uk	£13.4m	SE	120	6	AS9100, ISO9001:2008, IPC610/620 to Class 3, ISO14001-2004, SC21	Y	Y	Y	Y	Y	Y
NOTE	01453 797580	www.note.eu	£100m	UK/EU/China	1,000	14	ISO9001, 13485, 14001, 18001, IPC-610 Class 3	Y	Y	Y	Y	Y	Y
M-TEK (Assembly) Ltd	01189 455377	www.mtek.co.uk	£2.4m	SE	30	4	ISO9001-2008/IPC-A-610 Class 3/WHMA-620/ISO14001-2004/IPC-7711/7721	Y	Y	Y	Y	Y	Y
Pektron	01332 832424	www.pektron.com	£50m	E-Midlands	350	8	ISO9001, ISO14001, TS16949, BEAB, VCA, TÜV, UL	Y	Y	Y	Y	Y	Y
Protronix EMS	01582 418490	www.protronix.co.uk	£2.5m	Luton	10	2	ISO9001:2015, 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
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	£12.8m	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	£14.5m	SE	126	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	ISO9001:2015, IPC-A-610 Class 3	Y	Y	Y	Y	Y	Y

PCB Buyers' Guide

Manufacturer	Telephone	Website	Service Provided (ie 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	ISO9001:2015, UL	SML	Y	4-16	Y	Y	Y	Y	Y
Daleba Electronics Ltd	+44(0)1992 510000	www.daleba.co.uk	B/M	UK, Europe, Asia, USA	UL, ISO9001:2008, TS16949:2009	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
Fineline VAR Ltd	+44 (0)1249 815 815	www.fineline-global.com	B	UK / Global	ISO9001:2015 / UL / TS16949 / Nadcap / AS9100 / ISO14001	SML	Y	4-60	Y	Y	Y	Y	Y
GSPK Circuits Ltd	+44(0)1423 321100	www.gspkcircuits.ltd.uk	M/R	UK, Europe, Asia	IS 9001:2015, IATF 16949:2016, EN (AS) 9100	SML	Y	4-16	Y	Y	Y	Y	Y
LEF Circuits	0116 2891122	www.lefcircuits.co.uk	M/R	M	ISO 9001:2015, UL	SML	Y	4-30	Y	F/R	Y	Y	Y
Photronix Group	01903 231901	www.photronix.co.uk	B	SE	ISO9001:2015, ISO14001:2004, AS9100-B, NADCAP, TS16949:2002	SML	Y	4-58	Y	F, F/R	Y	Y	Y
Stevenage Circuits Ltd	01438 761811	www.stevenagecircuits.co.uk	M/B	UK/China	ISO 9001:2008, ISO 14001, EN9100:2009, UL, IOSCAR	SML	Y	4-44+	Y	F, F/R	Y	Y	Y
Tate Circuit Industries Ltd	01889 583627	www.tatecircuits.com	B	UK/China	ISO 9001:2015, UL	SML	Y	4-20	Y	Y	Y	Y	Y
Tecbridge Circuits	0207 993 6503	www.tecbridgecircuits.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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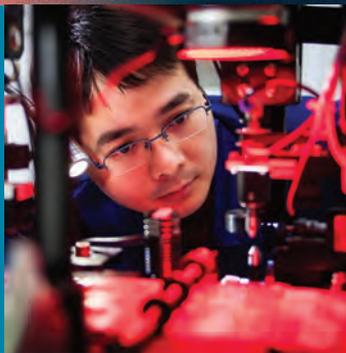
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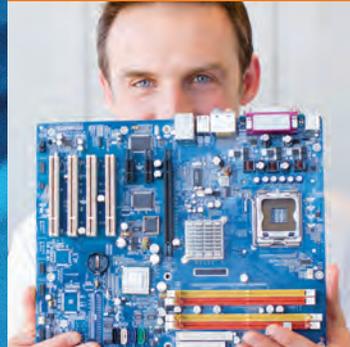


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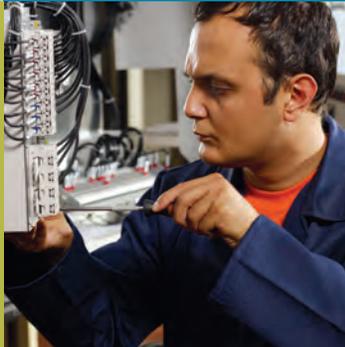


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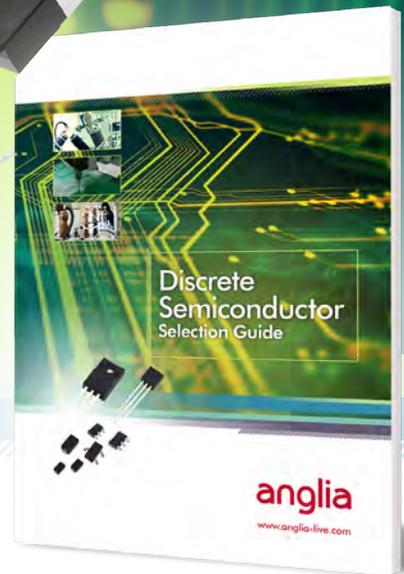
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