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TIME IS MONEY: ELECTRONIC COMPONENT SHOW PREVIEW

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Editor's Word



What a difference 10,950 days make

One of my 2020 New Year resolutions was to become a reasonably competent CAD operator. Given that 90 percent of the components I design will be output via my 3D printing cell I needed to upskill myself on parametric 3D modelling, including surface and mesh engineering. I'm off to a reasonably good start using Fusion 360. What has proved truly staggering is the system's capabilities which, in non-commercial environments, are essentially free.

I estimate that ten thousand days have passed since I wrote my first article on parametric design software. In those days the CAD capabilities that now reside on my laptop were the preserve of aerospace and automotive engineers sitting at mainframe driven workstations at companies who could afford to throw hundreds of thousands of pounds at such investments.

This stark contrast made me wonder how purchasing has evolved over the same period. Back then my purchasing role revolved around a library of printed catalogues and a Filofax or Rolodex for managing my contacts. Today I can attach my bill-of-materials to ecommerce systems which will systematically check each part against real-time inventories of global distribution stocks, informing me of live pricing and other valuable information such as whether a component is recommended for a new design due to potential short-term obsolescence issues.

One can only imagine what bills-of-materials will look or behave like in another ten thousand days. Will hyper integration shrink the size of an average BoMs tenfold? Maybe a plethora of new device technologies will see BoM double or triple in size? I hope to be around to witness this and should be provided I exercise a little more and focus on the fruit and veg.

Jon Barrett

N ES News

View current editions online

www.electronics-sourcing.co.uk









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Medical supplies in stock

Components Bureau has extended its range of medical power supplies from Cosel to include the new PCA series AC/DC power supplies. The PCA series comprises three models offering power from 300 to 1,000W and meets 2MOPP, EN60601-1 certification.

Supplies are packaged in a housing measuring 89 by 41 by 152mm and provide an average efficiency of up to 93 per cent with an operating temperature of -20 to 70°C. The input range is 85 to 264V AC and output voltages of 5, 12, 15, 24, 32 and 48V are available.

Key features of the 1U high PCA series include remote on/off, various alarms, constant current operation, parallel/redundancy operation, and EN and UL approval. Supplies come with a five-year warranty.

www.componentsbureau.com

New interconnect products ready to ship

Digi-Key Electronics has signed a global distribution partnership with Anderson Power Products providing purchasers with worldwide, 24-hour availability of APP's interconnect solutions, including Powerpole and SB connectors.

General manager at APP, William Estes, commented: "Anderson Power's vision is to be the leading quality power interconnect solution provider and this partnership enables us to reach the electronics design engineers that are developing next generation products and solutions."

APP's high-quality, low-cost, power interconnect solutions are supplied into several industries, including back up power systems, electrical recreational vehicles, uninterruptible power supply systems, telecommunications, high technology devices and alternative energy solutions.

Vice president, global supplier management at Digi-Key, David Stein, added: "APP has a substantial number of power interconnect products that will allow Digi-Key to offer new solutions to high power designs that we have not been able to in the past. This global partnership with APP is just one example of how Digi-Key is working every day to respond to global customer needs by offering the widest variety of in-stock components available for immediate worldwide shipping."

www.digikey.com



No more MOQs

Anglia has expanded its inventory profile of Hirose interconnect products and is offering all parts with no minimum order quantity in order to further support SME manufacturers in the UK.

Commenting, regional sales manager at Hirose, Wendy Leigh, said: "Anglia now offers one of the widest portfolios of Hirose products available off the shelf in the UK."

Technical director at Anglia Components, David Pearson, added: "We are seeing increasing demand for Hirose products as customers seek high quality, innovative and reliable connectors for their new designs. This has prompted Anglia to increase the depth and number of parts available off the shelf. Anglia's expanded inventory profile now covers the most popular ranges and latest product releases.

"Not only has the MOQ requirement for all parts been removed, Anglia can offer free samples of Hirose connectors across the entire portfolio."

Anglia's investment includes the addition of several new Hirose products to its inventory profile including the CX series of USB Type-C compliant connectors and the FX18 series of 0.8mm pitch board-to-board connectors designed to handle high transmission speeds.

www.anglia.com

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NES News

In Brief

Robotic resources for college
Harwin is demonstrating its commitment to engineering students by donating a package of robotic arm equipment worth more than £30,000 to Havant and South Downs College. The equipment will be used by students in the Harwin Academy, an initiative developed to provide school leavers with a more effective route into engineering. The new RV-FR robotic arm is predominantly intended for inspection and assembly of small component parts.
www.harwin.com

New ownership, new markets
Nexperia is expanding its business in China with help from Wingtech Technology, a Chinese computer and telecom equipment manufacturer that has officially obtained a controlling stake in the company. The change of ownership will open new opportunities for Nexperia's discrete and mosfet components and analogue and logic ICs, including 5G and related sectors.
www.nexperia.com

Keep up with PCNs
Phoenix Contact has added a product change / discontinuation notification section to its website to help purchasers keep up to date with product changes. Buyers can register to receive email updates on the complete range or tailor the service to specific product groups using the online form provided.
www.phoenixcontact.co.uk

Appliance standard adopted worldwide
Schurter has released a white paper advising purchasers about the USA and Canada decision to adopt the IEC 60320 standard for device plugs with minor deviations. The IEC 60320 represents a worldwide appliance plug standard making it easier for purchasers to evaluate guaranteed suitable sockets and plugs. Schurter explains how the standard will support interoperability and address safety against electrical impact.
www.schurter.com



Scottish investment heralds transistor development

Semiconductor manufacturer, Diodes, has received a £13.7m funding package from Scottish Enterprise enabling its future growth in Greenock, it was announced by First Minister Nicola Sturgeon.

In April last year USA-headquartered Diodes completed its acquisition of the former Texas Instruments business in the town, safeguarding all 300 jobs on site. Now, with the new funding package, the company is to put £12m towards a five-year R&D project to develop more technologically-advanced transistors and £1.7m towards a training programme to enable employees to support this change. The company has also received £169,500 from Inverclyde Council to assist with development of the site.

Diodes has identified GFAB as being integral to its long-term growth objectives. The site has room to expand in development, manufacturing and test and boasts an efficient and highly-skilled workforce.

Commenting, the First Minister said: "Almost £14 million from Scottish Enterprise will help Diodes advance its research, develop new processes and products and make its systems more efficient and effective."

Diodes' European president, Tim Monaghan, added: "With Diodes' expertise, the high calibre of the GFAB workforce, and support from Scottish Enterprise, I am excited by the opportunity we are creating to progress even further, building on our manufacturing capabilities to create a centre of process development excellence in GFAB."

www.diodes.com



Rapid access to IoT MCUs

Farnell has announced availability of the RA family of 32-bit Arm Cortex-M based MCUs from Renesas Electronics. This major product introduction will allow users to access Renesas' ready-to-use partner solutions and Arm ecosystem while developing their own hardware and software solutions.

Designed with a focus on security, connectivity and low power, the RA MCUs support solutions for a range of internet of things applications, including industrial automation, cloud computing and IoT, building automation, smart environment, energy and metering, and home appliances.

All RA MCUs are feature-, software- and pin-compatible for easy scalability and code reuse from one device to another. Users can develop IoT edge and endpoint devices, using the new Flexible Software Package, fast-start software for security and connectivity, and development tools from Renesas and the Arm partner ecosystem. Arm PSA security certification also provides customers with support to quickly deploy secure IoT endpoint and edge devices, and smart factory equipment for Industry 4.0.

Global head of semiconductors and SBC for Farnell, Lee Turner, said: "This addition to our range means customers can access our widest range of embedded solutions, whilst continuing to rely on Farnell for the latest in-stock products, alongside fast shipping and 24/5 technical support."

www.farnell.com

New TIB Series DIN Rail mounting AC-DC Power Supplies now available with ATEX and UL HazLoc approvals



UL 508 UL 60950-1 IEC 60950-1

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- Peak power capability of 150% nominal output power
- DC OK signal
- Full safety approvals including Atex and HazLoc for EX versions
- 5 year product warranty

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UK-made accessories look the part

Lane Electronics has developed a new accessory package of backshells, protective covers, heat shrink shapes, heat shrink tubing and adhesives for MIL-DTL-26482 / 38999 circular connectors, in partnership with leading manufacturers Weald Electronics and HellermannTyton.

The new accessories address customer requirements for circular connectors used in demanding applications and environments where purchasers insist on strong and reliable performance along with high-quality aesthetics.

Why aesthetics? Because this is what users see while components such as backshells or protective caps are doing their job. Availability is also very important with off-the-shelf supply of a versatile range and extensive stock levels.

Lane's new accessory package aims to meet this demand with high quality, performance, usability and aesthetics, combined with no minimum order quantities or minimum order values.

www.fclane.com

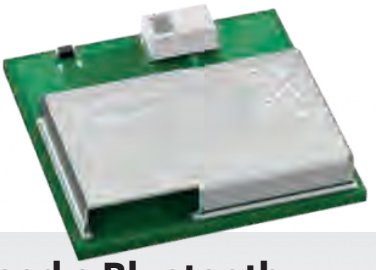
Smart sensor devices now within range

Mouser Electronics is stocking two new devices from TDK Group company, InvenSense: an ultrasonic time-of-flight sensor module for fast and accurate range measurement and a new sensor platform. Purchasers working on internet of things devices, augmented reality, drones, and mobile devices will be interested.

Capable of detecting objects of any size, colour and transparency, the MOD_CH101 ultrasonic ToF sensor module enables rapid integration of the Chirp CH-101 sensor. This integrated system-in-package features an ultra-low-power system-on-chip together with a piezoelectric micro-machined ultrasonic transducer. Built using MEMS technology, the CH-101 provides accurate range measurements to targets at distances up to 1.2m. The MOD_CH101 module allows for simultaneous range measurements to multiple objects within the field of view.

Also available to order from Mouser Electronics, is the DK-CH101 SmartSonic platform, which includes an on-board CH-101 sensor and a Microchip SAM G55 microcontroller with an Arm Cortex-M4 core. Featuring an onboard embedded debugger, the platform also includes software tools, including embedded drivers, and a GUI-based development tool.

www.mouser.com



Need a Bluetooth module with more range?

Rutronik UK can now supply a new Panasonic host controlled interface Bluetooth RF module claimed to offer approximately twice the range of other Bluetooth low energy solutions.

Based on Texas Instruments' CC2564C dual-mode Bluetooth controller which combines Bluetooth basic rate, enhanced data rate and low energy, the new PAN1326C2 module supports up to ten BLE connections at the same time without affecting the BR or EDR performance thanks to independent buffering for LE.

With an output power of +12dBm and receiver sensitivity of -93dBm, the PAN1326C2 offers a solid RF performance. The BT4.2-compliant module includes updated BLE features, such as enhanced security and higher data rates compared to Bluetooth 4.0 or 4.1.

Thanks to its low power consumption in all Bluetooth modes, potential applications include blood glucose meters, industrial sensors, entertainment devices, mobile accessories, and toys.

www.rutronik.com

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Investing in availability

A solid investment in the future has seen Farnell open a new warehouse in Leeds, UK, boosting its stock holding and facilitating the addition of more than a quarter of a million new products

Delivering a world-class distribution service is only achievable with a clear vision and continued investment in the foundation of the business. Farnell began this journey in 2016, following its acquisition by Avnet, with a $60 million investment in a new warehouse in Leeds, United Kingdom. Since then, it has added more than a quarter of a million new products and $150 million of stock.

But supporting purchasers as they prepare for tomorrow is about more than just stock — it's about carrying the right stock through strong relationships with leading manufacturers and providing access to the very latest technologies and the most innovative components.

Advanced semiconductors

Farnell claims to be the world's largest provider of semiconductor development tools and evaluation kits with around 120,000 semiconductor lines in stock from suppliers such as Maxim and NXP. Recently added lines include products for power management, sensing, connectivity and microcontrollers.

Connector investment

As a trusted source of technologically advanced components, Farnell has more than 550,000 interconnect products available. Recent investment has grown the range of in-stock products from Molex by more than a third and TE Connectivity by almost 20 per cent.

Passives in stock

Farnell has increased stock across its whole passives range by 70 per cent during the last year, including investments in magnetics, sensors and antennas. This provides purchasers with access to a greater product range from Panasonic, Vishay and Kemet. Customers also benefit from a full reel product offering and a re-reeling service.

More SBC choice

Farnell's in-stock range of products from leading single board computer manufacturers such as Raspberry Pi, micro:bit and Arduino has increased by more than a third in the last 12 months.

Industrial e-mech options

Farnell has more than 100,000 electromechanical components in stock with over half supporting Industrial IoT and industrial automation applications. Customers can also now benefit from a 150 per cent increase in Schneider Electric products in-stock, which is said to deliver a broader range of Telemecanique products than any other distributor.

Test and tools

Farnell has added more than 4,000 products in the last year, including oscilloscopes, power supplies, signal generators and digital multimeters, as well as soldering products, hand tools and 3D printers. Purchasers now also benefit from access to four new suppliers: Ikalogic, Hioki, Chauvin Arnoux and Schützinger.

More than just stock

Of course, helping customers get ready for tomorrow isn't only about having a portfolio approaching one million products with same day despatch and rapid delivery. It's also about delivering the kind of logistics capabilities, service and support that makes customers' lives easier.

That's why Farnell is continually investing in unique ways to improve its customer experience offering, such as providing fast quotes for customised or not-in-stock products, e-procurement and e-invoicing, and 24/5 technical support. There is also the element14 community and Farnell's content rich website, which includes online tools such as the Connector e-Guide and Soldering Tip Selector.

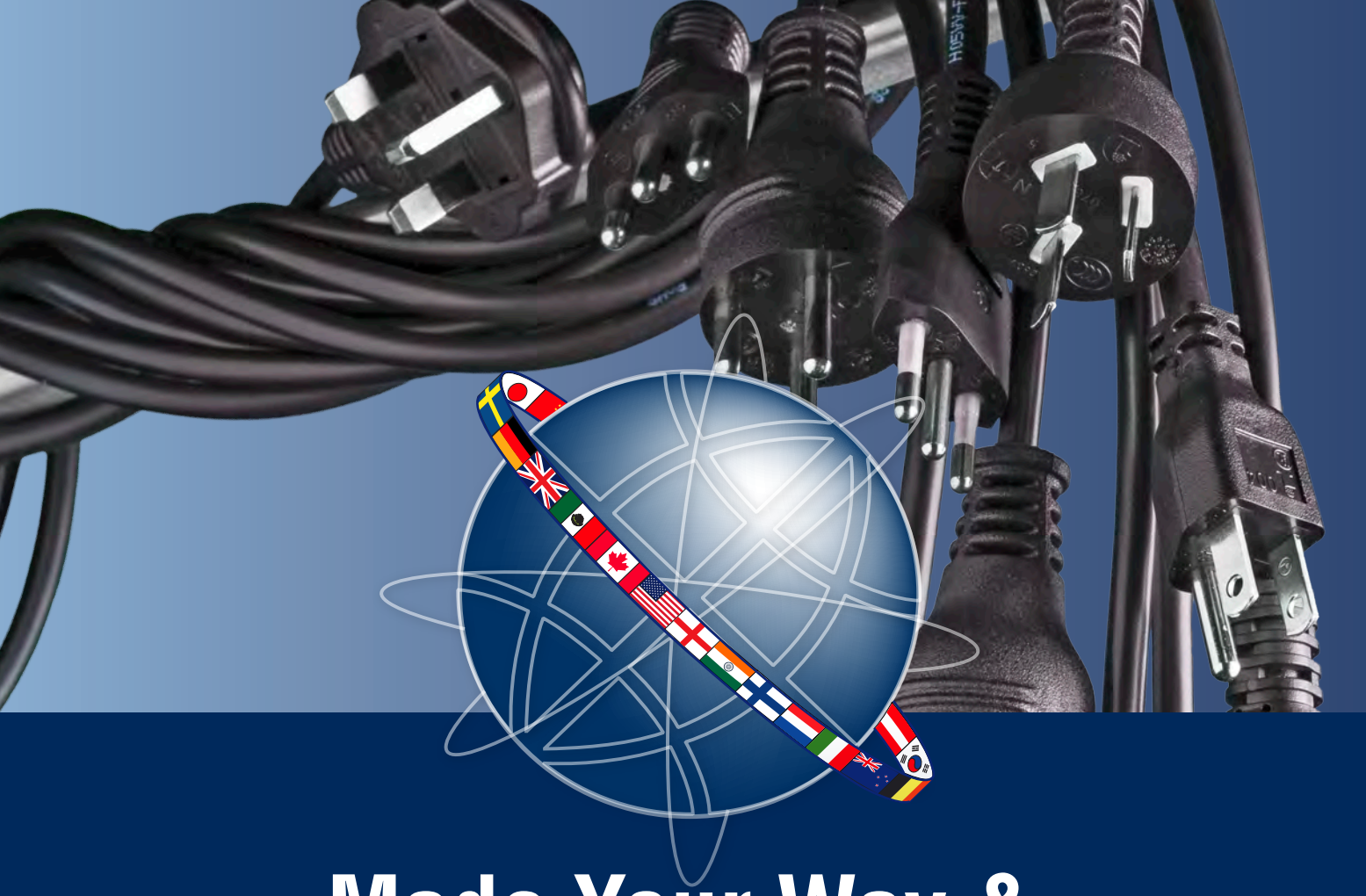
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Following its acquisition by Avnet, Farnell invested $60 million in a new warehouse in Leeds, United Kingdom



Strong relationships with leading manufacturers provides access to the latest technologies



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Distributors are optimistic about future growth in North American

Many electronics distributors expect to post single-digit sales growth over the next five years as more electronics are used in more systems and products

James Carbone

It's no secret that over the past 15 years, many North American electronics distributors have gone global expanding operations to Europe and Asia to service customers that have migrated manufacturing outside of North America.

Distributors have also expanded global operations to service European and Asian-based OEMs and electronics manufacturing services providers that they had not done business with before. As a result of global expansion, the percentage of total sales of North American distributors customers in the U.S., Mexico and Canada has declined.

North America used to be responsible for the vast majority of sales of large U.S.-based distributors, but now account for about a third of annual revenue, while Europe and Asia account for two thirds of sales. However, that does not mean North American sales are declining, or that distributors are not bullish about their prospects in North America.

Distributors are optimistic about the future of distribution in North America over the next five years and are confident that sales in North America will continue to grow, sometimes in the mid-single-digit or double-digit range although the growth rate may be lower than in Asia. They say demand will be strong in North America because of the growing use of electronics in a host of equipment ranging from wearable electronics and portable medical equipment to factory automation equipment and self-driving cars.

In 2019, some distributors in fact had more sales growth in North America that they did elsewhere. "Last year was not a great year for the overall market, but we still had 5 per cent growth in North America," said Mark Burr-Lonnon, senior vice president, Europe, Middle East, Asia and global service at Mouser Electronics. Mouser's business in Europe was flat, while its sales in Asia declined about 8 per cent.

Over the next five years, Mouser expects its sales to continue to grow in North America because there's so much design activity in the U.S., Mexico and Canada and most of Mouser's business is with the design engineers working on new products.

Customer base grows

In addition, Mouser has a huge customer base totaling about 400,000 in the Americas and the number grows each year. "A lot of them are small, but they're good margin customers and they keep coming back," he said. By comparison, Mouser has about 120,000 customers in Asia and 220,000 in Europe.

Mouser's business in North America is growing with startups and with established OEMs. Mouser is also growing the number of customers it has within companies. Often it has multiple buyers at multiple sites of a large company. "So, if we had 10 people buying from us before at a company, maybe now we have 20 people," said Burr-Lonnon.



"A lot of our customers are small, but they're good margin customers and they keep coming back"

Mark Burr-Lonnon, senior vice president, EMEA, Asia and global service at **Mouser Electronics**

While most of Mouser's customers are small, it has some big OEM customers that purchase $10-$30 million of parts per year from multiple company sites. "Each site may place hundreds of orders per day, or thousands of orders per month. It's not the production business. It's engineering or shortage business," said Burr-Lonnon.

He notes that during times of shortages, if a large OEM cannot buy parts directly from a component manufacturer, the company's buyers will reach out to distributors for shortage parts. They often turn to Mouser because the distributor has a wide breadth of inventory. "For us it's all about inventory. Whether it's TI, TE or Molex or ADI. We want to make sure we have the most number of parts available," he said.

Having a wide range of parts is important because most OEMs' forecasting is not as accurate as it should be. "That means distributors with inventory

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will always have orders. If a production line goes down tomorrow and you have the products, you're likely to get the business," said Burr-Lonnon.

A "buoyant" marketplace

Another distributor that is optimistic about the future of North American distribution is WPG Americas, based in San Jose, Calif. "We are predicting double-digit growth for 2020 in North America. Part of that was because 2019 was a bit of a rough year" and business should bounce back in 2020, said Ian Basey, vice president supplier marketing & asset, for WPG Americas. Long term, he expects high single-digit to low-double digit growth over the next five years. "We think the Americas distribution marketplace is a buoyant one," said Bassey.

One reason for growth is startups. "I think there is a lot of startup business occurring in the Americas. It's the culture of the business in the Americas to try something new, to try new business," he said.

He said WPG Americas is doing business with a lot of solid-state lighting startups. The distributor has a solid-state business unit to service startups and other companies that are designing solid-state lighting systems for commercial buildings.

"There are a lot of new commercial buildings going up and lighting is a big part of the cost of an overall building," he said. Solid-state lighting reduces energy costs and by using different lighting colors "make the workplace environment more enjoyable for workers and therefore more productive. That's a big focus for startups," he said.

There are also startups that focus on horticulture. Solid-state lighting systems are being designed for vertical farming where vegetables are grown inside and in stacked layers. Lighting systems for horticultural applications use less power and enhance plant growth compared to other lighting technologies.

Besides solid-state lighting, medical, and autonomous driving will also drive North American distribution sales over the next five years.

"There have been so many improvements in medical devices, mostly electronic improvements and that will be a big growth driver for the Americas marketplace," said Basey. A lot of those devices tend to be high-cost, low-volume, and they tend to be the type of products, distributors can get a foothold in," said Basey.

He added that autonomous vehicles will be a "driving force" for electronics distributions in the near future. "It's not just cars. There are other areas," such as farming, which will use autonomous driving technology. There will be more driverless tractors, combines and other agricultural vehicles, he said.

Basey added that 5G will also help drive North America distribution sales over next five years, but it probably won't begin in 2020. He said 5G will be used in IoT, "but that's a longer-term play."

Confidence level grows

One distributor that is cautiously optimistic about North American business is RS Components. Cameron Ward, senior vice president of marketing for RS, said there should be mid-single-digit growth in North America over the next several years.

"There's a much higher level of confidence going into this year," he said. "Last year was difficult for everyone across the board. I don't think there's a single distributor out there that would claim that it was a great year," said Ward.

However, RS is conservative with its outlook because "there's a lot of things happening in the marketplace that we have no control over," said Ward. "You take a look at the trade war that's going on. That's affecting business. And there is Brexit. "There's also a little bit of a wait and-see approach about what technologies are going to take off," he said.

The Internet of things, the growing use of electronics in vehicles, and 5G technology will help drive growth, said Ward.

"The industrial space represents a good opportunity for us," he said. The fact that is we already have very large customer industrial customer base that consumes some type of electronics. Industrial IoT is an opportunity, "said Ward.

Cameron Ward, senior vice president at **RS Components**

> "There's a much higher level of confidence going into this year. Last year was a difficult for everyone across the board"



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Shrink EMI problems down to size

Conductive heat-shrink tubing can solve a variety of EMI/RFI issues without specifying custom cable shields or metal enclosures and without costly redesigns. President of Electronic Connector Company, Bernard Gizzi, explains

With the proliferation of high-speed communications in ruggedized equipment, the susceptibility to electromagnetic interference and radio frequency interference has become a growing challenge. This is usually manifested in one of two ways: conducted EMI/RFI causes the system to malfunction from within, or radiated EMI/RFI causes other nearby equipment to malfunction.

Today, EMI/RFI control is so important that the Federal Communications Commission in the US, the European Union, and other nations have imposed strict guidelines mandating allowable EMI/RFI limits in electronic systems. Designing for compliance can be complicated, with the EMI/RFI performance of a prototype often being different to the actual production unit. Consequently, manufacturers may not discover equipment is non-compliant until pilot production units have been built and tested.

Costly cable solutions

Shielded cable is often used to mitigate EMI/RFI, however EMI/RFI problems frequently occur at the junction between a shielded cable and its connector. Common solutions include using a metal or metallized plastic connector and soldering the cable shield to the connector or, alternatively, wrapping the junction with copper tape and then soldering it to the cable shield. More robust solutions involve metal braided sleeving and tubular expandable braided cable shielding. Unfortunately, although though these solutions work, they are costly, labour-intensive, and can produce inconsistent shielding performance.

An easy-fit alternative

One alternative solution is to use shielded conductive heat-shrink tubing with a metallic conductive ink coating on the inside of the tube. The inner coating provides electrical continuity and EMI, RFI, and ESD shielding around the joints being connected. This can solve various EMI/RFI problems inexpensively and does not require in depth expertise.

In use, the appropriate diameter of tubing is simply placed over the components or assemblies to be shielded, and heat from a heat gun or oven is applied to the tubing. After shrinking, the inner metallic layer provides an electrical connection between the outside surfaces of the objects that are joined, thereby creating a 360deg circumferential shield.

Heat-shrink tubing requires no soldering. This multi-purpose polyolefin is rated at MIL-STD-R-46846 and meets stringent aerospace specifications for outgassing such as ASTM E- 595, NASA SPR-0022A, and ESA PSS-010702. It can also be used with solderable and non-solderable surfaces such as stamped metals, plated finishes, and shielding paints. Standard inside diameters range from 1/8th of an inch to five inches, with custom materials available for application specific programs.

Although not all EMI/RFI cable shielding problems can be fixed with heat-shrink tubing, it can be a cost-effective and easily implemented solution to EMC challenges.

www.eccoconnectors.com



President of **ECCO**, **Bernard Gizzi**



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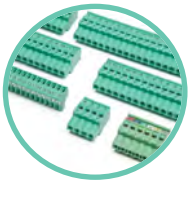


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Conex-it

An easy approach to EMI filters

Aerco's filtered connector solutions from Oxley Developments meet the need for custom filtering without adding to the complexity of a project

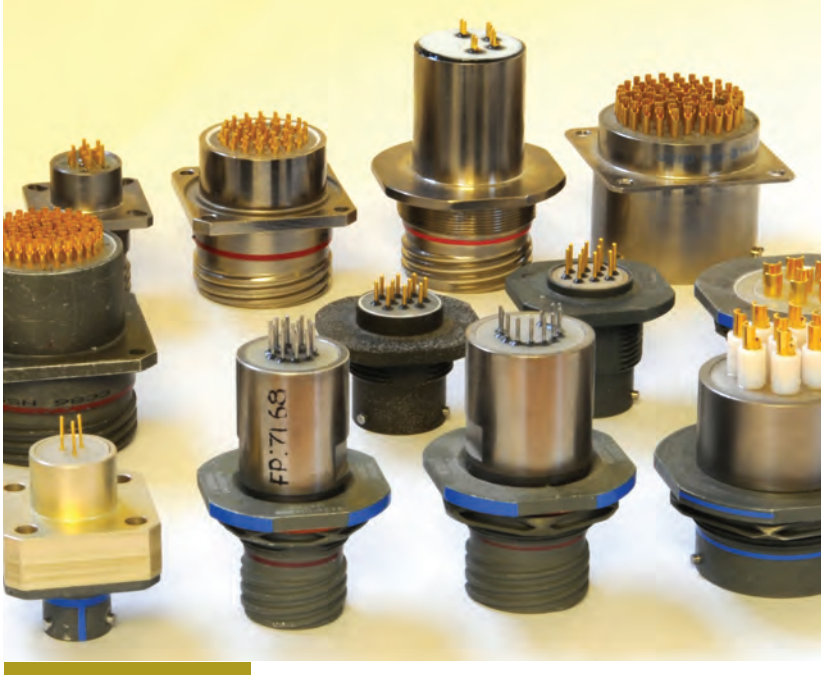
In most electronics systems there are electromagnetic challenges; to protect the system from dangerous electromagnetic interference signals and also to guard against unwanted emissions from the system. In applications ranging from aerospace and telecommunications to military and civil control equipment, filtered connectors are used to provide that protection.

In most design circumstances, specific frequency ranges must be filtered, so custom filters are required, however most applications also use standard connectors to interconnect equipment. The Oxley solutions supplied by Aerco can be delivered across many different mil-spec connector ranges including MIL-DTL-38999 and MIL-DTL-26482 as well as ARINC and D-type connectors. Options include filtered extensions added to standard connector shells or filters integrated into custom-manufactured shells.

When compared with alternative solutions, filtered connectors provide ease of assembly, a reduction in space and weight, and the ability to avoid having internal bulkheads in equipment.

These filter connectors are designed and manufactured at Oxley Development's self-contained facility in the UK, with prototypes available on rapid schedules and production quantities being supplied through Aerco's flexible stock-holding services.

www.aerco.co.uk



Circular filtered connectors are available in many different mil-spec styles



Connectors offer tasty savings

Harting's Han F+B series is designed to help shorten set-up times and reduce production stoppages in the food industry. The connectors provide strong resistance to detergents, can function at temperatures from -40 to 125°C and prevent the build-up of dirt. The housings are certified by Ecolab and have FDA 21 approvals.

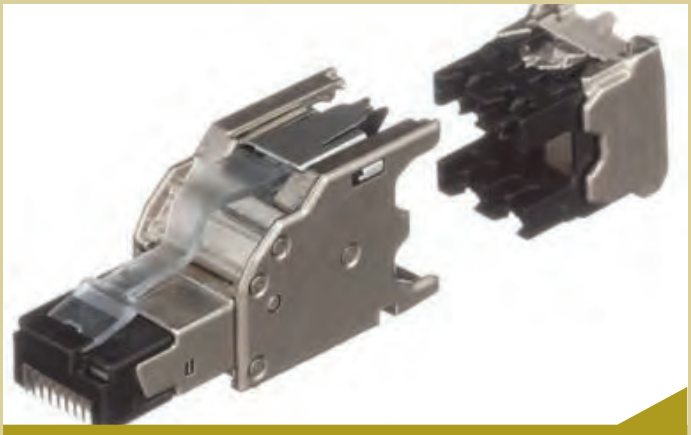
Circular shapes and smooth junctions, threads and seals were chosen for the Han F+B to ensure a hygienic, easy-to-clean design and to make it harder for dirt and bacteria to accumulate.

As an interface for food production, the Han F+B is also be resistant to water jets used to clean equipment. Coupling and uncoupling is fast and easy with the specially designed housing profile, said to enable secure handling, even in humid environments.

If machine downtime occurs, users no longer need to open a cable gland on the control cabinet to decouple devices. As a result, costly detaching and re-establishing of hardwired connections is eliminated and machine downtimes are reduced.

The housings can be used with hybrid contact inserts for data, signal and power.

www.harting.com



Easy to terminate plugs now available with shielding

Panduit's new TX6A Shielded Field Term Plug provides an easy to install and maintain, male RJ45 connector for WiFi access point and site deployed PoE applications, such as cameras, where EMI shielding is required.

Together with the existing UTP Field Term Plug, the TX6A plugs provide a direct connect method which promises cost savings, faster installation and increased reliability in both unshielded and shielded applications. The plugs support Category 6A, 6 and 5e performance levels in one product family. They are also rated for use in elevated temperature environments.

The Panduit TX Field Term Plug family is said to be easier to terminate in the field than typical modular plugs thanks to its two-part construction, which provides a more compact size in PoE applications and simplifies cable connection.

www.panduit.com





Fast track access to smaller, lighter connectors

Extreme temperatures, constant vibration and hazardous liquids all put motorsport connectors to the test, but as Lane Motorsport's Pete Costin explains, size, weight and delivery times are also crucial

Connectors for motorsport, like their aerospace and military counterparts, must be capable of operating across an incredibly wide range of environmental conditions. Extremes of temperature, constant vibration and the presence of a variety of liquids come together to provide the ultimate test of a connector whose integrity and reliability are paramount.

But these environmental demands are just one area that makes the motorsport sector unique. Those working on the latest motorsport platforms are increasingly requesting more complex cable assemblies and harnesses fitted with smaller and lighter connectors, which in turn handle higher currents and much faster signal and data speeds.

One source for connectors and accessories

Lane Motorsport specialises in providing all forms of motorsport with the latest connectors and connector accessories and is an assembling, value added distributor for Souriau, a manufacturer of 8STA interconnection products. Souriau's 8STA circular connectors find application connecting engine control units, communications equipment, data acquisition systems, fuel pumps, starters, alternators and batteries throughout all levels of motorsport.

To complement these connectors, Lane's sister company, Weald Electronics, manufactures a range of ultra-lightweight 8STA compatible accessories including protective caps, gaskets, nut plates and all the assembly tools required.

Weald also offers a connector modification service for those customers who require something special for their application. This includes an increasingly popular single flange receptacle which has a single hole fixing enabling users to optimize their electrical architecture, for example, for box mounting. Another Weald 8STA accessory is a tiny nut plate designed to make installation easier and faster.

More choice on motorsport boots

Because every connector needs a boot, Lane Motorsport supplies HellermannTyton's moulded boots and shapes specifically for the motorsport market. The company stocks standard boot, glue lined boots, high temperature boots for fuel tank applications, both straight and right-angled variants and the popular VG950 twin pack epoxy used to glue standard boots, mostly available for next day delivery. Lane Motorsport also stocks the very small boot used on the tiny size 01 8STA Souriau connector.

The ultra-miniature size 01 Souriau 8STA circular connector series offers a 20 per cent saving in size and weight over the size 02 series while maintaining all the size 02 performance advantages—including the anti-vibration design and the high resistance to motorsport fluids.

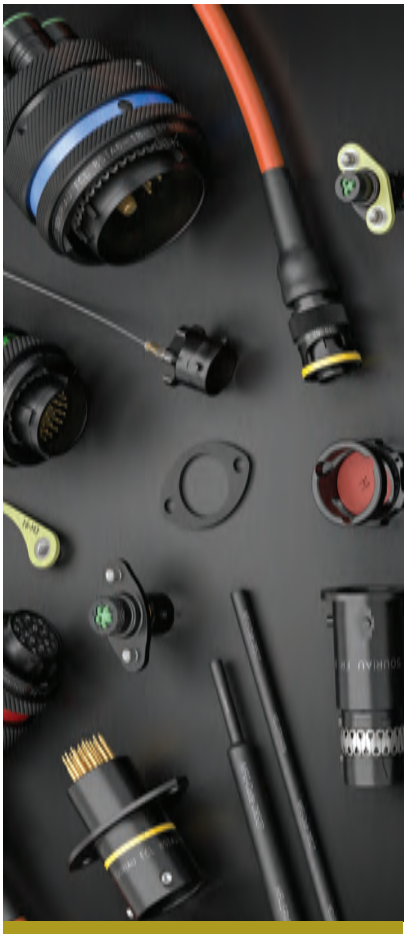
Here, Weald Electronics' size 01 aluminium protective caps are ultra-lightweight, feature an anti-vibration locking design, and are about 50 per cent lighter than the standard size 02. The caps can be supplied with or without a flexible, stainless steel micro wire rope lanyard. HellermannTyton's size 01 heat shrink boots are exclusively available from Lane Motorsport.

Rapid delivery by return

As everybody knows, the motorsport industry can also be very demanding when it comes to component lead times and suppliers need to be able to respond literally by return to requests for product, no matter how small the quantity or how 'unusual' the specification. Lane Motorsport has at its disposal an almost limitless stock of the multitude of parts needed to build the connector as well as the facilities to assemble the finished product on demand.

This comprehensive motorsport interconnection package is available to specify and purchase online.

www.lanemotorsport.com



Lane Motorsport supplies HellermannTyton's moulded boots and shapes specifically for the motorsport market

"Suppliers need to be able to respond literally by return to requests for product, no matter how small the quantity or how 'unusual' the specification



Be demanding

With the ability to assemble caps and lanyards to order, plus a full range of circular connector accessories in stock, NYKCS supports purchasers that require approved product in a demanding timeframe

Interconnect solutions provider, NYK Component Solutions, is a fully franchised distributor for EMCA Electro-mechanic, stocking a comprehensive range of circular connector backshells and caps. The added ability to assemble caps and lanyards to suit customer-specific requirements means NYK's offering is an attractive alternative to standard product from original equipment manufacturers such as TE/ Polamco and Glenair.

EMCA manufactures an extensive range of VG approved connector backshells, protection caps, dummy receptacles, conductive gaskets, O-rings and custom assemblies. Based in Germany, the company produces accessories for a variety of connector types including D38999, 26482, 83723, 5015, VG95328, VG95234, VG96912, JN1003, CECC75-201-002 and many more.

Backshells and accessories are available in materials such as aluminium, marine nickel aluminium bronze and stainless steel. There is also a range of plating finishes including electroless nickel, cadmium olive drab, zinc nickel passivation, and EMCA's VG 95319-1011 approved high-performance black hybrid plating. This is RoHS and REACH compliant as well as being fully compatible with other plating finishes.

One-stop interconnect shop

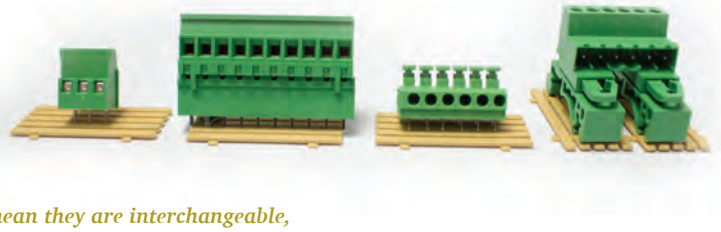
To meet the demand of purchasers in the aerospace, defence, industrial and automotive industries, NYKCS holds a large volume of backshell products that are typically used in these sectors. The company is also a QPL listed value add distributor for Conesys mil-spec connectors. This is good news for customers that require approved product in a demanding timeframe. The ability to supply complementary accessories alongside quick turnaround connectors enables NYKCS to be an efficient 'one stop shop' meeting purchasers' complete interconnect requirements.

The NYKCS and EMCA websites offer further support, providing a valuable online resource for buyers with product specifications and a cross reference tool covering over two million items, accessed by entering a part number. With a focus on technology and efficiency both companies aim to help customers find the right product for their application at the right price.

www.nykcs.com



Not all terminal blocks are equal



All terminal blocks are used to connect wires to a PCB, but this doesn't mean they are interchangeable, so what should buyers consider when sourcing these essential components. CamdenBoss explains

The nominal current and system voltage of the electronic circuit will drive the requirements of any terminal block. The voltage rating will determine the minimum pitch, while the expected current of the circuit will control the size of the block. A terminal block with a larger current rating will have a larger profile and wire acceptance capable of withstanding the load.

With options such as screwless, pluggable and standard, the market caters for all requirements, with each type bringing its own advantages. CamdenBoss stocks a large profile of wire to board connectors that fall into each of these categories.

Standard PCB terminal blocks are available in a large selection of sizes and power capabilities making them more versatile and suitable for a range of applications. With options such as rising clamp and wire protector termination methods, standard terminal blocks are a reliable connection method that meets most electrical standards.

Pluggable terminal blocks are made up of a plug and receptacle half. Once the wiring has been assembled, they can be quickly disconnected, without having to remove the wires. This greatly improves maintenance capabilities.

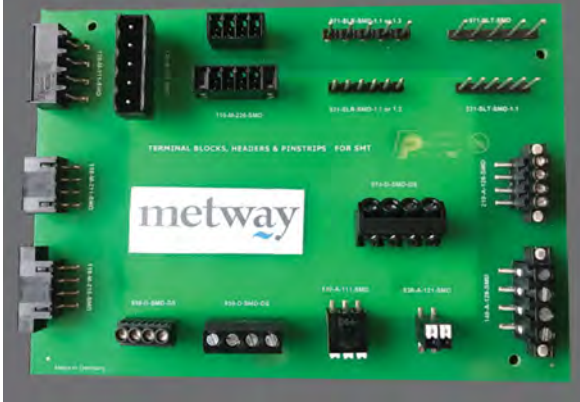
Screwless terminal blocks provide a quick assembly method and are used where speed is an essential requirement. They work using an actuator that opens up a cage clamp in which the wire can be inserted and held. The effectiveness of clamping is harder to control, however, and should be considered carefully.

Although terminal block type will depend on the application, it is the electrical specification that should ultimately take priority to ensure the terminal block will not fail in use.

Looking to the future, industries such as IoT and EV charging will push terminal blocks to develop in ways that make them more practical. Development boards for example will look towards lower power and lower profile blocks and with the world looking to become more sustainable and energy efficient, we can assume that terminal blocks follow this trend.

www.camdenboss.com

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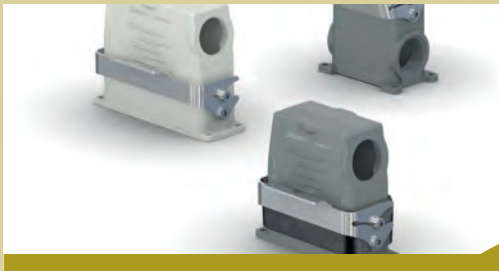
Punch down plugs offer assembly savings

Stewart Connector, a Bel group company, has announced a new time-saving solution for Ethernet connections that require field termination. The company's Cat6 and Cat6A Multi-Axis RJ45 punch down modular plugs offer a 90deg termination position with top, bottom or side entry. A colour-coded conductor pre-load wire manager helps provide efficient termination without tools.

The Multi-Axis punch down plugs can be used for solid or stranded 22 to 26 AWG cable with a diameter over the conductor insulation up to 1.6mm and an overall outside diameter of six to eight millimetres. The connectors feature contacts with 50 micro inches of gold plating for increased cycle life, with these IP20 rated plugs featuring a zinc die-cast housing and latch protectors to help withstand harsh environments.

The Cat6 version of the Multi-Axis plug is suitable for use in 1G Base-T networks and the Cat6A version is suitable for 10G Base-T networks. Applications include data, telecom, wireless, PoE applications and industrial equipment connections.

www.belfuse.com



Modular connectors get an IP upgrade

Stäubli Electrical Connectors has redesigned the aluminium DIN housings for its CombiTac modular connector range to offer increased ingress protection to IP65 and IP67. Lifetimes have also been extended to 10,000 mating cycles.

Purchasers can opt for coupler hoods in sizes two, three and four, with or without protective walls, and surface and pedestal housings with or without protective walls and covers. Accessories include parking stations, interchangeable seals and protective caps for manual applications.

The DIN housings, which are available with six marking options, offer IP2X protection during connection/disconnection and an operating temperature range of -40 to 125°C. They are also suitable for use in the rail industry, being compliant for shock and vibration resistance according to EN 61373 category 1B.

www.staubli.com

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Behind the scenes

From order placement right through to delivery, ESNA takes a look at a day in the life of an electronic component

You probably know the little thrill you get when the mail man hands you an eagerly awaited parcel containing a product you ordered online. In B2B business the thrill might be a bit smaller and the parcel a bit bigger, but on time shipment is even more important, otherwise a whole production line may come to a halt.

Most people only have a vague idea of the underlying processes that lead to a successful delivery of electronic components. As a broadline distributor, Rutronik needs to cope with a variety of different shipment volumes and product quantities. Depending on the order, some tasks may vary, but in general, the majority of customer orders are handled in a similar way.

An order is placed

Well, firstly, an order is not just an order. To offer customer-specific solutions, there are three different types of logistics systems available: a delivery plan system, a Kanban system, and a consignment warehouse. These consist of standardized elements but can be adjusted to fit individual requirements.

Each order is channeled via the main logistics hub in Germany but gets processed in the warehouse location closest to the recipient. This helps ensure a globally uniform standard of service.

Delivery plan system

This is pretty much your basic ordering process and is suitable to all available components at Rutronik. Based on expected production figures, the customer forwards their desired bill of materials to Rutronik at fixed intervals. The BOMs are then subject to warehouse operations and get picked, packed and sent out to the customer in the desired time frame.

Consignment warehouse

A consignment warehouse is ideal for manufacturing lines that can face short-term fluctuations and need a high degree of independence from delivery schedules.

But what does that mean in a practical way? A consignment warehouse is designed to work like a Rutronik warehouse at the customer's premises. The client provides the storage space and Rutronik provides the stock. The customer is then free to take out parts according to production capacity, which results in greater flexibility than a delivery plan system. The fulfillment schedule can be based on a forecast, much like the delivery plan system, or on a component consumption report that states the withdrawn quantities and part numbers.

Kanban system

This system combines the previous two systems. The so-called Kanban containers are defined in the run-up with a certain filling quantity of components and are tagged with an individual identification code.



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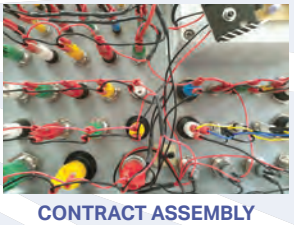
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This code contains all necessary information of the container's contents including part numbers, quantity and location. The codes are listed on a Kanban card. In case a container is empty, this card will be forwarded to Rutronik electronically, which then starts the delivery process and the container will be re-filled.

Parts enter the warehouse

A fully functioning warehouse is comparable to a well-oiled machine. Many different parts are working together to guarantee a smooth operation. With a warehouse, this begins before the actual incoming shipment even arrives. Due to logistic tracking, it is possible to know well in advance which shipment contains which parts, in what quantity, and what package size. This means that every component is already booked into the logistic system, before it even reaches the warehouse. This accelerates the process of labeling and storage and guarantees full traceability of components during their whole journey. It's even possible to know before hand, if a shipment contains parts that are urgently required by a customer and need to be handled as a priority.

After the parts have been received, each package unit is inspected visually, and is then individually marked with a label that contains all necessary information, such as Rutronik's part number, and the supplier number, before storage. By doing so, full traceability of each part is ensured, and we can intervene in a part transaction at any given time.

After the customer has chosen their preferred logistics solution, everything is ready for the first order, which starts a variety of internal processes at Rutronik.

Components are picked

Picking describes the actual removal of the component from the warehouse shelf. The customer's order is forwarded to a picker together with the exact location of the goods. This minimizes the time spent looking for specific components inside the warehouse, which, at 22 billion articles readily available, can take quite some time. The individual orders that need to be picked are not chosen randomly. An algorithm that takes numerous parameters into consideration prioritizes the order of sequence, so each shipment arrives at the customer on time.

The picked items are placed in a container, called a 'tote' that is then forwarded for shipping on a conveyor belt. Each tote has an ID-tag, so every order can be tracked individually during the ordering process.

When a tote reaches the shipping area, a complex infrastructure of conveyor belts direct it automatically to the packing station with the least traffic. This also ensures an absolute minimum of transit time for the shipment inside the warehouse.

Items are packed for shipping

During packing, items are handled according to customer specific needs. Components that are sensitive to humidity are stored within a special packing inside the warehouse and get checked multiple times during picking and packing. It's also possible to have the goods marked with customer specific labels or have a second outbound inspection, in addition to the mandatory inbound inspection.

By offering additional services like these, processing time at the customer's premises can be minimized. This way, each shipment reaches its destination exactly the way the customer wants it to be and can be processed immediately.

www.rutronik.com



Obsolescence planning: the best medicine for device longevity

Director of industrial automation parts supplier, EU Automation, Jonathan Wilkins, explains why planning for obsolescence in medical devices is vital, as well as how this short-term cost can result in long-term gains

Out with the old and in with the new. For most of us, this is just another cliché that we've heard a million times before, however in the medical device manufacturing industry, it is very much a reality, particularly in light of changes to the EU's Medical Device Directive.

In the past, the Medical Device Directive was used to harmonise the laws relating to medical devices within the European Union. Products that conformed with the MDD were labelled with a CE mark. The intent of this mark was to provide a certification of quality and reliability that could be trusted. However, things did not always go to plan.

A combination of problems, stemming from diverging interpretations of the MDD and high-profile scandals involving medical devices, highlighted the weaknesses of the laws in place.

Managing component failure

In the past, problems have arisen with medical devices holding CE marks caused by parts failing during the expected lifespan of the device and there then being a difficulty to replace the part in question. These issues, among others, highlighted the need for the regulations to be updated to include regular testing of equipment, regardless of whether it is certified with a CE mark.

Now, the MDD has been updated and replaced with the new Medical Devices Regulation. Unlike with the MDD, the MDR is a regulation and not a directive. This means that it is directly applicable in all EU member states and is not open to different interpretations.

The MDR has introduced several changes to the laws surrounding medical devices in Europe compared to its predecessor. One of the changes is that it makes manufacturers responsible for the lifecycle of a device.

Finding replacement parts

When a device is not performing as it should, it could be just one component

> **Unlike with the MDD, the MDR is a regulation and not a directive**

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letting the whole system down. In cases such as these, it makes far more sense to replace the part that isn't working correctly instead of the whole device. However, sourcing spare parts could prove difficult if the component in question is no longer produced by the original equipment manufacturer and is therefore obsolete.

An obsolete industrial parts supplier, like EU Automation, can help source like-for-like replacement parts, however you don't want to have an over reliance on this when manufacturing your devices.

Essential obsolescence management

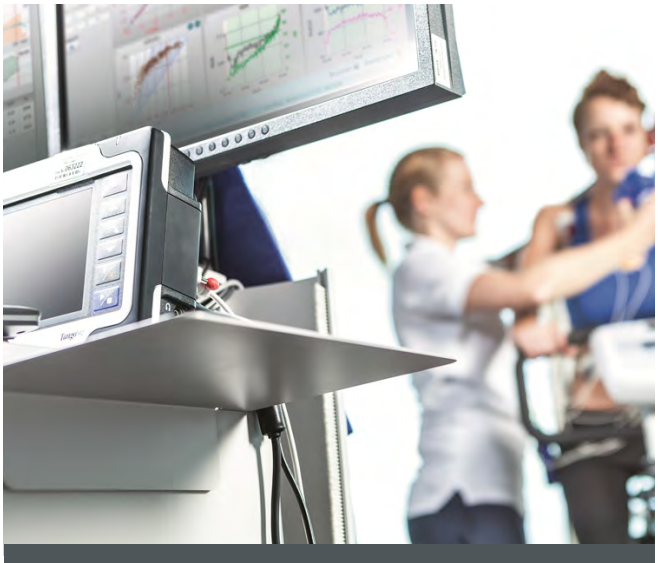
While it isn't impossible to find replacement parts, it's much easier if obsolescence management is considered from the outset. When manufacturing a medical device, it's important to consider the lifespan of all the components individually.

For example, manufacturers may face a choice when sourcing components between a part that is cheaper but faces imminent obsolescence and another that is a bit more expensive but has a longer production lifespan. In this case, it is worth investing in the part with greater longevity so that the overall device life is not threatened by the future obsolescence of one component.

With the rate at which components face obsolescence increasing all the time thanks to new technological advances, good obsolescence management is more important than ever before. Failing to carry out this practice could cost companies millions in unnecessary replacement of devices—money which could have been saved with good obsolescence management from manufacturers.

To help purchasers learn more about how to plan for obsolescence, EU Automation's *Book of Obsolescence Management*, available online, will guide readers through the seven steps to obsolescence management.

www.euautomation.com



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Blockchain or bust



John Denslinger is a former executive VP Murata, president SyChip Wireless, and president/CEO ECIA, the industry's trade association. His career spans 40 years in electronics

John Denslinger explores the electronics distribution use case to identify tangible, measurable benefits of implementing blockchain for buyers and supplier alike

Blockchain • By John Denslinger

Want to see someone's eyelids elevate, just mention the word blockchain. Want to stump them further? Ask what they know about blockchains. Want to impart pain? Ask if they're involved in mapping or implementing a blockchain multi-party solution. The point to be made here is blockchains are as much a mystery for most as it is a strategic priority for some.

In a 2019 global survey Deloitte found 'Leaders wary of tech-based solutions have come to see the larger, transformational importance of the technology'. Yet that same survey mentions only 23 per cent have actually started some level of blockchain deployment down from the 34 per cent reported doing so in 2018. The top five barriers mentioned: problems adapting or replacing existing legacy systems; regulatory issues; potential security threats; lack of in-house capabilities; and lastly, uncertain ROI. With all that said, perhaps the most startling stat was 43 per cent still see blockchains as over-hyped up from 39 per cent in 2018. Deloitte concludes blockchain decisions are evolving in both pragmatism and maturation. As more use cases are confirmed, adoption is bound to gain traction.

So, let's examine a buyer/supplier relationship typical of our industry. Is there a justifiable use case worth committing time, resources and investment in a blockchain solution? Is it really possible to achieve a buyer /supplier relationship that: further reduces cost; shortens cycle time of essential processes; mitigates multi-lateral risk; creates unparalleled trust; and is completely secure?

Blockchain information is readily available from a number of sources. ECIA recently hosted a webcast by Christophe Begue, director solution strategy & business development, discussing IBM's blockchain and how it might relate to our industry. His Trust Your Supplier (TYS) blockchain solution essentially connects qualification, validation, on-boarding and life cycle management. Within that blockchain loop is the buyer and supplier as expected, but also included are: industry standards bodies; key government agencies; environmental compliance verifications; financial/credit/insurance/indemnity validations; embargo/watch-list screenings; 3rd party authentications; and auditors. The chain is scalable to fit small to large concerns. Sounds promising, but is there a tangible, measurable benefit?

Yes, it would appear so. Buyers gain: real-time access to supplier data at a fraction of former costs; speedy and consistent on-boarding new suppliers at substantially reduced cost; risk minimization; uniform compliance assurance; and permanent and easily accessible records of all events by all parties in the blockchain.

Suppliers gain as well: elimination of repetitive and redundant qualifications; cycle time optimization on-boarding as a new supplier; faster time to first order; reduced administration costs managing approvals, certifications, compliance and other life cycle expectations.

Obviously, there are a number of blockchain platforms to choose from. IBM is only one solution. Some are public, some private, others consortium based, and finally there is even a hybrid version. Regardless of your choice, plan for a lengthy period of intensive discovery, status quo challenges, and potential system upheavals. You will ultimately find digital networks create enormous efficiency when classic barriers are removed. Our industry definitely has a use case. The contribution of blockchains is just beginning.



The keys to effective HMI

Human machine interface systems are the critical link between user and machine. EAO offers a useful list of factors to consider before you decide which interface products to specify

Whether it's a simple two-button panel or an extensive software-based system, a well-designed HMI system should allow the user to perform necessary actions while providing noticeable feedback and essential system information. Every decision, from the layout to control element selection, style, and color, must be focused on providing functionality and interactivity for the user, increasing ease-of-use and improving productivity.

Determine operational requirements

Factors such as user environment, operating temperature, humidity, dust or vibration, are all pivotal considerations when determining material and functionality choices for HMI.

As safety should always be the top priority, it's also vital to understand who will be operating the HMI. What is their role? Are they expert or novice users? Will they be operating with or without gloves? These are just some of the many questions to ask.

Select control elements

After determining the application, functional requirements and operator needs, you're ready to select the control elements. For basic alphanumeric or graphical displays, LCD and LED non-touch displays are an ideal choice.

Touch displays are better suited for HMI systems requiring increased interactivity, however, it's important to remember your key operational requirements when selecting a touch display. For example, resistive touchscreens, which are operated by a finger or stylus are popular in industrial applications due to their high resistance to moisture, dust, oil and cleaning agents. Infrared touchscreens, which register when a finger or object breaks an infrared light beam, are an ideal option for workers wearing gloves.

Yet, touch displays also run the risk of a 'false trigger'. Unwanted reactions, which can be caused by anything from moisture to electrical interference, are one of the biggest safety and productivity concerns for HMI systems. As a result, touch displays are not suitable for all applications.

Specify tactile controls

In scenarios where touch displays are not suitable, particularly where the HMI is not in the operator's direct line of sight, tactile control elements and electromechanical devices provide an alternative. Devices such as pushbuttons, emergency stops, selector switches and optical and acoustic signaling devices offer intuitive use, reliability and safety.

When selecting electromechanical devices, it's important to consider the materials used and how the devices are installed, as well as their compatibility with any other systems.

HMI design is not a one size fits all approach. Mixed technology solutions combine touch screens with tactile elements to provide benefits such as intuitive operation, discrete pushbuttons, illumination and softkeys.

Think about safety

When specifying an HMI, you must consider all available safety mechanisms and select the most effective one. For



example, emergency stop switches are covered by strict regulations and are actuated via a manual action, while keylock switches require some sort of prior authentication before being activated.

Standards are immensely important as both general and industry-specific requirements can dictate features, functional attributes and even the placement or color of components.

Remember, a poor HMI system can alienate users or even encourage them to circumnavigate the system, resulting in poor or unsafe system performance. HMIs should therefore create an optimal user experience with a mix of design and layout considerations, such as style, color, and tactile response coupled with ergonomic and intuitive operation. Working with a knowledgeable HMI and mixed technology solutions expert such as EAO is the best way to specify an HMI system that satisfies unique requirements.

eao.com

In scenarios where touch displays are not suitable, particularly where the HMI is not in the operator's direct line of sight, tactile control elements and electromechanical devices provide an alternative

Smart factories demand clever sourcing

Industry 4.0 and the internet of things open new opportunities for production planning and predictive maintenance on the shop floor. Harting's IoT portfolio helps realise these benefits—even in legacy equipment

The speed and capability of IoT and Industry 4.0 are constantly evolving. As a result, demand for equipment to accommodate enhanced communication methods is increasing too. Harting's forward-thinking approach therefore sees the company constantly developing solutions to make the benefits of the IoT a reality.

New equipment to support the IoT must be compact, robust and easy-to-use and the Modular Industry Computer Architecture, a rugged industrial computer designed for use in production environments, is one such product.

MICA allows manufacturers to access information from machines such as energy use and cycle times and combine it with production figures to generate valuable real-time data. Once this information is unlocked, it provides a much better understanding of what's happening on the shop floor and allows users to develop strategies for efficient production planning and predictive maintenance.

Thanks to its open source software, the MICA is extremely versatile and can be used to undertake a variety of projects across a range of markets, including condition monitoring and asset management. What's more, it can be easily retrofitted to older legacy machines in order to achieve all the benefits of Industry 4.0 and the IoT.

Condition monitoring solutions

Harting has also developed a fully functional new plug-and-play kit that utilises the MICA and enables digital condition monitoring of any kind of machinery or equipment. What's particularly interesting about this development is that it can be installed in a few hours and begins to provide valuable production data immediately.

The robust and compact Bosch CISS sensor unit can be easily attached to any machine surface using the supplied magnets, allowing short-term diagnostics or permanent condition monitoring. Once it's in place, it can simultaneously measure vibration, pressure, temperature, humidity, light, magnetic fields, acoustics and any changes in position.

Intuitive connectors

In addition to condition monitoring and production data, Harting's connector technology has also advanced to meet the demands of new, high-tech manufacturing environments.

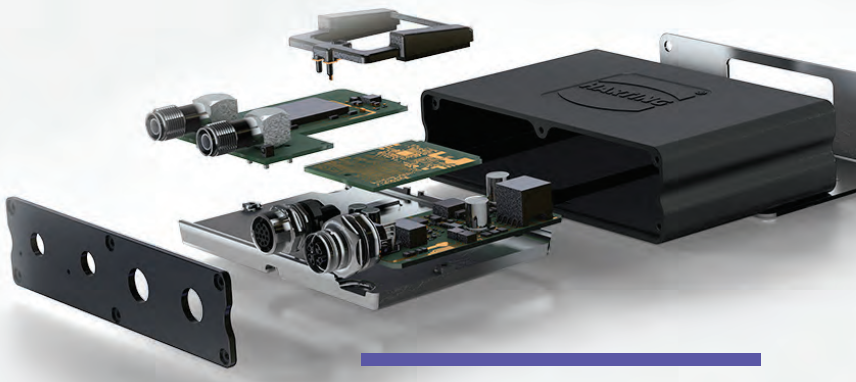
The PushPull range incorporates an uncomplicated connection and termination technique that ensures absolute dependency and reliability. This intuitive, tool-free method guarantees an error-free, secure connection as the two sections click into place, allowing interfaces to be changed quickly and easily without the need for specialist training.

Users can also allocate colour codes to each PushPull plug and socket to help reduce cabling errors. For example, you can easily colour code data, signal and power lines to ensure each line is easily identifiable.

When it comes to obtaining products, Harting is also committed to making partner collaboration and purchasing easier. Customers with direct accounts can now register for an eShop account, which allows users to place orders, check pricing and stock and track deliveries online. Harting also aims to have sustained and available stock of all class A products from its new European distribution centre; a customer-focused approach which allows the company to both manage customer expectations and provide a great service.

www.harting.com

> **The robust and compact Bosch CISS sensor unit can be easily attached to any machine surface using the supplied magnets**



MICA allows manufacturers to access information from machines such as energy use and cycle times

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Simplify your BoM with smart power solutions

Clever converters help purchasers address growing demand for dual voltage power in automotive systems, without ramping up the component count, explains Digi-Key Electronics' Rich Miron

The LV148 automotive standard combines the existing automotive 12V system with a secondary 48V bus. The 12V bus will typically continue to provide power to systems such as lighting, infotainment, audio, and ignition while the 48V bus will supply systems like the adjustable suspensions, electric turbos/superchargers, air conditioning compressors, and active chassis along with regenerative braking support.

Implementing this additional 48V supply network will present various challenges. To help alleviate these issues, Linear Technology offers several DC/DC converters that handle bi-directional energy transfer very efficiently. With these converters, either battery could be charged and current could be supplied to the same load when needed.

Unlike many early 12V/48V dual battery DC/DC converter designs that utilize separate power components to step-up and step-down the voltage, Linear Technology's LTC3871 bi-directional DC/DC controller uses the same external power components for stepping down the voltage as it does for stepping it up.

An integrated solution

The LTC3871 is a bi-directional 100V/30V two phase synchronous boost or buck controller. It can provide bi-directional DC/DC control and battery charging between the 12V and 48V system networks. It operates in boost mode from the 12V bus to the 48V bus and in buck mode from the 48V bus to the 12V bus.

This device allows both batteries to simultaneously supply energy when additional power is required. The maximum current delivered to the load is regulated by the on-chip current programming loop. There are four control loops that enable the control of voltage and current on either of the 12V or 48V busses.

Maximize efficiency

To provide more output current without increasing input or output voltage ripple, users can daisy chain multiple LTC3871s and run them out-of-phase. A maximum of twelve phases can be daisy chained to run simultaneously out-of-phase with respect to each other.

The demonstration board for the LTC3871 can be configured in either two or four phases with one or two LTC3871s.

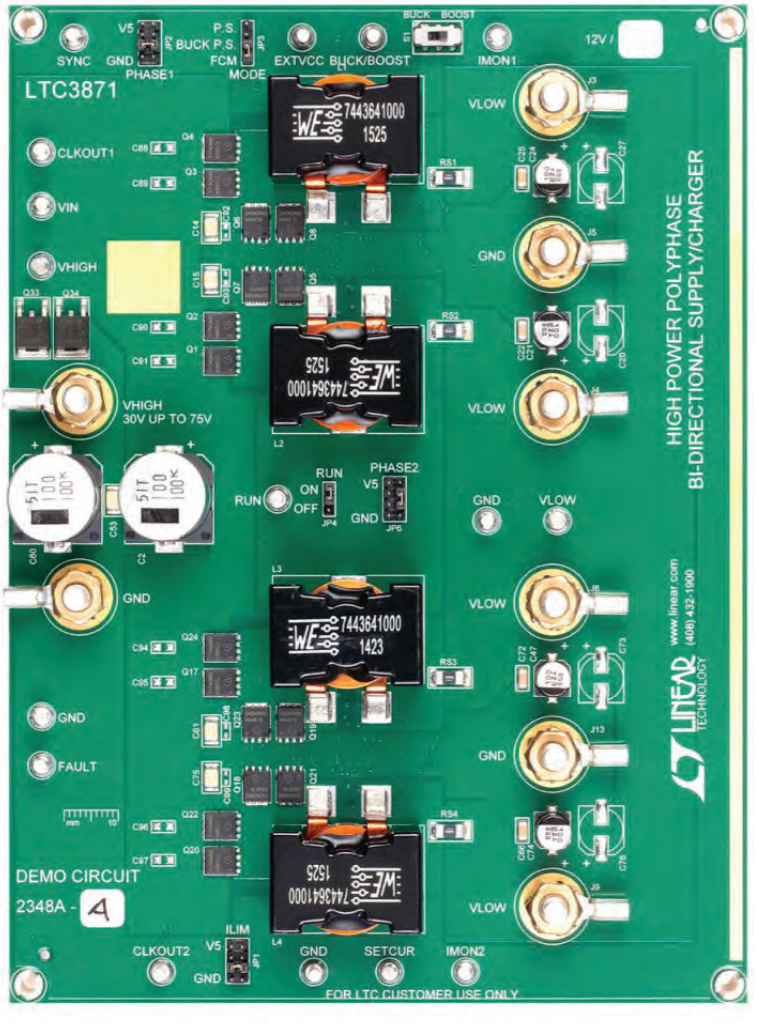
Efficiency curves for the devices are encouraging. Looking at a four-phase demonstration board utilizing two LTC3871 devices, the buck mode curve shows the efficiency as the board steps a 48V input down to 12V at up to 60A, while the boost mode curve shows the efficiency as the board steps a 12V input up to 48V and up to 10A. On both curves, peak efficiencies are around 97 per cent.

Simpler sourcing

Not only will the LTC3871 bring a new level of performance and enhanced control, it also has the power to simplify dual battery 48V/12V DC/DC automotive systems. By allowing the same external power components to be used for both step-up and step-down purposes, this clever converter could well cut your component count.

www.digikey.co.uk

Specify either a two or four phase demo board for the LTC3871



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Introducing the first of three Electronic Component Show previews

In just over three months, purchasing professionals and design engineers are invited to step through the doors of the DoubleTree by Hilton Hotel, Stadium MK, Milton Keynes, into a world of electronics design, purchasing and manufacturing.

On 14 May 2020 visitors to the event will have direct access to leading manufacturers, distributors, CEMs and service providers. Running alongside the exhibition are two seminar programmes where attendees can learn about managing obsolescence, IoT design, engineering part selection, avoiding counterfeits and much more.

The event offers a first of its kind Obsolescence Clinic (hosted by Rochester Electronics) which encourages buyers and designers to discuss obsolescence problems face-to-face with professionals who will exchange ideas and offer practical solutions.

For visitors who influence component selection, from design to purchasing, the show presents an opportunity to get hands-on with the latest products, while exploring the best components and materials for their projects.

Time is money which is why we wanted to launch a show that is both time and cost effective. With opening hours of 10am to 3pm, the event offers a productive day where you can meet with suppliers, make new contacts, attend your chosen seminars and be on the road by 3:05pm. No late-night drive home, no need for hotels and no need to be out the office for more than a day.

Registration and parking are free. To sign up online, go to *www.electronic-component-show.co.uk* and follow the **'REGISTER NOW'** tab at the top or the link on the homepage.

As a valued reader of *Electronics Sourcing*, I look forward to welcoming you at the show.



ECS business development manager, **Jack Pollard**

Exhibitor List

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APC Technology
Astute
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Make sense of sourcing

With two separate seminar streams covering purchasing and engineering, we address some of the common challenges the electronics industry faces when it comes to sourcing components today

The *Electronic Component Show* will offer a dual seminar programme, available to all visitors. Seminars are free to attend and will be running throughout the day across two suites, from 10:30am.

Seminars for Purchasers

In suite one, we will be hosting non-technical seminars for buyers and purchasing professionals. The seminars will cover common topics that crop up in *Electronics Sourcing*'s yearly reader research, providing answers to the purchasing community's biggest concerns regarding sourcing electronics.



Component obsolescence – how to minimise the costs and risks

Ken Greenwood, Rochester Electronics

Electronic component life cycles between launch and obsolescence are shortening. A large percentage of the world's electronic component demand is driven by consumer electronics and this market typically has shorter product lives. Obsolescence is therefore affecting more companies, more regularly than ever before. In his presentation, Ken will speak about the impact of obsolescence and how it can be managed.



Avoiding counterfeit components – how to manage and mitigate risks

Debbie Rowland and Kathryn Stevenson, Charcroft Electronics

The recent period of component sourcing issues led to companies looking for fulfilment via other channels. This demand has resulted in further grey market growth and, as a result, increased the threat of counterfeit electronic components entering the supply chain. It is therefore more important than ever to be vigilant.

In their presentation, Debbie and Kathryn will address the following points:

- Minimising the risk of counterfeit components entering the supply chain
- Maintaining qualified supplier status and efficient design, verification, plan and report (DVPR) processes
- Operating as designated supplier quality representative (DSQR) for customers to ensure absolute confidence in component validity



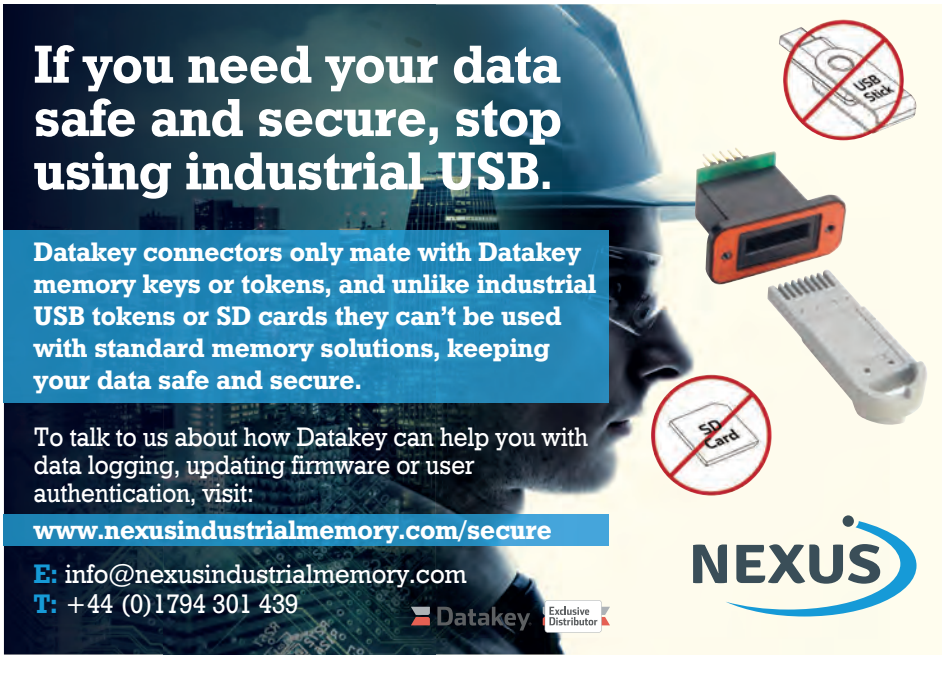
Global component distribution: safe supply in a volatile marketplace

Mark Shanley, Astute Electronics

Rapidly evolving macroenvironmental factors can provoke a surge in demand and scarcity that creates opportunities for counterfeiters within the electronic component supply chain. Mitigating this risk will remain of the utmost importance to protect the integrity of safety-critical applications.

In his presentation, Mark will discuss how Astute's dedicated safe-supply team empower OEM/CEMs to:

- Recognise suspicious suppliers through extensive vetting including early detection and avoidance procedures
- Understand the severity of the counterfeit situation via real footage of counterfeit factories
- Understand what best practise looks like by collaborating with trusted industry organisations
- Manage cost increases that drive demand and create opportunities for counterfeiters
- Understand the practicalities of a modern counterfeit avoidance program (ACAP)



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Seminars for Engineers

In the second seminar suite, we will be offering technical presentations for designers and engineers, covering some of the hottest topics and presented by experts in these fields.

IoT design: an approach to designing resilient, robust and reliable secure systems

Ian Pearson, Microchip

Designing for IoT requires a different approach to classical, non-connected, embedded design. Connected embedded devices function as part of a larger system where requirements and dependencies of the node and system are intrinsically linked. Security has also become a primary design consideration. Understanding the system helps us to make design choices sympathetic to these requirements resulting in a more robust, resilient, reliable and secure system.

Engineering part selection and supporting a rapid prototyping environment

Nikola Kontic, Zuken



Engineers face challenges in innovative product design, from specification and product appearance to part selection. Searching for parts takes a significant amount of time, investigating component specification, associated circuit elements, suppliers, availability, costs and ECAD model data.

In his seminar, Nikola will discuss these challenges, exploring what information is available from electronic component distributors, part intelligence, BoM scoring and risk analysis to help make an informed decision. The seminar will introduce you to a wealth of information to enable rapid product design and prototyping, allowing engineers to focus on circuit design and product innovation.

Security alert – don't put your system and data at risk with USB technology

Richard Warrilow, on behalf of Nexus Industrial Memory



Many applications require removable memory devices. Uses include in-field data logging and providing end-products with software updates where wired networking is impossible and wireless networking is either impossible or undesirable. Devices are also used for user authentication and to control user access privileges, however, with cyber-security and data protection growing concerns in all industry sectors, commercially available solutions, such as USB, do not provide adequate protection.

Nexus Industrial Memory's guest speaker, Richard Warrilow of Declaration, will explain how to design security into systems that rely on removable memory devices. He will also talk about why bespoke form factor industrial devices are the best option for security as well as durability, ruggedness and longevity.

Why thermal simulation is a must for electronics design?

Thomas Gregory, 6SigmaET

There are so many things to consider when designing a PCB, from signal integrity to design for manufacture, that thermal management can get forgotten until the last minute. In this workshop you will learn how to use thermal simulation to identify issues early in the design process.



Discover how to import PCB designs from your electronic design automation software in to a 6SigmaET thermal simulation and accurately model components on your board. This can establish how heat is transferred through a PCB, using the simulation results to improve a system's thermal management. Using simulation helps you eliminate thermal issues and streamline your design process from concept to final design.

"We will be offering technical presentations for designers and engineers, covering some of the hottest topics and presented by experts in these fields

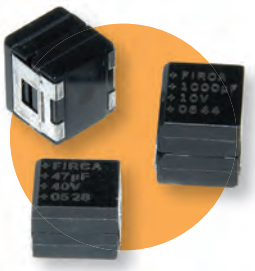
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Charcroft Electronics & Exxelia work in partnership to provide through-life support to customers, through both legacy components and innovative new designs.



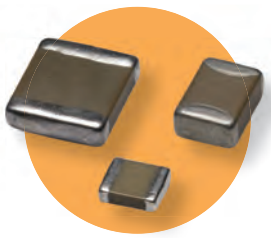
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Don't let excess inventory go to waste

When faced with excess component inventory, CCL asks whether we could do more to make the supply chain more efficient and reduce its environmental impact



Marketing manager,
Lauren Costello-Fox

Purchasers have a difficult job of planning and forecasting to acquire the components for current and future electronics production. Products are designed, developed, manufactured, and sold. Sometimes they continue to be manufactured for years with no change to the bill of materials.

Often, however, the design is altered and the bill of materials changes, meaning the components purchased are no longer required. At that point in the supply chain, there is the option to dispose of unwanted components, but there is another possibility.

Excess inventory holds significant value and can be resold rather than written off and scrapped. This creates revenue and simultaneously avoids contributing to e-waste.

As the zero waste movement gains momentum, companies shouldn't be ashamed to have excess. Excess happens for a variety of reasons and in reselling components, electronics manufacturers can reduce their environmental impact.

In giving excess inventory an extended lifespan, OEM and EMS companies can play their part in cutting down on the volume of e-waste that goes to landfill. We all have a responsibility to limit waste, so how can we do this?

When faced with the issue of unwanted components, consider working with an excess inventory management specialist to reduce the impact and realise the value of any surplus. Parts hold the most value when they are new; the longer they sit on the shelf, the less they are worth as the potential for other manufacturers to use them declines.

Advice and support from an excess inventory management company such as CCL can make all the difference. To discuss anything from e-waste to obsolete components, visit CCL at ECS 2020 on stand 86, where marketing manager Lauren Costello-Fox will be on hand to answer your excess queries.

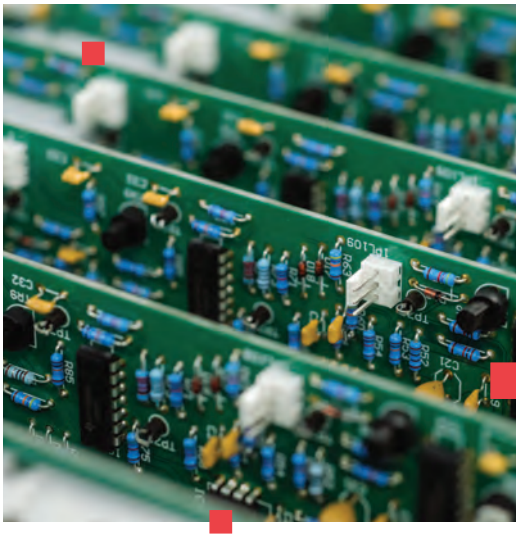
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Can DfM really cut costs?

Bringing new ideas to market rapidly is never easy, but as FermionX explains, the simpler the design process, the less chance that mistakes will cause costs to ramp up



Let's say you have a phenomenal new product idea and you know time to market is critical. The simpler you keep the design process, the less chance of mistakes but design isn't a linear process. Often, the results demand we take some steps backwards, reframe and repeat. Regardless of how many design steps there are, however, it is vital that design for manufacture principles are applied for successful long-term manufacturing.

Designing a product using DFM makes it easier to manufacture repeatably. It focuses on evaluating and identifying potential issues and opportunities in manufacture and addressing these during the design process, avoiding the risk of changes to tools, components or suppliers during the manufacturing stage. During DFM, we consider production processes, materials, tolerances, obsolescence planning and supply chain optimisation. This can reduce build times, associated labour costs and machine time.

Imagine the problems if, after months of work, the design team sign-off but the production team can't make it for the sell price because the material specified cannot be sourced as required. DFM is key to avoiding these types of costly issues.

Powerful prototyping

DFM is supported by rapid prototyping. Designing with a rapidly sourced prototype can help teams quickly move past the conceptual stage of design and allow them to fully embrace iterative testing.

Rapid prototyping checks functionality whilst allowing design and supply chain reviews. This can highlight long lead or high cost components for identification of alternatives. Similarly, using technology such as 3D printing allows for road-testing of mechanical versions.

A fully testable prototype helps individuals understand your product and tangibly interact with your vision. FermionX has considerable experience in working with customers to ensure their ideas get to market. We can start with design concept, through to rapid prototyping, compliance testing and beta production for product launch. And because we design and make our own products, we understand first-hand the challenges and pitfalls of getting new product designs to market.

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Bringing IIoT within reach

New technology and clever design methodologies are helping the internet of things live up to its promises on industrial telemetry. IIoT designer, Datasound Laboratories, explains

At its beginning, industrial telemetry invariably involved one or more primitive sensors connected to a data gatherer and a dial-up modem, all hard-wired and all mains powered. The data itself was basic, recording a temperature or conveying the presence of a leak. The hardware required to obtain even this rudimentary data set was expensive. The communications infrastructure strived to transport data cost-effectively and reliably, yet often achieved neither.

In the last decade, embedded computing technology driving industrial telemetry has evolved rapidly, driving down hardware costs. Many today like to talk about the 'revolution of IoT', particularly those wanting to cloud connect their devices who are now a new part of the industry. For me, IoT and it's industrial subset, IIoT, are merely evolutions of existing technologies that us diehard embedded folks have been knee-deep in since the turn of the century.

Industrial beta testers

The major change I have seen is that industry, traditionally a few years behind mainstream computing, is now breaking new technology barriers—but at a cost. What was once the low-risk deployment of mature, mainstream proven technology now sees us as the beta testers for industrial telemetry.

Those at the front end of deploying industrial telemetry systems are dazzled by the promise of narrowband cellular technologies, particularly in Europe with NB-IoT. The promise is near 100 per cent coverage with near zero transmission cost and power consumption. The power of today's core processors finally brings the cost of ownership down to levels accessible by almost anyone.

Lack of infrastructure

But, the issue with NB-IoT is that while the industry



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is falling over itself about its promise, it isn't actually useable yet. NB-IoT modules such as u-blox's SARA-N2 do exist, but the infrastructure—not so much. This is resulting in a stop-start path to fulfilling promises, with the same infrastructure delays experienced by frustrated early cellular data users when 3G first became available.

No one wants to fund the new Betamax, releasing a 2G/3G based IIoT telemetry system only for NB-IoT to quickly render it all but obsolete. Such a solution would also suffer the relatively high power consumption restraints that remain an obstacle for existing cellular technology deployments, dictating regular battery swaps or batteries so large as to be unviable. Thankfully there is a solution.

Scalable IIoT telemetry

Forward thinking cellular modem vendors like u-blox, combined with IIoT designers like Datasound Laboratories, enable IIoT telemetry developers to employ existing 2G/3G infrastructure, and immediately migrate to NB-IoT the second the infrastructure is available. This avoids costly re-design, re-prototyping and re-certification. This is all made possible by a combination of footprint compatible parts and clever design methodologies. It's not as simple as designing with one and switching to another, but it is possible to design a scalable IIoT telemetry system that supports it.

NB-IoT infrastructure providers face a chicken and egg situation—the costs of deploying the infrastructure are only recoverable if a lot of people use it, and quickly. They need assurances they'll recover that cost as much as telemetry vendors need assurances the infrastructure will be there.

With the future-proofing ability of new IIoT telemetry designs now fully secured, hopefully the stuttering around IIoT telemetry deployments on both sides can now end.

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Will IoT change the connectors on your BoM?

The internet of things has prompted rapid growth in areas such as building automation. With more connected devices than ever before, connector technology is evolving to push down costs

The term 'internet of things' was coined back in the late 1990s by Kevin Ashton to persuade Proctor & Gamble bosses to utilise RFID tags to track the company's products around the world. Fast forward to today and there are billions of devices connected to the internet and the rate is growing exponentially.

For consumers, the benefits are clear but for industries, the benefits are only now starting to be realised. In the last 10 years or so, for example, the lighting market has been transitioning from filament bulbs to LEDs resulting in longer life spans and lower energy costs. Alongside LED lighting, the building automation market is embracing real time monitoring and control of the entire building ecosystem, from heating and ventilation to security and energy management.

As a consequence, many devices throughout a building are wirelessly connected to the central building management control system. So, what does all this mean for Phoenix Contact and its device connection portfolio?

Firstly, devices are getting smarter and more complex, requiring sophisticated electronics to handle both control and communication functions. With more electronics in each 'connected' device, there is also a challenge to manufacture such devices cost effectively.

A significant percentage of the electronic components in these devices are surface mount devices but there will likely be a few through-hole components, typically connectors. These may require a secondary production process involving hand assembly and wave soldering, which adds time and cost to assembly.

There is, however, a solution from Phoenix Contact, with many connectors now available as SMD or through-hole reflow options, meaning they can be assembled on a single automated production line along with the other SMD components. Connectors must be robust and require good mechanical strength during wiring to avoid PCB damage and we achieve this through the use of THR technology or SMD anchors.

With the introduction of reliable wireless mesh networks, we see the trend for smart building automation accelerating in the coming years and this will require more robust connectivity within each 'connected' device. Phoenix Contact can help solve these connectivity challenges.

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Visit Omron at stand ECS062

Make time for MEMS sensors

Omron Electronic Components Europe is showcasing a variety of new MEMS based sensor products at ECS, with solutions for building automation, environmental management and security



The HVC-P2 B5T face recognition module can estimate age, gender and expression

Centrepiece of the stand will be the recently launched wide angle 32 by 32 element version of the Omron D6T MEMS thermal sensors, designed to offer the widest field of view that Omron has ever delivered. The new Omron D6T-32L-01A can view across 90 by 90deg and is able to encompass a wide area such as a whole room from a single point. From detection of abnormal temperatures in industrial equipment on the production line to monitoring of food and other temperatures in the kitchen, the D6T can make a valuable contribution to safety—identifying potential problems before they become major hazards.

Also being shown is the second-generation Omron human vision component, HVC-P2, which offers 10 times the recognition speed of the original. This integrated module includes a camera and an image processing board. It offers ten image sensing functions for use in digital signage, home and office automation and security applications, including body detection, face recognition, hand detection, age estimation, gender estimation and expression estimation. Results are accessible through a UART or USB interface.

Omron's 2JCE multi-function environmental sensor will also be exhibited, demonstrating how it can quickly monitor seven parameters. Available for the first time as a USB unit measuring just 14.9 by 29.1 by 7.0mm, it can monitor temperature, humidity, light, UV, barometric pressure, noise, seismic activity and air quality. The sensor can accumulate data for approximately three months, based on a communication frequency of once every five minutes, and connect to multiple devices, such as smartphones, via Bluetooth 5.0.

Throughout the show, Omron's team will also be available to discuss the company's pressure, flow, vibration and tilt sensors, as well as electromechanical relays, micro switches, MOSFET relays, DIP switches, photo-microsensors and connectors.

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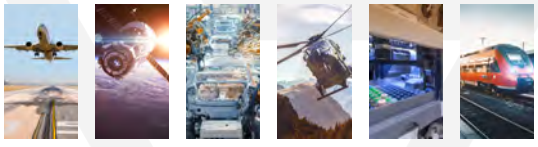
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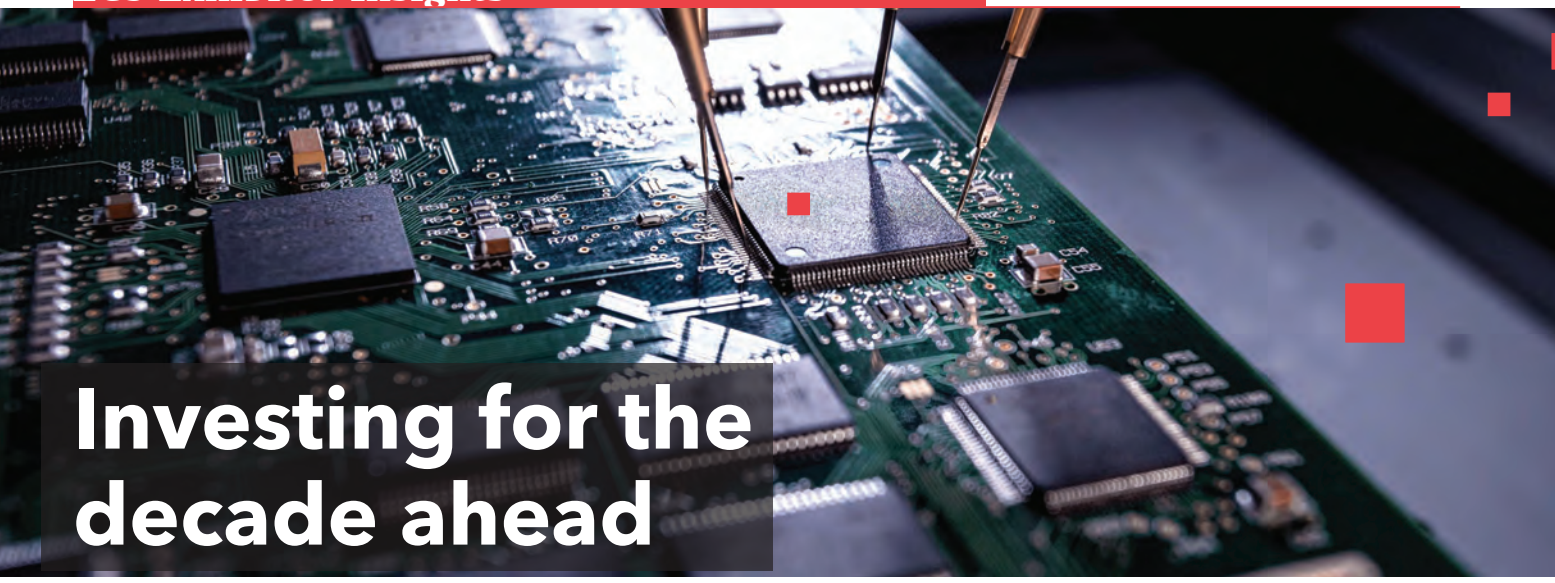
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Investing for the decade ahead

Sustained investment has helped UK electronics manufacturing services provider, Esprit Electronics, prepare for the new decade, laying strong foundations for improved efficiency, quality and capacity

Hampshire based Esprit Electronics is forecasting a strong start to the 2020s on the back of a record £1.3 million of investment in new equipment.

Last year, Esprit invested almost £850,000 in new machinery. The company introduced a new technology in the form of a SPEA 4050S2 flying probe tester to complement its existing bed of nails test capability. It also upgraded one of its four surface mount lines with the addition of two high speed Yamaha I-pulse S20 machines along with an upgraded stencil printer and reflow oven.

Benefits of the new S20 machines include higher throughput, ultra-large PCB handling capabilities, higher placement rates and greater accuracy.

A MEK PowerSpectorGTAz 650L thorough hole automated optical inspection machine also featured on the shopping list, along with an Ersa Waveflow N2 XL nitrogen wave solder machine.

As we move into 2020, the company has finalised a further £450,000 of investment with January seeing the installation of a new SPEA 3030IL in-circuit test machine. In-line with its commitment to quality and improved efficiency, Esprit has also acquired a new Asys Divisio 5100 depanelisation machine.

Equipped for new business

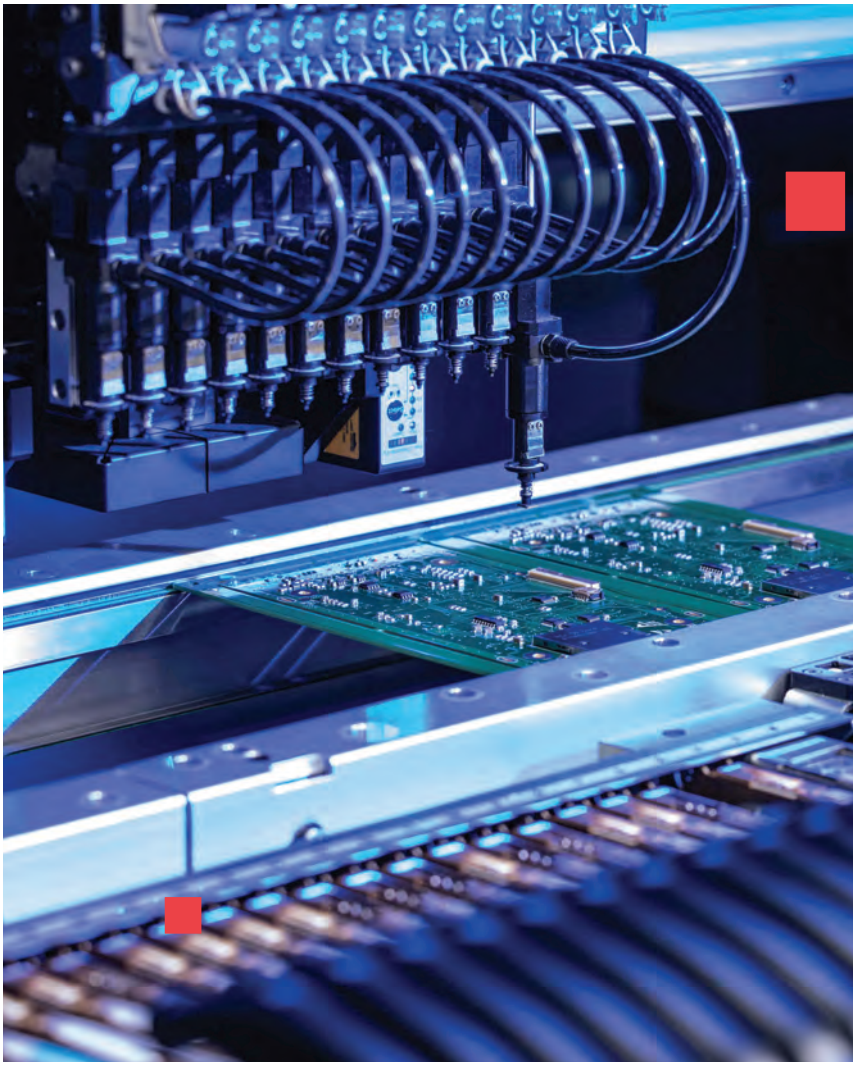
Continued capital expenditure over the last few years has been part of the Esprit growth story, enabling it to develop a reputation for providing bespoke and robust solutions. The strategy has been driven by the management team, which is committed to longer-term investment in automation and new technology.

Commenting on the investments, sales director, Russell Otter, said: “Over recent years we have achieved several strategic goals, which have helped lay the foundations for what is an excellent start to the decade. We are always looking at ways to improve our efficiency, quality, capacity and capabilities and this is reflected in our substantial on-going investment program.

“As a direct result, we anticipate significant new business in 2020 from a broad range of customers, including some that have been in R&D and pre-production moving into full production.

“Despite the uncertainty around Brexit we have seen no slowdown. Our order book has been very strong, and we are cautiously optimistic that we will deliver a solid full year performance, which will maintain our track record of consistent growth. The company looks well placed to roar into the '20s.”

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Five reasons to use a design-in distributor

From advice on component selection to logistics and inventory stocking, there are several advantages to purchasing from a design-in distributor, rather than going direct to the manufacturer

Component selection

It goes without saying that any manufacturer will advocate their own product. And although they can answer technical questions quickly, they are unlikely to disclose product pitfalls, or make comparisons with the competition (unless it's favourable). Design-in distributors, however, represent several manufacturers and have a good understanding of customer requirements, enabling them to better recommend the right product for you.

Technical knowledge

Many design engineers like utilising the same components from the same manufacturers time and time again, yet there may be innovative new products offering a variety of advantages. Technical manager at Rhopoint Components, Jay Gasson, explained: "Representing over 25 different manufacturers, means we launch several new products a year. It is always a challenge when new technology is introduced, as customers just don't know they can do things more effectively."

Rather than asking for a specific part number, try discussing what you want to achieve. You may find there is a better solution with benefits including accuracy, pricing, physical board space, lead times or even eliminating other components.

Local representation

A sales representative is not always required, but what if the manufacturer is located on a different continent and you need the answer today? Or you think the component is right but could do with samples or seeing a demo? Manufacturers employ a network of distributors for that purpose so utilise them.

Customisation

Many industry-leading component manufacturers are capable of offering much more than what is available from online marketplaces. If you spend ages browsing websites and datasheets but can't find what you need, speak to a design-in distributor. They know which products are customisable and may be able to arrange the perfect component.

Stocking and logistics

Purchasing via online stores allows you to order as and when required, but what if your supplier runs out of stock and you are quoted several weeks for delivery, which will impact production. A design-in distributor may be able to offer alternatives from the various suppliers they represent on shorter lead times or even from stock, as well as offering stocking options or call-off orders to help combat future potential shortages.

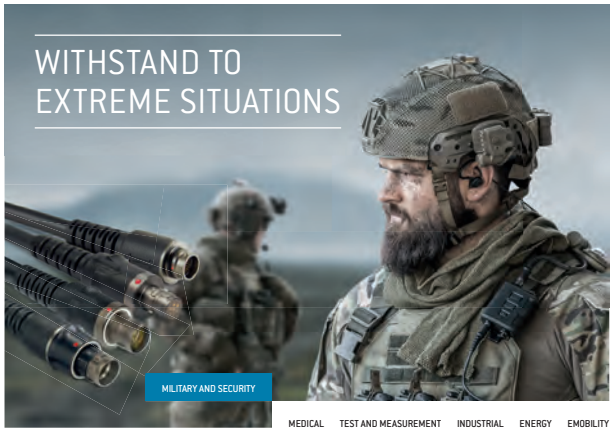
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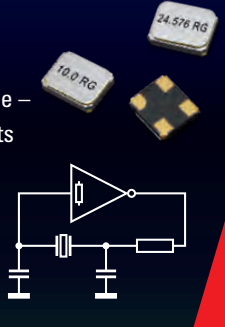
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Multi-protocol products simplify purchasing

With more and more products connecting to the cloud, discrete wireless connectivity solutions are increasingly prevalent, but there are several factors to consider before you buy, explains Solid State Supplies



The use of wireless technologies has proliferated into numerous applications, from toys and home automation to smart street lighting and industrial automation. In the era of the internet of things, the demand for smart sensors and end equipment to provide data is on the increase. From monitoring how much energy you are using to monitoring industrial machines, the information gathered can provide insights on the way assets can be better deployed, improving efficiencies, which in the long run will lower running costs. Also, should critical parameters fall outside the normal operating conditions, preventative maintenance can reduce down-time.

When designing a new application there are several wireless technologies to choose from depending on parameters such as data rate, range and battery life. Options include Wi-Fi, Bluetooth, Zigbee, IEEE802.15.4, LTE CAT-1, NB-IoT and subGHz ISM bands.

Often, wireless module manufacturers provide discrete component solutions or pre-certified modules. Unfortunately, the form factor is usually different for each protocol and not pin compatible, so before committing to a new PCB design, the type of wireless technology needs to be chosen carefully depending on the range, data rate and topology of the wireless network.

The next step is to look at the capability for cloud connectivity. If capable, does the link need to be secure and how do you implement this? This is a lot to think about. How do you get the device data from the end nodes up into the cloud? Digi International's XBee3 technology provides a solution to help connect to the cloud.

To provide customers with a head start, Digi has designed the XBee3 with multiple protocols in Zigbee, 802.15.4 and its own proprietary meshing protocol called Digimesh, which is much leaner than the Zigbee standard and well-suited to a battery-powered network. There are also variants for NB-IoT, LTE CAT-1. The advantage of this is that there's a common form factor on either surface mount or through hole technology devices, so the same PCB footprint can be used for all the different Digi protocols.

To configure, evaluate and optimise an XBee3 communications network, Digi also provides robust tools such as the XCTU XBee configuration tool utility.

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Take control of frequency challenges



Working with an experienced frequency control partner helps address challenging issues like miniaturisation, from project concept through to volume production, explains Geyer Electronic

Electronic components need to fit in ever decreasing spaces, particularly in height restrictive products like smart cards and wearables. Recognising this trend, Geyer Electronic's ultra-slim 1.2 by 1.0 by 0.3mm KX-3T quartz crystals are now available from stock in a variety of frequencies with a standard 10ppm frequency tolerance and a -40 to 85°C operating range.

The KX-3T is the second crystal to benefit from this ultra-slim design, following on from the slightly larger KX-4 device, and Geyer has also reduced the height of its popular KX-327RT miniature real time clock crystal to 0.35mm, almost half of the original 0.6mm height. Further innovation in 2020 continues the miniaturisation trend with the launch of two new TCXOs developed especially for small-space mobile communication applications like W-LAN, ISM, NFT, wireless modules, and IoT.

The KXO-81 measures 2.0 by 1.6 by 0.7mm and comes in frequencies from 13 to 52MHz and a choice of five different input voltages. Smaller still at 1.6 by 1.2 by 0.6mm, the KXO-88 is currently available in a frequency of 26MHz, with other frequencies between 26 and 52MHz coming in the near future.

Long-term delivery

As a manufacturer of frequency products, quartz crystals, oscillators, and ceramic resonators, Geyer Electronic is continually introducing innovative solutions characterised by high quality, creativity, and safety.

The company attaches great importance to close co-operation with customers during the development phase of each project, ensuring it delivers exactly what is required. An extensive library of EDA files is available during a project's initial design phase alongside technical support from Geyer's engineering team. Sample quantities are then available for initial prototypes, followed by pre-production quantities as production increases.

An extensive range at head office in Germany and a small but increasing stock at Geyer UK's office enables fast delivery once a project is established and production schedules are known.

For projects that require volume production overseas, a global sales network guarantees worldwide availability within short delivery times. Kanban and ship to stock ensure the smooth flow of goods where requested and a no-product-discontinuation policy ensures long-term delivery covering the lifetime of the product.

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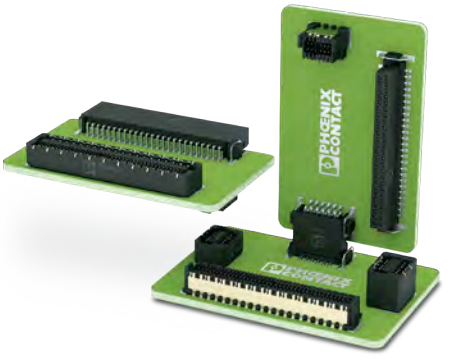




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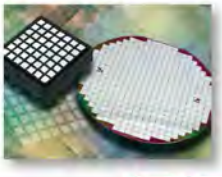
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Getting under the surface – a guide to PCB purchasing

Electronics Sourcing spoke to managing director of Cambridge Circuit Company, Mark Sanford, to get a PCB manufacturer's perspective on the tricky task of buying printed circuit boards

What five factors should purchasers consider when looking for a new or alternative PCB supplier?

1. What experience do they have?

There is no substitute for experience in PCB manufacture. Often working to tight deadlines, PCB purchasers need their boards right first time, so choosing someone with extensive knowledge and experience makes sense. How long has the company been in business, what experience, skills and knowledge have they got and what are their specialisms? This information should be online, but if not, give them a call to find out more.

2. Do they produce PCBs in-house?

You'd be surprised by the amount of PCB suppliers that manufacture little, if any, of their own work, choosing instead to outsource to companies that have the capabilities they lack. This can have implications for the PCB purchaser, who will likely have to wait longer and pay more for their job. Do some research and don't be afraid to ask your supplier exactly who is fulfilling your order.

3. What's their facility like?

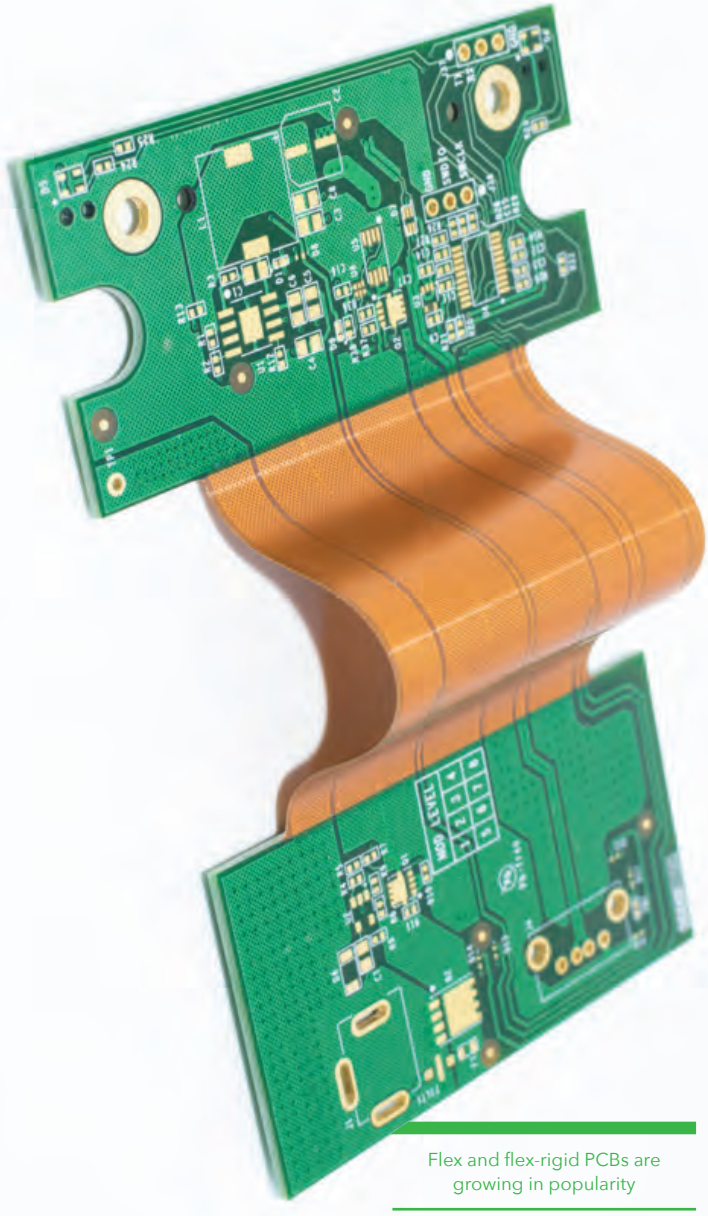
Well-serviced, modern equipment is the holy grail of PCB production. What was impossible, is now possible, and what used to take days, can now take hours or even minutes thanks to production technology advances. Does the manufacturer continually invest in new equipment/technologies? Some manufacturers may offer cheap prices, but if they're not keeping pace with advances and continuing to invest then they're likely to be unsustainable. Ask to have a factory tour—any manufacturer keen for your custom will only be too happy to showcase what they have to offer.

4. Where are they located?

Location is particularly important when working to tight deadlines or in multi-agency situations with PCB designer, manufacturer and assembler working closely together. Are they nearby and have they got reliable delivery methods in place? UK PCB manufacturers are sadly on the decline; faced with unsustainable competition and spiralling costs. Overseas producers can sometimes be cheaper in the short term, but if there are errors or designs need modification after production, it can be a lengthy and costly process to correct them. Overseas PCB manufacture can be valid, notably for large-volume production, but it's best to go through a UK manufacturer who can use their trusted partners and manage the process for you.

Are sustainability and environmental credentials important?

There's no escaping that we're facing a global climate crisis, so sustainability should be at the forefront of everyone's minds, including the PCB purchaser. Check to see if the PCB manufacturer is following an environmental management system, which should govern issues such as environmental



Flex and flex-rigid PCBs are growing in popularity

policy, impact reduction, pollution prevention, legal compliance, corporate responsibility, reputation and resource management. This will provide peace of mind and a clear conscience.

Are global mineral prices increasing the cost of PCBs?

Like most things in this world, costs continue to rise, and unfortunately PCB production isn't immune. Mineral prices continue to fluctuate, as determined by The London Metal Exchange, which is the world centre for industrial metals trading. The price of copper, as the base material, will always have the biggest impact, but we average out mineral costs across the year to ensure our prices remain consistent for the PCB purchaser. One of the biggest costs to the PCB manufacturer however is electricity, and we have to work hard to negotiate the very best price to remain competitive.

What are lead times like in the PCB sector?

Lead times vary widely, depending on the purchaser's budget and deadlines and pivotally on the manufacturer's capabilities. For example, we offer lead times from as little as eight hours as we are a complete in-house PCB manufacturing service and we don't need to outsource. We offer five-day delivery as standard and have also seen an increase in 10-day lead time orders from customers, as this can be more cost efficient.

Have you noticed any purchasing trends?

Flex and flex-rigid PCBs are a growing trend thanks to their advanced capabilities. They're a specialism, so knowledge and experience of the field is key and ensuring your manufacturer understands all types of PCB is the best way to navigate a successful path through PCB purchasing.

What other advice would you give to readers sourcing PCBs?

The best advice I could give any PCB purchaser would be to do your research about manufacturers, both online and through industry publications, and then arrange to meet them. That way you can see their facilities and learn more about their skills, experience and knowledge. Then you'll be able to make informed decisions and hopefully start on a new journey to PCB perfection.

www.cambridge-circuit.co.uk

"We offer lead times from as little as eight hours as we are a complete in-house PCB manufacturing service and we don't need to outsource

Well-serviced, modern equipment is the holy grail of PCB production



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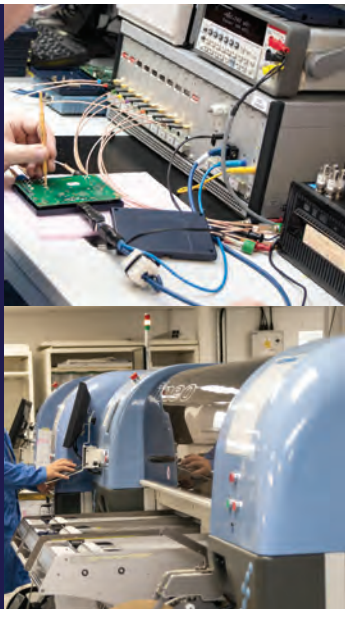
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Buying into sustainability

Sustainability is more than just an environmental focus, explains PCB supplier, NCAB Group. Purchasers should also probe social and economic responsibility when establishing a sustainable supply chain .

In today's ever-changing economic climate, it's important that every business has a sustainable supply chain. It's natural to focus solely on the environment when considering this topic but it is crucial to harmonize three core elements: economic growth, social inclusion and environmental protection. These elements are interconnected, and are all crucial for the well-being of individuals and societies.

The triple bottom line

When evaluating how sustainable a business is, it's important to focus on the triple bottom line concept. This model consists of social equity, economic, and environmental factors and was originally articulated by John Elkington in his 1997 book *Cannibals with Forks: The Triple Bottom Line of 21st Century Business* and later adopted by Shell for their first sustainability report in 1997.

The concept demands that a company's social responsibility lies with stakeholders rather than shareholders. This ensures employees, customers, suppliers, local residents, government agencies, and creditors are invested in, ensuring the future of the company and its environment.

Why prioritise sustainability?

If a business does not focus on all three elements of the triple bottom line, then it impacts the company's environment and its ability to react to marketing conditions is significantly reduced. This is a risk to the company and every business associated with it.

For example, if a company is under pressure to reduce cost and increase profit, they might be inclined to ignore child labour or poor working conditions to achieve lower manufacturing costs and ultimately achieve a higher gross profit.

While this might prove beneficial for their business in the short term, what would happen if employees chose to quit? What would happen if the government changed it strategy? What is the impact of this decision on the local society?

The triple bottom line concept eradicates these risks as each element is considered when any decisions are made. This ultimately improves the culture within an organisation and promotes a more conscious approach to business.

True to this concept, the NCAB Group has been proudly publishing a sustainability report every year since 2014 and has conformed to ISO26000 since 2015. We believe in the triple bottom line concept as we live it every day. It is the reason we can confidently say we will be here in the foreseeable future.

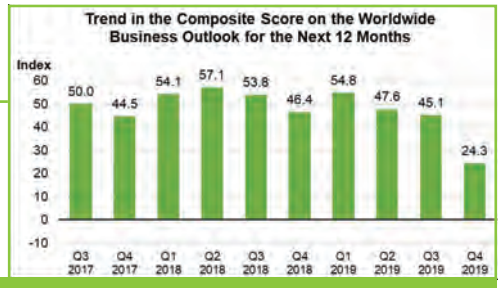
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> **There are several factors that should inform your sustainable supply chain purchasing decisions**



Is your finger on the pulse?

Purchasers keen to stay abreast of supply chain trends should check out the latest IPC 'Pulse of the Electronics Industry' survey in which electronics manufacturers report slowing growth and cautious optimism



Electronics manufacturing growth has a less optimistic outlook than in previous quarters

Electronics manufacturing growth is slowing worldwide with a less optimistic outlook than in previous quarters, although the industry is still generally positive, according to results of the IPC's fourth-quarter 2019 *'Pulse of the Electronics Industry'* survey. Based on responses from 82 companies that make up a representative sample of the industry, global third-quarter 2019 sales growth was at its lowest level since mid-2017, with predicted sales growth for the current quarter down further.

Current-state scores for Europe and the Americas turned negative this quarter. Sales, orders and profit margins are moving in a positive direction on balance, while labor and material costs, ease of recruiting, inventories and order backlogs are having a negative impact.

That said, the industry's expected direction in the next six months remained generally optimistic with all business indicators looking positive. Among the industry segments, PCB fabricators are the most optimistic about the next six months. Overall, the industry expects its health to remain generally good through the first quarter of 2020 despite some slowing.

Looking to the next 12 months, the business outlook is positive in all regions except Asia where the uncertainty of US-China trade relations is contributing to a lackluster 12-month outlook. Generally, respondents ranked economic uncertainty as the leading concern in terms of impact on future business growth. Asked about trends that are increasing costs, respondents predominantly cited the tight labor market and trade conflicts.

Looking to the future, the internet of things and smart systems are seen as the number one growth driver, followed closely by 5G/high-speed communications. Defense and aerospace topped the list of growing vertical markets with medical device and LED lighting also cited.

www.ipc.org



Cracking down on counterfeits



Taking a tough stance on counterfeiting is second nature for distributor, Mouser. With its anti-counterfeit strategy certified to aerospace standards, the company supports purchasers in all sectors to mitigate inventory risk

Authorized global distributor, Mouser Electronics, is rightly proud of its accreditation to AS6496. This is the aerospace industry's exacting standard for anti-counterfeit measures in authorized electronic component distribution—with Mouser enthusiastically claiming its position as the first to receive certification.

The standard sets requirements for the avoidance, detection, mitigation and disposition of counterfeit products in the authorized distribution supply chain. Recognized internationally, the standard requires authorized distributors to have a counterfeit mitigation policy and a counterfeit electronics parts control plan in place. Purchasers looking to reduce the risk of counterfeit electronic parts entering the supply chain can therefore accomplish this by using distributors accredited to AS6496.

Vice president of quality at Mouser, Chuck Amsden, explained: "By becoming accredited to AS6496, Mouser demonstrates that we are committed to providing customers with only authorized, genuine components. From sales to shipping, Mouser is dedicated to providing customers with the right product, on time, every time. Our mission is to be the source most preferred by engineers and buyers to design, prototype, test and manufacture electronics."

Rigorous processes

Despite growing concerns over counterfeit parts entering the supply chain, Mouser customers can order with confidence, knowing that Mouser has rigorous processes in place to prevent counterfeit products from entering its inventory. Over 800 semiconductor and electronic component manufacturers count on Mouser to help them introduce their products into the global marketplace. Purchasers, Mouser states, can expect 100 per cent certified, genuine products that are fully traceable from each manufacturer.

Mouser received the AS6496 accreditation in fall 2018 from the Performance Review Institute, as part of the Counterfeit Avoidance Accreditation Program. The CAAP audit was based on AC7403 audit criteria created jointly by PRI, the Electronic Components Industry Association and aerospace OEM representatives.

CAAP is a cooperative industry effort to mitigate the risk of introducing counterfeit parts into the supply chain, supporting compliance throughout the aviation, space, and defense industries. The program was established to enable organizations like Mouser that purchase components and assemblies to demonstrate that they have systems in place to identify counterfeit products, and to minimize the risks associated with them. CAAP accreditation reassures purchasers of the organizations' vigilance and ability to act appropriately.

Exacting quality control

In addition to AS6496, Mouser is also registered to AS9100D/ISO 9001:2015 and ANSI/ESD S20.20-2014, the industry's gold standards for quality, control, and electrostatic discharge protection. This quality management system adds additional aviation, space and defense industry requirements, including procedures and processes for the prevention of counterfeit parts. Registration to these standards demonstrates a focus on traceability, risk management, process control and documentation.

Mouser Electronics strives to empower innovation among engineers and buyers alike by delivering advanced technologies. In addition to stocking the latest components, the company's website offers advanced search methods to help locate inventory quickly. Data sheets, supplier-specific reference designs, application notes, technical design information, and engineering tools are all online, further encouraging customers to buy with confidence.

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Future safety starts now

As electric vehicles accelerate and autonomous cars evolve, the number of electronic systems on board is set to multiply, yet the safety of next gen cars depends on components sourced today

Whether powered by gas electric, fuel cell electric, diesel electric, Li-ion polymer, or ultra-capacitor engines, electric vehicles are challenging automakers to address higher energy applications. Features such as battery management systems and on-board charging systems already require careful consideration, but with autonomous self-driving vehicles starting to make an appearance on the road, on-board electronics are set to increase.

Emerging automotive protocols

Vehicle connectivity is another area of stimulus, with internet access required to connect devices both inside and outside the car. A range of new protocols are emerging around this technology including: vehicle-to-vehicle (V2V) communications that notify the driver or vehicle to take evasive action when there is the potential for a collision; and vehicle-to-infrastructure (V2I) communications, which could, for example, allow traffic systems to collect data that can be used to control traffic light timing, allowing more efficient traffic flow.

Other emerging protocols include BroadR-Reach technology, which allows multiple in-vehicle systems to access information simultaneously over unshielded single twisted-pair cable; and HDBaseT, which has historically been used in the consumer and high-end A/V market to provide high bandwidth, long-reach capabilities. Now, a new automotive version has been introduced to provide 6Gbps throughput for in-vehicle convergence of high-definition A/V, USB, ethernet, feature controls and power on a single pair of wires.

Ensuring automotive safety

Any automotive modules currently in development must meet the safety and test standards of these latest communication protocols. To help purchasers and designers across the industry meet this remit, TTI is working with supply partner, Littelfuse.

Littelfuse provides circuit protection solutions for a variety of automotive applications such as motor control, lighting, ignition systems, infotainment and navigation systems, e-calls, on board chargers and battery management systems. It also offers solutions for communications systems including LIN and CAN bus, as well as for load dump protection, heating, ventilation and air conditioning and electrical cooling fans.

The company ensures appropriate support for all kinds of automotive systems, by offering a full AEC-Q101 and AEC-Q200 portfolio for automotive circuit protection including: fuses, surface mount reflowable thermal fuses, PPTCs, varistors, ignition IGBT, TVS and diode arrays.

In fact, since its first automotive fuse was invented in 1930, Littelfuse has partnered with many carmakers on circuit protection solutions that have become the industry standard. This means its experts are well-equipped to support customers' projects in accordance with worldwide automotive safety standards.

Its engineers can help purchasers understand which standards apply in terms of both the application itself and the geographical location for which it is designed, as well as offer guidance on how to meet those standards.

Certified circuit protection

To this end, the Littelfuse portfolio offers a broad line of circuit protection devices certified compliant with standards such as the JASO and ISO 7637-2 surge test covering transient surges; ISO 7637-2 standard covering electrical disturbance by conduction and coupling; ISO 10605 standard covering electrical disturbances from electrostatic discharge; and standards relating to load dump, switching transients and ESD threats in the form of SAE J1113; GM 9105, ES-F2af-1316-AA Ford Visteon.

Other areas of expertise focus on electrical component qualification, with expertise on AEC-Q101 failure-mechanism based stress test qualification for discrete semiconductors in automotive applications and AEC-Q200 stress test qualification for passive electrical devices.

By contributing their own experience to the development of new standards, Littelfuse engineers are helping to ensure the safety and reliability of the next generation of automotive circuit protection products.

www.ttieurope.com



Memory IC supply could tighten in the second half

Prices for both DRAM and NAND flash memory should firm this year after declining sharply in 2019

James Carbone

Semiconductor buyers can expect a buyer's market for memory ICs in the first half of 2020, but supply should tighten and prices increase in the second half as demand for DRAM and NAND flash rises.

While price increases will be modest, the market may lean towards being a seller's market in the second half and will be markedly different than the memory IC market 2019, according to industry analysts.

"Last year was a brutal year" for memory IC manufacturers, said Brian Matas, vice president of research for IC Insights. "The total memory market was down 33 per cent. DRAM declined 37 per cent, flash declined 27 per cent," he said. DRAM prices fell 44 per cent, while flash tags dropped 25 per cent compared to 2018.
The decline of the memory IC market in 2019 actually began in 2018 after new capacity was added following two years of robust demand and rising sales. "In 2017 and 2018, DRAM manufacturers were making a killing and prices were rising," said Matas. "They started reinvesting their profits to add new manufacturing capacity and it came online and supply exceeded demand," he said.

Demand cools

At the same time, memory IC demand cooled as fewer servers were ordered for data centers for cloud computing by companies such as Amazon, Facebook, Google, Microsoft. Such servers use a lot of memory and help to drive the overall memory IC market. With weakened demand, prices for both DRAM and NAND flash memory fell.

The good news for DRAM and flash memory manufacturers is that data centers will invest in more servers and storage systems in 2020, which means demand for memory chips will increase. "We're expecting a return to growth in the second half of the year," said Matas. "We are seeing double-digit increases for both DRAM and flash."

He said DRAM revenue will increase 12 per cent to $69.8 billion, while NAND flash sales rise 18 per cent to $53.5 billion. "Both of these are pretty nice turnarounds," said Matas. However increased demand for memory IC probably won't occur until the second year. "It may be a little bit soft in the first half of the year or just perhaps tepid growth," said Matas.

Prices for DRAM will remain soft in the first half and for the total year, but rise in the second half, although for the total year, the average DRAM price will fall about 8 per cent, according to IC Insights. However, flash memory prices should rise about 4 per cent in 2020.

Low prices boost demand

Low prices in the first half of 2020 will boost demand for memory ICs. "We think these low prices are really going to spur unit demand for DRAM and NAND flash because of elasticity of demand," he said. He said prices are very low compared to last year and 2018 so memory is much more affordable. Systems manufacturers will likely decide "to pack their systems with a lot more memory," said Matas.

Servers and mass storage systems for data centers and cloud computing won't be the only drivers for memory ICs in 2020. Demand for memory should also increase for portable computers and next generation smart phones, according to Jeff Janukowicz, research vice

By the Numbers

33%
The rate of decline of the worldwide memory integrated circuit market in 2019. Source: IC Insights

$110.3 billion
The forecasted size of the worldwide global memory IC market in 2020. Source: WSTS

4.1%
The rate of growth of the memory market in 2020. Source: WSTS

$73 billion
The expected size of the worldwide DRAM market in 2020. Source: IHS Markit

$57 billion
The total of NAND flash revenue in 2020. Source: IHS Markit

$188.1 billion
The forecasted size of the global memory IC market in 2024. Source: IC insights

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president for IDC. More portable computers will be equipped with solid-state drives (SSD), which use NAND flash. We are expecting almost a 70 per cent SSD attach rate next year for portables," said Janukowicz. He said lower NAND prices will help drive use of SSD in portable computers.

He said the mobile phone market will also drive memory IC growth in 2020. "That's due to next generation mobile phones and the ramp up of 5G," he said.

Janukowicz noted that 5G is in its early phases of adoption but will grow in 2020 and for several years after. New 5G phones will use more memory than previous generations. Many older phones had been equipped with 8 or 16Gb of memory, but newer 5G phones will have 64Gb of memory or more.

Michael Yang, director of research for researcher IHS Markit, said 5G will deliver more bandwidth, enabling people "to do more with their cell phones." Fifth generation phone technology "will deliver a better gaming experience, a better virtual reality experience, enhance analytics and all of that is going to increase memory consumption," said Yang.

More memory for cars

Another memory driver will be autonomous vehicles. "As cars become smarter, they need more sensors to collect more data and they need more processing power and more DRAM to help process that data and NAND flash for storage," said Yang. As a result, memory IC content in vehicles will increase significantly.

However, Yang points out while memory content in vehicles will rise, automobiles represent a relatively small market compared to computers and smart phones. About 1.8 billion smart phones will ship in a year and about a 250 million PCs are sold each year. Vehicle sales typically total about 100 million annually.

One of the other drivers for memory will be next generation game consoles," said Janukowicz. Both PlayStation and Xbox are scheduled to release next generations of their video game systems and the new consoles will shift away from hard drives to SSD which will "help boost demand for NAND flash," he said.

While memory IC demand will increase in 2020, the bad news for buyers is there will be cutbacks in capital expenditures for new capacity. "The challenges that the industry experienced in 2019 resulted in some lower production plans for 2020 and reductions in capital spending," said Janukowicz. "That will bring the market a little bit more back into balance." As a result, prices should firm or even rise a bit.

"In fact, with NAND we are already beginning to see the market firm up. "We are expecting price increases" in the first quarter, he said.

In addition to overall memory IC cutbacks which will limit memory capacity growth, a fire and a power outage at two memory IC fabs could also end up crimping supply in the short term.

"There was a fire at a Kioxia (formerly Toshiba) plant and a power outage at a Samsung fab," said Janukowicz. Those events have created "some uncertainty in the NAND market."

Production disrupted

Production of DRAM and NAND at Samsung's fab in Hwaseong, South Korea was stopped due to the outage, which was caused by an explosion at a local substation. While the outage only lasted about a minute, it was unclear how many wafers were in process at the time and how many of them were damaged.

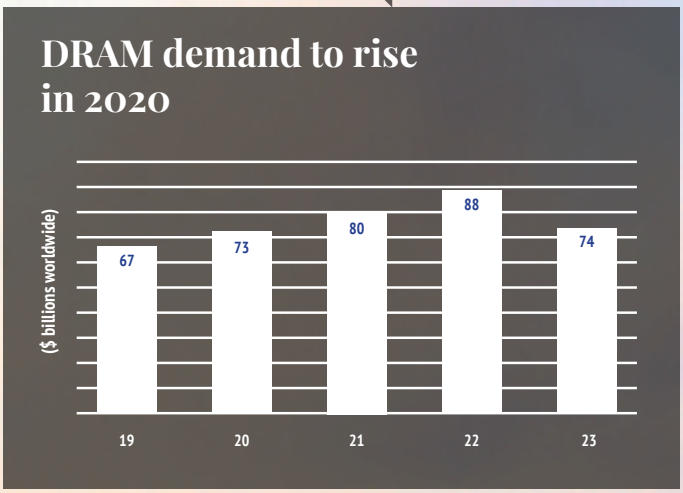
Production was also disrupted by a fire at Kioxia fab in Japan and would likely lead to price increases in the first quarter. The fab makes 64-layer and 96-layer, 3D NAND flash.

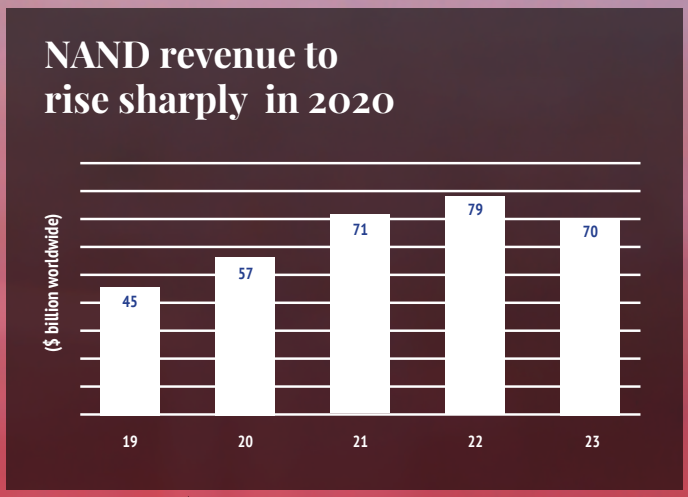
Because of the fire and outage and overall capex cutbacks, "we expect pricing to remain volatile through the first half of this year and some price increases to come along with that," said Janukowicz.

Some memory IC buyers may be heartened by the fact that two Chinese companies are expected to begin volume production of DRAM and NAND in 2020, which eventually could boost supply in the longer term. China's CMXT will produce some DRAM and YMTC will build NAND flash.

Both will start volume production in 2020 but probably won't be a factor in the memory market until 2021, according to Janukowicz. "It takes some time for their products to ramp. But China remains committed to being a memory provider and becoming a larger player," he said.

Worldwide sales revenue for DRAM will increase from $67 billion in 2019-$73 billion in 2020. Source: IHS Markit





After declining 25 per cent in 2019, NAND flash memory rep will rise from $45 billion last year to $57 billion in 2020 because of increasing demand and higher prices.Source: IHS Markit

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The event also provides a great opportunity to expand your expertise with the complimentary seminar programme always a popular feature. Two programmes will run in tandem this year, aimed at manufacturing and electronics respectively. Themes such as technology, innovation, business management, marketing and a review of present industrial law and regulations will help delegates stay abreast of the latest issues.

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At the heart of the show are its exhibitors; there to support and simplify component selection. Several major distributors are present this year including WDS Component Parts, Optimas Components, Midas Electronics, Wurth Electronics UK, Schurter Electronics and Transfer Multisort Elektronik. Easby Electronics, Delta Impact and Rebound Electronics—all part of UK component vendor Rebound Group—will have a significant presence at the 2020 event. Other notable names include, for the first time, Austria's CODICO, G English Electronics and Selwyn Electronics, UK distributor of ODU Connectors, amongst many others.

New product highlights include the R360D rotary position sensor and CANbus LVDT from RDP Electronics, a new range of LoRa long range radio modules and off-the-shelf products from RF Solutions. There are also numerous new products from BT2000 including PCTEL performance critical antennas, portable RF telecom scanners and interference locating systems, AMR magnetometer ICs, Vinatech supercapacitors and carbon solutions for fuel cells.

Specialist parts include optoelectronic components and systems from Japanese firm Hamamatsu Photonics,

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> which will showcase a range of products including x-ray cameras and sources for NDT plus light measuring devices for LiDAR applications. Connector manufacturers exhibiting include Binder, Yamaichi Electronics, Coax Connectors and Lemo UK. E-tec will also be showing a range of interconnect solutions for the first time. Products include high-reliability IPX7 rated wire-to-wire waterproof connectors, available in 2mm pitch with two, three or four contacts.

Production purchasing

Purchasers looking for subcontract service providers will have plenty of choice with a broad range of expertise available from electronics design, EMC testing and PCB assembly, right the way through to full contract manufacturing support. A selection of the exhibitors that purchasers can meet include Bytesnap Design, Heber, JJS Manufacturing, Merlin PCB, European Circuits, Hammond Manufacturing, Corintech and several others. Off-shore firms exhibiting include Latvian CEMS, Volburg SIA, Shenzhen X-Mulong Circuit and MV Circuit Technology.

Along with manufacturing services, the exhibition is also an important marketplace for production components. Advanced Manufacturing Systems will be exhibiting the Neoden4 pick and place machine featuring a placement rate of 10,000cph, fiducial/camera alignment and electronic feeders. Blundell Production Equipment returns in 2020 with its proprietary wave soldering and solder recover machines, together with solutions from Yamaha, Fritsch, Kurtz Ersa and IBL. Amongst other systems, it will introduce the i-Pulse Yamaha M20 auto-placement machines.

Other noteworthy highlights include VisionAid, which will launch a range of Scandinavian digital magnifiers, microscopes and inspection solutions said to offer superior optics with advanced features including precise measurement, focus stacking, overlay, image and video capture. Others exhibiting for 2020 include PACE Europe, Purex, Turner Electronics and test fixture specialist Yelo.

Easy access

Farnborough International Conference and Exhibition Centre provides free car parking for 3,500 vehicles and is well-served by road and public transport links. A regular free shuttle bus service runs from both of Farnborough's mainline railway stations straight to the exhibition. The venue itself features various amenities including a free WiFi service and high quality food and drink franchises.

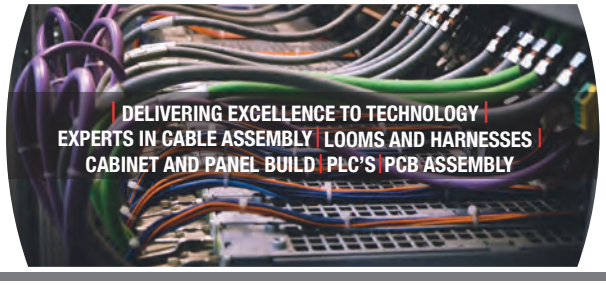
Southern Manufacturing and Electronics 2020 opens from February 11 to 13. Admission to the event is free of charge.

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Along with manufacturing services, the exhibition is also an important marketplace for production components

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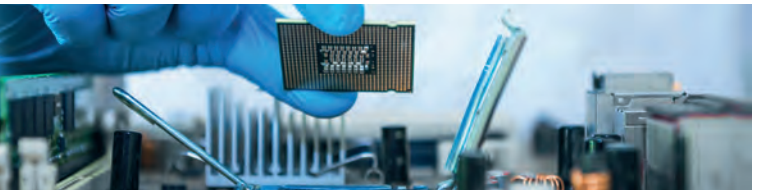


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Ramping up reliability

Discover how to optimise quality and reliability for full-scale electronics manufacture by meeting with the Corintech team at Southern Manufacturing

With services ranging from initial-concept design support, right up to end-production, Corintech's aim is to be as flexible as possible in meeting customers' needs. This year, visitors to stand D165 can expect to take advantage of the company's expert electronics manufacturing advice, with particular emphasis on PCB assembly for full-scale production.

PCB assembly services have been at the core of Corintech's business for over 40 years. Specialisms include pick and place of surface mount components, including 01005 and μBGAs, and automated conventional through hole soldering. Other services include serialisation and barcoding for full traceability, conformal coating and encapsulation, and wire bonding. Assembly can be carried out using a range of substrates including FR4, T-clad, steel and ceramic, with Corintech providing thick film hybrid circuits that use ceramic substrates to offer increased reliability and durability in extreme conditions.

Whatever the service, Corintech understands that quality is paramount, especially when manufacturing in high volume. The company works in accordance with AS9100 and ISO 9001 quality accreditations and continually invests in the latest technology and machinery. In addition, every customer is assigned a dedicated account manager to ensure that they continuously receive specialist support.

Meet with the team on stand D165 to discuss how your end-production can function seamlessly and guarantee the highest level of quality.

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Cut the cost of logo lighting

Multitron is offering a new module from Mentor designed to provide area lighting for logos, symbols and text. The module, which is available ex-stock with low minimum order quantities, is said to provide even illumination with a single RGB LED, offering an infinite range of backlight colours.

Using a single LED makes the module a cost-effective way of transforming a product in applications such as status indication, instructive text and multiple branding. The flat panel design provides homogeneous illumination over an area of 50 by 16mm with four printing options and six mounting options.

For illustration and test purposes, a sample version with a logo already printed on the diffusor is available from stock. Samples with customer-specific printing can also be provided at a cost, which will be credited against the first production-volume order. Further custom modifications include a larger lighting area, different wire gauges and connector options as well as custom shapes such as circle, ellipsis, triangle, sickle, and freeform.

The overall size of the standard module is 80 by 31mm with a depth of 5.5mm.

www.multitron.co.uk



USB Type-C assemblies in stock

Stewart Connector, a Bel group company, has added USB Type-C cable assemblies to its range, which already includes the USB Type-A, Type-B and micro/mini-B cable assembly family.

The company's USB cable assemblies are designed to support data speeds up to 480Mbps for USB 2.0, 5Gbps for USB 3.0 and 10Gbps for USB 3.1. Assemblies include a shielded cable design that allows for high-speed data transfer with an over moulded strain relief feature providing protection to the cable and reducing strain on the conductors.

Stewart's new USB Type-C cable assemblies utilize USB Type-C male plugs on one end and an option of USB Type-A or USB Micro-B on the other. This makes them ideal for a range of applications including internet of things and point of sale equipment as well as consumer products including laptops, gaming systems and cell phones.

www.belfuse.com



Opt for an enclosure with smart mounting options

Enclosures manufacturer, CamdenBoss is kicking off the new year with an addition to its range designed to provide multiple wall-mount options for maximum versatility



Enclosures are available in one size and three colour options

The new 1500 Series Universal Smart Enclosure features 45deg angles for optimum mounting flexibility. The enclosure is available in one size and three colour options: black, white and grey. It can also be supplied with a solid or vented base, making the 1500 series ideal for applications such as room sensors, access control, lighting management or smart temperature devices.

Moulded in a UL94-V0 material, the 1500 series comes with a top cover featuring a recess for overlays, keypad membranes or digital printing, along with a base that can be attached with a single screw for quick and easy assembly. Both halves are equipped with multiple mounting bosses at different levels to provide plenty of options when positioning PCBs.

In order to achieve maximum mounting flexibility, the corners of the base have been cut to leave 45deg angles, adding two more usable faces to the enclosure. This increases the diversity of potential applications as, with the use of a mounting bracket, the enclosure can be used in a corner mounting orientation. In some circumstances 90deg walls cannot be guaranteed and this creates problems, however, the 1500 series can be mounted on irregular walls without hassle. In addition to corner mounting, the 45deg mounting style also opens up avenues for tilted door entry systems such as keypads and biometrics or mounted above a door for motion entry.

Sold primarily as a kit with all the necessary components to get started, including the 45deg bracket and screws, CamdenBoss is on hand to help customers get the most out of this enclosure. In-house customisation such as digital printing, CNC cutting and coatings are available where required. Ongoing support in the form of informative videos also highlight the various features delivered by the 1500 series.

Information can also be found on the dedicated 1500 web page or on individual SKU pages. Alternatively, the CamdenBoss sales team are on hand to discuss any enquiries.

www.camdenboss.com



Blow away energy worries

Energy and space saving miniature blowers will pay for themselves in reduced energy consumption in just months, explains Micronel

At this year's *Southern Manufacturing*, Micronel will once again be showcasing its latest range of miniature DC blowers aimed at a variety of electronic, industrial and process control, pressure or suction/vacuum applications.

With climate change and energy reduction a hot topic, the U100HL blower will prove interesting to many purchasers. It provides an energy and space saving alternative to bulky and power-hungry side channel blowers and centralised compressed air systems. Its 24V DC 200W brushless DC motor uses less than a tenth of the power of larger and bulkier side channel blowers, which typically use over 2kW of energy. U100HL also boasts much lower running costs when compared to costly compressed air, which is one of the most expensive forms of energy in a plant. In most applications, the U100HL blower will pay for itself after only a few months of operation through reduced electricity costs.

In addition to this high efficiency solution, Micronel offers a variety of high performance blower and fan products that meet the needs of industries with special performance characteristics. Supported sectors include medical, electronics cooling, personal protection, packaging, gas analysis, laboratory, transportation, process control, industrial and many more applications.

To meet these needs, Micronel offers a wide choice of standard ultra-slim fans, axial fans and high performance, high pressure radial blowers from UK stock, as well as providing technical design support for modified products and client specific designs.

www.micronel.com



The U100HL blower will pay for itself after only a few months of operation through reduced electricity costs

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Take control of safety

EAO has introduced a new series of ruggedised CAN bus keypads and rotary cursor controller joystick modules designed to meet the safety needs of ultra-demanding applications such as construction and agricultural equipment and vehicles.

Announcing availability of pre-production samples of the new Series 09 devices, marketing manager at EAO, Robert Davies, said "The system itself monitors whether the safety-related function is working properly and if a function error does occur, promptly informs the operator."

Available as a six-button or as a two-button module with joystick, all Series 09 CAN bus devices share the same physical footprint. They require an ultra-low back panel depth and can be installed in either the vertical or horizonal plane. With electronic and mechanical actuators and indicators built for the utmost reliability, modules in the series conform with EN ISO 13849 PLD and ISO 26262 ASIL B functional safety standards. These IP67 protected modules will work reliably at operating temperatures between -40 and 85°C.

According to Davies, equipment operators will benefit from the excellent visual and tactile feedback delivered by the new keypad design, with night visibility further ensured by a configurable four-segment LED halo button illumination.

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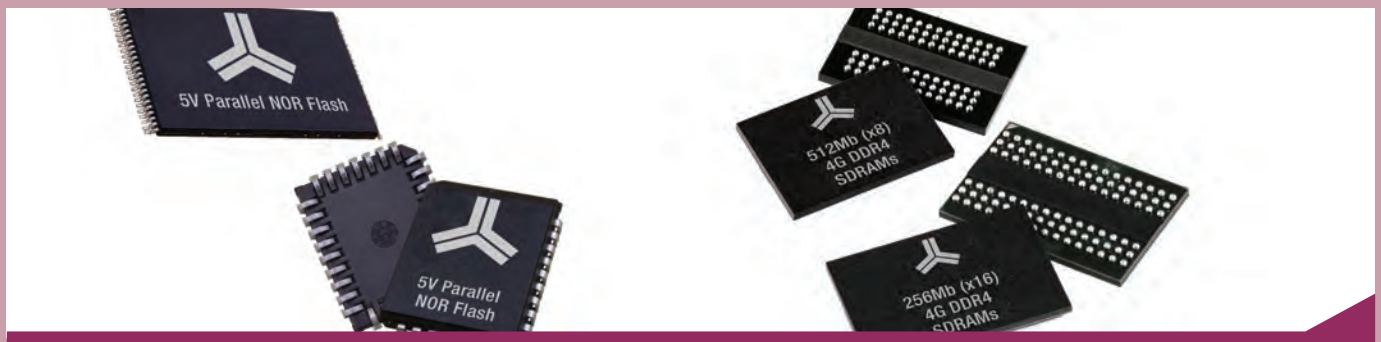
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Discover long-term memory solutions

Following its inaugural appearance at *Embedded World* last year, Alliance Memory returns to Nuremberg in 2020 to highlight its SRAM, pseudo SRAM, NOR Flash, and DRAM memory ICs for embedded platforms. Addressing both legacy and new designs in industrial, automotive, medical, communications, telecom, and consumer electronics, Alliance Memory will exhibit a range of products of interest to European purchasers.

New products on display from Alliance Memory include a line of high-speed CMOS DDR4 SDRAMs, said to offer improved performance over previous-generation DDR3 devices. The 4Gb AS4C256M16D4 and AS4C512M8D4 boast lower power consumption and faster data transfer rates in 96-ball and 78-ball fine pitch BGA packages respectively.

Also on show will be a new line of 5V parallel NOR Flash memory solutions. Available in boot and uniform sectored architectures, these new memory products offer reliable, long-term performance for embedded systems. Available in densities from 1M to 16M, the devices offer access times of 55ns for high-performance applications like digital still cameras, in addition to process-intensive networking routers and switches, home gateways, set-top boxes, automotive infotainment systems, industrial robotics, and medical electronics.

Finally, purchasers of Micron's 8G DDR3L SDRAMs will be interested to know that MT41K512M16HA-125 IT:A devices are now available from Alliance Memory. The last time buy date for this part was January 13, 2019, however, buyers can now purchase the same device from Alliance Memory under part number AS4C512M16D3L-12BIN. This is one of three Micron DDR3L SDRAMs for which Alliance Memory is offering identical replacements. In addition, Alliance Memory is offering several Micron Technologies DDR3L SDRAMs under their original part numbers.

As a supplier of legacy memory ICs, Alliance Memory distinguishes itself by providing long-term support for end-of-life components and by minimising or eliminating die shrinks.

Hall 3, Stand 318
www.alliancememory.com

Full speed ahead for autonomous vehicle development

At *Embedded World 2020*, 25 to 27 February, Real-Time Innovations will present its connectivity solution for autonomous systems, focusing specifically on its new automotive-grade connectivity solution, Connext Drive.

Designed to accelerate the development, deployment and management of highly autonomous systems, RTI's connectivity software, Connext DDS, is based on the Data Distribution Service standard. The framework manages complex data distribution for real-time, scalable connectivity across platforms and systems. It is said to deliver optimised data processing, easier system integration, enhanced performance, simplified data recording, security and platform support. For example, Connext DDS provides the ability to integrate OPC Unified Architecture into DDS systems and run DDS with the emerging IEEE TSN set of standards. RTI will present a standardised OPC UA/DDS gateway at the booth.

Targeted squarely at autonomous vehicle development, Connext Drive offers automakers the software they need to operate in diverse real-time environments, to interoperate with other systems within the vehicle, connect to off-vehicle systems, evolve systems over time, and build in security. It includes a software framework and a native software development kit for developing and integrating vehicle applications. Users can implement data-centric connectivity that offers a virtual distributed shared memory.

Connext Drive is claimed to be the first platform that can integrate DDS, ROS2, AUTOSAR Classic, and AUTOSAR Adaptive, letting OEMs work with the standard or standards that best meet their needs at different points in the innovation cycle.

Hall 4, Stand 471
www.rti.com



Buyers can expect tighter supply, higher prices for MLCCs in the second half of 2020

The good news is that supply conditions will not worsen to 2018 levels when many multilayer ceramic capacitors went on allocation

Purchasers can expect supply of multiplayer ceramic capacitors (MLCCs) to be ample in the first half of the year, but supply will likely tighten and lead times could stretch in the third and fourth quarters as demand builds through the year, according to component manufacturers and distributors.

Some industry analysts say supply could even tighten before the second half because higher-than-usual inventory levels are being worked off and demand from key market segments such as smart phones and automotive is expected to rise. Some distributors say there is a possibility of allocations for some parts later in the year, but the MLCC supply scenario won't devolve into 2018 levels when lead times time stretched to 30+ weeks and parts were on allocation.

Capacitor manufacturers have been adding capacity since 2017 and, while lead times for many parts could stretch, allocations for most parts, are not likely. However, it is unclear what the MLCC scenario will be and if buying conditions will turn from being a buyer's market to a seller's market. One thing is for sure. The MLCC market will be different in 2020 than it was in 2019.

Last year was 'a correction' year for MLCCs, said Roberto Salazar, business manager for capacitor manufacturer AVX when there were fewer orders placed with MLCC manufacturers. "It's hard to say how much underlying demand grew last year because of high inventory levels that we had to deal with as a result of the shortage of 2018," said Salazar.

When the shortage hit, manufacturers increased prices after years of falling to flat tags. Capacitor manufacturers took some of their new-found profits and invested in new capacity to boost supply. For instance, AVX bought new equipment for its capacitor factories and built a new facility for MLCCs, said Salazar.

However, as capacity began to come online, many companies had built up inventories and fewer orders were placed for MLCCs in 2019 with component manufacturers and distributors.

MLCC usage increased

Salazar said AVX shipped fewer MLCCs in 2019 than 2018, "but we feel the actual usage of MLCCs actually grew." The parts that were used were from inventories at OEMs, EMS providers and distributors.

He said that in 2018, because of tight supply and allocations, buyers at many companies ordered large number of parts that they did not need. Rather than return the components, they held onto them and slowly worked through inventory in 2019.

Usually, OEMs and EMS providers "keep lean inventories," said Salazar. However, because there was an unprecedented shortage of MLCCs, companies built up their inventory so they had the parts on hands rather than risk a line shut down over a part that costs less than a penny.

A lot of the inventory in the supply chain has been worked off, but some buyers say inventory levels are still higher than normal for some components including MLCCs. Capacitor makers and distributors say inventory levels should be mostly depleted by the end of the first half and demand should pick up through the year. Some distributors say they are already seeing increased orders.

"Going into 2020, the global MLCC market business is starting to heat up and we're seeing examples of how the 2020 market will become more robust due to increased global demand, particularly in smaller case size MLCCs used in communications applications," said Jeff Ray, vice president of product and supplier marketing for TTI. While MLCC demand is increasing, pricing has remained flat, according to Ray. "Manufacturers have been slow to react to price corrections during the 2019 lull period, likely due to foreseeable near-term upticks in the overall market," he said.

While lead times for most MLCCs have been reduced "across the board," some have started to inch upward because of increased demand in the Asian communications sector, according to Ray.

He said many MLCC manufacturers added capacity in 2018 and 2019, but some reduced their workforces due



Jeff Ray, vice president of product and supplier marketing for **TTI**

Going into 2020, the global MLCC market business is starting to heat up and we're seeing examples of how the 2020 market will become more robust due to increased global demand, particularly in smaller case size MLCCs used in communications applications

to lower market demand and lead times for some MLCCs in 0201 and 0402 cases sizes have seen increased lead times. While larger case size MLCC lead times are still extended, they have been stable over several quarters, according to Ray.

Lead times will stretch

He added that MLCC demand will increase in the second half and lead times for MLCCs could stretch.

Some capacitor manufacturers and distributors think strong demand for MLCCs could kick in later in the second half and continue through 2021 because OEMs and EMS providers cut back on purchases last year because of high inventories. In addition, MLCC demand is likely to increase from key large volume customer segments including smart phones and automotive systems.

The return of robust demand for MLCCs could mean allocations in late 2020 once inventories are worked through and companies need to buy more parts including MLCCs in the second half.

"MLCCs will be a problem as we go through the year," said Mark Burr-Lonnon, senior vice president, Europe, Middle East, Asia and global service at Mouser Electronics. " It's going to be a messy year" for MLCCs, he said. Business will be relatively flat in the first half but I think in the third and fourth quarters allocations will hit. "Most people are thinking there will be some type of allocation of MLCCs at some point in 2020," said Burr-Lonnon.

He said many MLCC manufacturers added capacity in 2018 and 2019, but some reduced their workforces due to lower market demand and lead times for some MLCCs in 0201 and 0402 cases sizes increased. Mobile phone service providers are building out 5G networks and consumer demand for new 5G handsets will likely increase towards the end of the year. Industry analysts say many consumers have been holding off upgrading their phones until 5G networks are widely available. Once 5G handset demand builds, there will be a surge in demand for MLCCs. Each handset has hundreds of MLCCs. In fact, the iPhone X has 1,000 MLCCs.

The automotive industry is also a huge user of MLCCs. As more and more car models are equipped with more sophisticated electronic systems such as advanced driver assistance systems, demand for MLCCs from automakers will rise. The traditional gasoline powered car has about 2,000 MLCCs, while high-end electric vehicle may use 10,000 MLCCs.

Automotive accounts for 25 to 30 per cent of MLCC business for some capacitor manufacturers. Demand for MLCCs will also grow from aerospace and defense, electronics, industrial IoT, consumer electronics, smart homes and buildings, and smart manufacturing facilities, according to researcher Frost & Sullivan. In fact, Frost Sullivan says the number of MLCCs is increasing significantly in every electronics application segment.

Will capacity be added?

While demand for MLCCs will rise, it does not necessarily mean that component manufacturers will be aggressive about adding new capacity to meet rising demand. Capacitor manufacturers are careful about boosting capacity because of the capital cost, the researcher said.

When capacitor manufacturers do decide to increase production capacity, most will invest in manufacturing facilities that make capacitors in small case sizes rather than larger sizes. Larger case sizes are often used in equipment that has very long lifecycles such as industrial equipment. Demand is much stronger for smaller case size MLCCs used in smart phones and consumer electronics equipment.

In the first half of 2020, it is not likely that new capacity will be needed for large case size capacitors. Dave Valletta, executive vice president of worldwide sales for Vishay Intertechnology, said demand for MLCCs in larger case sizes has held up "fairly well, but as the new year began there was still inventory in the supply chain that built up in 2019. Vishay only makes MLCCs in larger case sizes including as 0603, 0805, 1206, 1812, 1825, 2225 and 3640.

MLCC case sizes can range from 008004 to 6560. Typically, small case sizes are 0402 and smaller, while larger sizes will be 0603 and greater. A case size of 0402 measures .04 inches by .02 inches.

Valletta says many capacitor manufacturers have stopped making larger case sizes because "when you're a major commodity producer it just doesn't make sense to invest in smaller product lines." He added that large case size MLCCs are a "healthy niche" business for Vishay.

Valletta said that while many capacitor manufacturers have exited the large case size MLCC business, there will always be demand for them. Large case size MLCCs are used in equipment that has long lifecycles such as medical, telecommunications, and industrial equipment.

"When you need a more stable dielectric and higher voltage rating with a decent capacitance, a larger size ceramic will always be needed," he said.

No serious issues

Valletta said he did not expect any serious supply issues with MLCCs in larger case sizes in 2020. "We will



Roberto Salazar, business manager for capacitor manufacturer **AVX**

> **Demand for MLCCs in larger case sizes has held up fairly well, but as the new year began there was still inventory in the supply chain that built up in 2019**

see continued inventory depletion in the first quarter and the market will pick up a little bit," he said.

AVX is another capacitor manufacturer that builds MLCCs in larger case sizes, although it also makes small case size capacitors as well. "We offer the entire range of capacitors," said Salazar. "We recognize that there are a lot of requirements out there for smaller case sizes and smaller voltages and we make them as well," he said.

However, the "sweet spot" for AVX's business is with three markets: automotive, industrial and networking infrastructure equipment although it also services defense, aerospace, medical OEMs.

Networking infrastructure and industrial equipment needs MLCCs in larger case sizes. "They have certain voltage requirements that need to be met and higher voltage than consumer voltages," said Salazar. Salazar said automotive is the fastest-growing market for MLCCs as the number of MLCCs in vehicles continues to rise exponentially because more vehicles are equipped with sophisticated infotainment and safety systems. Autonomous cars and electric vehicles will also contribute to MLCC demand. Electric cars in the future will have thousands of MLCCs so even if vehicle sales stay flat, demand for MLCCs by automakers will continue to rise.

In the long term, the biggest driver for MLCC growth will be 5G technology, said Salazar. MLCCs are used in 5G infrastructure and handsets, but the technology will result in new products being designed and built that will take advantage of 5G's bandwidth and speed. Salazar said AVX's supplies MLCCs for 5G networks, but "we have only scratched the surface with 5G."

Salazar said besides 5G, buyers should keep apprised of the miniaturization trend with MLCCs. While miniaturization is not new in the electronics industry, the size of MLCCs continues to shrink as capacitor manufacturers find ways to deliver more functionality in a smaller package.

"From a manufacturing standpoint if you downsize it is more efficient because you make more parts with the same resources. There are marketable incentives to downsize," said Salazar.

But there are challenges for customers with miniaturization. OEMs and EMS providers often "don't have the ability to place such small parts on boards because the parts can't be seen naked eye" he said.

> **It's hard to say how much underlying demand grew last year because of high inventory levels that we had to deal with as a result of the shortage of 2018**

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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	5,000	N/A	£0	58%	50	1,500+	Y
EPCOS/TDK	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	5,000	N/A	£0	58%	50	1,500+	Y
Littelfuse	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	35,000	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
FREQUENCY MANAGEMENT											
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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
Geyer Quartz Technology	Geyer Electronic UK Ltd	01794 329341	www.geyer-electronic.com	N	N/A	N/A	£0	100%	6	50+	Y
Golledge Electronics Ltd	Golledge Electronics Ltd	01460 256 100	www.golledge.com	N	N/A	£800,000	£0	100%	3	24	Y
Jauch Quartz	Digi-Key Electronics	0800 587 0991	www.digikey.co.uk	Y	500	£250,000	0	100	15	130	Y
HEATSINKS											
Aavid	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	700	N/A	£0	67%	50	1,500+	Y

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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
Cirrus Logic	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	300	N/A	£0	80.00%	50	1,500+	Y
Cypress Semiconductor	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	1,400	N/A	£0	63.00%	50	1,500+	Y
Diodes Incorporated	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	1,600	N/A	£0	98%	50	1,500+	Y
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Fairchild Semiconductor	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	2,500	N/A	£0	90.00%	50	1,500+	Y
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FTDI	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	100	N/A	£0	97%	50	1,500+	Y
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Intel	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	500	N/A	£0	78%	50	1,500+	Y
International Rectifier	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	600	N/A	£0	87.00%	50	1,500+	Y
Intersil	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	1,900	N/A	£0	50.00%	50	1,500+	Y
ISSI	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	700	N/A	£0	98.00%	50	1,500+	Y
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Maxim Integrated	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	11,200	N/A	£0	67.00%	50	1,500+	Y
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Microsemi	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	400	N/A	£0	90%	50	1,500+	Y
Monolithic Power Systems (MPS)	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	600	N/A	£0	40%	50	1,500+	Y
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Texas Instruments	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	36,900	N/A	£0	41%	50	1,500+	Y
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Positronic	Lane Electronics	01403 790661	www.fclane.com	Y	N/A	N/A	N/A	N/A	N/A	N/A	Y
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OBSOLESCENCE / HARD TO FIND											
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Rochester Electronics	Rochester Electronics	+44.1480.408400	www.rocelec.com	Y	299	N/A	$250		10	400+	Y
	SeSemi Electronics LTD	01264 731009	www.sesemi.co.uk	Y	2800	N/A	£100		3	12	Y
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Taiyo Yuden	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	6,400	N/A	£0	82%	50	1,500+	Y
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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
Wurth 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
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Cincon	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	5,500	N/A	£0	60%	50	1,500+	Y
Cosel	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	11,800	N/A	£0	99%	50	1,500+	Y
CUI Inc.	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	3,900	N/A	£0	100%	50	1,500+	Y
FRIWO Gerätebau GmbH	Haredata Electronics	01423 796240	www.haredata.co.uk	Y	250 - 500	€1M	£250	100%	7	14	Y
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
Freescale Semiconductor	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	1,000	N/A	£0	66%	50	1,500+	Y
Honeywell	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	15,500	N/A	£0	80%	50	1,500+	Y
Maxim Integrated	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	900	N/A	£0	N/A	50	1,500+	Y
Melexis	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	700	N/A	£0	N/A	50	1,500+	Y
Omron	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	5,700	N/A	£0	N/A	50	1,500+	Y

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
Sensirion	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	100	N/A	£0	N/A	50	1,500+	Y
TE Connectivity	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	1,100	N/A	£0	N/A	50	1,500+	Y
SWITCHES & KEYBOARDS											
ALPS	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	400	N/A	£0	70.00%	50	1,500+	Y
Apem	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	700	N/A	£0	96%	50	1,500+	Y
C&K Components	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	1,500	N/A	£0	84%	50	1,500+	Y
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	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	400	N/A	£0	84.00%	50	1,500+	Y
Honeywell	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	700	N/A	£0	98%	50	1,500+	Y
NKK Switches	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	1,100	N/A	£0	94%	50	1,500+	Y
Omron	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	900	N/A	£0	68%	50	1,500+	Y
TE Connectivity	Mouser Electronics	0044 (0)1494-467490	www.mouser.co.uk	Y	400	N/A	£0	98%	50	1,500+	Y
TERMINAL BLOCKS											
Marathon Special Products	Global Supply Services	01904 436 488	www.global-supply-services.com	Y	8,000	£800,000	£100	100%	3	11	Y
THERMAL MANAGEMENT											
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	4,300	£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
Challenger Solutions Ltd	01245 325252	www.challengersolutions.com	£8m	Essex/SE	95	7	AS9100 Rev D, ISO9001:2015, ISO 140001:2015, UL , CCC, IPC-610-G Class 3	Y	Y	Y	Y	Y	Y
CML Innovative Technologies (uk) Ltd	01284 714700	www.cml-it.com	£12M	UK/EU/China	65		ISO9001, TS16949, UL ISO9001 2015, IATF 16949 2016	N	Y	Y	Y	Y	Y
Corintech Ltd	+44 (0)1425 655655	www.corintech.com	£11m	UK & Far East	72	3	AS9100, ISO9001, IPC-A-610 Class 3, J-STD-001	Y	Y	Y	Y	Y	Y
Custom Interconnect Ltd	01264 321321	www.cil-uk.co.uk	£18.6m	Andover (Hampshire)	130	6	AS9100 ISO13485 ISO9001 IPC-A-610 Class 3	Y	Y	Y	Y	Y	Y
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
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.etluk.co.uk	£3.5m	SE	55	2	AS9100, ISO9001, ISO14001, 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
FermionX Ltd	+44(0)1903 524600	www.fermionx.com	£5m	Worthing, W. Sussex	40	4	ISO9001:2015, ISO14001:2015, IPC 610 A Class 2 & 3	Y	Y	Y	Y	Y	Y
G&B Electronic Designs Ltd	01420 474188	www.gandbelectronics.co.uk	£4.2m	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 449080	www.iconelectronics.co.uk	£6.5m	Hampshire & Yorkshire	70	5	AS9100, ISO9001, BS EN ISO/IEC 80079-34:2018 ATEX, IPC-A-610 Class 3	Y	Y	Y	Y	Y	Y
Industrial Electonic Wiring Ltd.	+44(0)1793 694033	www.iew.co.uk	£5.5m	Swindon, UK	60	N/A	ISO9001:2015, IPC610, IPC620	N	Y	Y	N	Y	Y
Jaltek	01582578170	jaltek.com	£10m	UK	90	3	AS9100, ISO9001, ISO13485, IPC-A-610 Class 3, Certified IPC Trainer (IPC-A-610, J-STD-001 & J-STD-001 Space Addendum)	Y	Y	Y	Y	Y	Y
JJS Manufacturing Ltd	01455 555500	www.jjsmanufacturing.com	£35m	Bedford, Lutterworth, (CZ)	420	3	ISO9001:2015, ISO14001:2015, IPC 610 A class 2&3	Y	Y	Y	Y	Y	Y
Key-Tech Electronic Systems	01592 597711	www.key-tech.co.uk	£5m	Scotland	65	2	ISO9001:2015, J-STD-001, IPC-610/620 CLASS 3, IPC-7711,	Y	Y	Y	N	Y	Y
Nemco Limited	01438 346600	www.nemco.co.uk	£15.9m	SE	120	6	AS9100, ISO9001:2008, IPC610/620 to Class 3, ISO14001-2004, SC21	Y	Y	Y	Y	Y	Y
Speedboard part of NOTE	01753 746700	www.speedboard.co.uk	£115m	UK/EU/China	1,050	18	IPC610 to Class 3, ISO9001:2015, 13485, 14001, 18001	Y	Y	Y	Y	Y	Y
M-TEK (Assembly) Ltd	01189 455377	www.mtek.co.uk	£2.4m	SE	30	4	ISO9001-2008/IPC-A-610 Class 3/WHMA-620/ISO14001-2004/ IPC-7711/7721	Y	Y	Y	Y	Y	Y
Pektron	01332 832424	www.pektron.com	£50m	E-Midlands	350	8	ISO9001, ISO14001, TS16949, BEAB, VCA, TUV, UL	Y	Y	Y	Y	Y	Y
Protronix EMS	01582 418490	www.protronix.co.uk	£2.5m	Luton	10	2	ISO9001:2015, IPC-A610 Class 3	Y	Y	Y	Y	Y	Y
Season Electronics Limited	02392 452222	www.seasongroup.com	£5m/£100m	Havant, UK/USA/Mexico/China/Malaysia	65/1800	2/18	(AS9100 & ISO9001 in UK) (TS16949 & ISO13485 at sister sites)	Y	Y	Y	Y	Y	Y
Simtek EMS Ltd	01843 233120	www.simtekems.co.uk	£8.2m	SE	77	3	ISO9001:2008, ISO13485, IPC-A-610 Class 3 & IPC-7711	Y	Y	Y	Y	Y	Y
TEXCEL TECHNOLOGY PLC	+44(0)1322621700	www.texceltechnology.com	£15.5m	SE	131	7	ISO9001, ISO14001, IPC610 Class 3,	Y	Y	Y	Y	Y	Y
Tioga Limited	01332 360884	www.tioga.co.uk	£16m	Derby	130	6	ISO 9001, ISO 13485, ISO14001, IPC 610, 620, 7711/7721	Y	Y	Y	Y	Y	Y
Wilson Process Systems	01424 722222	www.wps.co.uk	£12m	SE	100	4	ISO9001:2015, IPC-A-610 Class 3	Y	Y	Y	Y	Y	Y

PCB Buyers' Guide

Manufacturer	Telephone	Website	Service Provided (i.e Broker, Manufacture &/or Repair)	Location	Approvals	Volume - Small, Medium, Large	Double-sided	Multi-layer 4-10/10-20-20-30	Metal PCBs	Flexi / Flexi-Rigid	Obsolescence Solutions	Modifications	Prototyping
ABL Circuits Ltd	01462 894312	www.ablcircuits.co.uk	M	SE	ISO9000: 2015	SML	Y	4-10	Y	Y	Y	Y	Y
Cambridge Circuit Company Ltd	01223 423100	www.cambridge-circuit.co.uk	M	SE	ISO9001:2015, UL, ISO 14001:2015	SML	Y	4-16	Y	Y	Y	Y	Y
DK-Daleba Printed Circuits	01992 510000	www.dk-daleba.co.uk	B/M/R	UK, Europe, Asia, USA	UL, ISO9001:2008, TS16949:2009	SML	Y	4-30	Y	Y	Y	Y	Y
Fineline VAR Ltd	+44 (0)1249 815 815	www.fineline-global.com	B	UK / Global	ISO9001:2015 / UL/ TS16949 / Nadcap/ AS9100/ISO14001	SML	Y	4-60	Y	Y	y	y	y
GSPK Circuits Ltd	+44(0)1423 321100	www.gspkcircuits.ltd.uk	M/R	UK, Europe, Asia	IS 9001:2015, IATF 16949:2016, EN (AS) 9100	SML	Y	4-34	Y	Y	Y	Y	Y
LEF Circuits	0116 2891122	www.lefcircuits.co.uk	M/R	M	ISO 9001:2015, IPC-A-610	SML	Y	4-30	Y	F/R	Y	Y	Y
Stevenage Circuits Ltd	01438 761811	www.stevenagecircuits.co.uk	M/B	UK/China	ISO 9001:2008, ISO 14001, EN9100:2009, UL, JOSCAR	SML	Y	4-44+	Y	F, F/R	Y	Y	Y
Tate Circuit Industries Ltd	01889 583627	www.tatecircuits.com	B	UK/China	ISO 9001:2015, UL	SML	Y	4-20	Y	Y	Y	Y	Y



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