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ALIGNING WITH AEROSPACE SOURCING REQUIREMENTS

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Editor's Word

Disintegrated circuits

I can still remember when I first encountered the concept of integrated circuits during electronics lessons at school in the 1970s. As a naive child encountering this technology for the first time I imagined the integration process would rattle along at a good pace until all electronic functions were integrated into a single chip. At that point, the world would only need one chip because it would be able to offer every function any electronic product would ever need.

I could not have got that more wrong if I tried. Every 'integration' the semiconductor sector achieves is followed by a 'disintegration' caused by new technology requiring a standalone device. There can't be a product catalogue in the world bigger than that of semiconductors.

Thanks to this growth, the sector followed the outsourcing model which began in the 1990s and we arrive at today's centralised model. All was well until the pandemic revealed the risk associated with having all your eggs in one basket. The obvious de-risking response was to start reshoring and dispersing production, a task so great in scale it warrants state support.

There will be many twists and turns in this road, from people and skills to geopolitical shifts, each operating on disjointed timeframes. I still wonder what the industry would look like based on my original 'one chip' solution with all products defined by their software. Then I remind myself it's a very childish idea.

Jon Barrett

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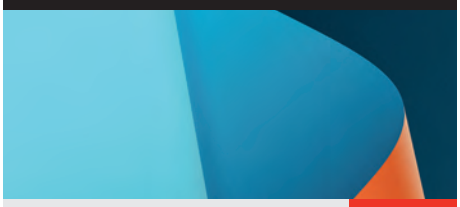

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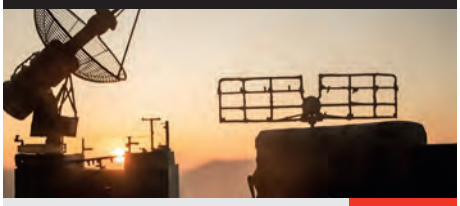

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ES News

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Increasing capacity and customer service

Schurter has expanded its Romanian production site. The project included construction of a third building, expanding the operating area by 2,000m². The new space houses EMC production facilities, logistics infrastructure and offices.

The production site is independent with an operational purchasing department and logistics centre. The development has increased employee numbers, making Schurter a major regional employer.

Schurter management emphasises the importance of the Romanian expansion as an investment in the company's future. The strategic decision underlines the company's commitment to offer customers the best possible service. Schurter states that with the expanded Romanian plant, the company is well equipped to meet the challenges of the constantly evolving electronics industry.

www.schurter.com

Mature NAND agreement signed

Rochester Electronics has joined forces with SkyHigh Memory to provide a continued source of low-density, mature NAND storage solutions. EoL microprocessors within existing designs may require storage solutions with low-density capabilities, perfectly complementing SkyHigh Memory's SLC NAND products ranging from 1Gb to 8Gb and 4GB eMMC.

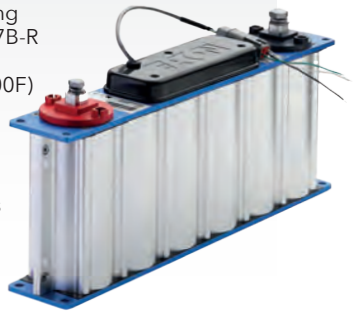
Rochester Electronics' global director memory technology, Paul Mason, said: "Our partnership with SkyHigh Memory bolsters Rochester Electronics' customer base and offerings with a continuity of supply in low-density mature NAND storage solutions. Memory longevity is achieved alongside legacy microprocessor technology."

Rochester Electronics' director, supplier development EMEA, Alexander Stempfle, added: "Rochester Electronics' strengths in managing and supporting legacy and EoL devices, particularly in the realm of microprocessors align with SkyHigh Memory's mature SLC NAND and eMMC storage solutions."

SkyHigh Memory's sales director Central and Eastern Europe, Vural Yildirim, concluded: "We are looking forward to a strong partnership with Rochester Electronics in order to increase the service provided to our customers globally."

www.rocelec.com

Improved supercapacitor modules



Rutronik is introducing Eaton's XLR-16R2507B-R (16V/500F) and XLR-18R0507B-R (18V/500F) supercapacitor modules. Thanks to low self-discharge and low leakage current, the modules offer a long service life. Likewise, their IP65 housing and stable performance at operating temperatures between -40 and 85°C suit harsh environments.

The supercapacitor modules can be used as a stand-alone energy storage device or in combination with batteries to optimise cost, lifetime and uptime. System requirements can range from a few microwatts to megawatts.

They have extruded aluminium sidewalls, which can provide improved heat dissipation and mechanical stability. The laser-welded internal structure allows reduced overall weight and ensures that ESR remains stably low throughout the lifetime and power density does not decrease, even when the component is subjected to shock and vibration over an extended period.

Applications include: automated guided vehicles, people movers, emergency power supplies, robotics, automation, variable frequency drives, engine starting, H2 fuel cell drives and traction inverters.

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MOUSER ELECTRONICS

N
ES News

Affordable IR data transmission

MikroElektronika has expanded its range of wireless connectivity boards with the IrDA 4 Click, a compact add-on board that provides a cost-effective solution for sending and receiving IR serial data. This board features the TFBS4650 infrared transceiver from Vishay Semiconductors, including a PIN photodiode, infrared emitter and low-power integral circuit. The board also includes an infrared encoder/decoder, Microchip's MCP2120, that sends and receives IR serial data between the infrared transceiver module and host MCU.

Click boards let engineers change peripherals easily, cutting development time. The mikroBUS socket standard lets any Click board instantly connect to the microcontroller or microprocessor on a main board. Microcontroller companies including Microchip, NXP, Infineon, Dialog, STM, Analog Devices, Renesas and Toshiba now include the mikroBUS socket on development boards.

Mikroe's CEO, Nebojsa Matic, said: "This Click board makes the perfect solution for the development of short-distance communication and data transfer or in use in environments where RF is problematic."

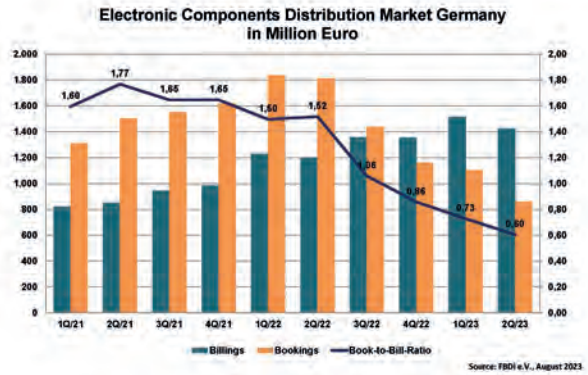
www.mikroe.com

German distribution sees slowdown

Not entirely unexpectedly, the second quarter ended with good and bad news for German component distribution. On one hand, turnover of FBDi's member distributors increased by 19 per cent to €1.42 billion, compared to Q2 2022, but on the other hand, bookings fell by almost 53 per cent to €859 million, compared to the record bookings of Q2/2022. Book-to-bill fell from 1.52 a year ago to 0.6, the lowest level since FBDi was founded in 2003.

FBDi chairman, Georg Steinberger said: "Almost nothing was a surprise in this quarter, except for the fact that after last year's surge things have slowed down a little. In fact, not all products are out of allocation, SiC and GaN components, for example, are likely to remain in short supply until well into next year. Otherwise, customer inventories are filled to the brim, and a resurgence in component demand is likely to be a long time coming—how long, that's the key question."

www.fbdi.de



Global agreement supports thermal sensor switches

Mouser Electronics has announced a global distribution agreement with Microtherm Sentronic for their temperature measurement solutions and overheating protection switches. Applications for their products include motors, transformers, damper controls and power electronics.

Mouser's stock includes the T Series enclosed bimetal snap-action temperature switches which incorporate a two-contact system where temperature and current influence switching. They provide thermal protection and temperature-limiting control with high power ratings and no vibrational influence. Normally closed or normally open options are offered. Package options are wired in single, double or triplet configurations with rated maximum currents 6.3A (type T12) with maximum switching currents of 12A

F Series enclosed bimetal snap-action temperature switches offer a central contact for fast response time. They suit installation into motor windings being small, pressure-stable and resistant to impregnating resins and lacquers. The devices also suit confined applications such as transformers, PCBs, welding devices and relays.

www.mouser.com

MOUSER ELECTRONICS

Don't Use a High Reliability Connector!

Choosing connectors for demanding applications is now more important than ever. Sophisticated devices are being deployed into harsh environments as industrial users adopt the latest technologies. Designers need to provide connectivity in the toughest conditions, and many are turning to high reliability solutions.

High reliability is the gold standard of the connector industry. It is a term that is often used to describe products with a military pedigree. For decades, manufacturers have offered connectors that conform to military specifications. Subjected to rigorous testing, connectors with a MIL-DTL or BS part number deliver superior reliability in the toughest environments.

This superior performance does come at a price, however, and an expensive MIL-Spec or BS part number is not the only way to obtain reliability. In an era of extended lead-times, rising costs and logistical challenges, perhaps now is the time to stop focussing on high reliability and instead start talking about appropriate reliability.

Mating Cycles

When choosing a connector for demanding roles, most manufacturers publish a minimum mating cycle count in their specifications, as it provides a good indication of how long a connector will last. A military specification connector – the archetypal high reliability solution – might boast a published performance of 500 or even 1000 mating cycles. However, the humble USB connector that has been with us for nearly 3 decades is designed to provide up to 5000 mating cycles, and there are even versions available that will provide a service life of 20,000 mating cycles or more.

Almost all manufacturers who make products conforming to a MIL standard also make the same connector under their own part number. These are usually made on the same production line, using the same materials, and deliver the same performance. As an example, the ever-popular D38999 Series III circular connector is available from Amphenol as the TV, from Souriau as the 8D and from ITT Cannon as the KJA families.

The same is true for D-Sub connectors sold as M24308 and micro-D connectors as M83513. Finding out what manufacturers call their equivalent product can save a great deal of money.

An Alternative Choice

Mating cycles are not the only measure of a connector's reliability. The environment in which the connector will be used must also be considered. We talk regularly of IP ratings, shock and vibration, and resistance to electromagnetic interference (EMI). The need to perform even under these conditions will have an enormous effect on the design of any connector. There are plenty of connectors that will provide excellent service.

This is important to remember, because connectors do not have to be designed for military specifications to be capable of military-grade performance. Manufacturers like LEMO have been making connectors for decades, subjecting them to a range of tests which prove their suitability in a wide range of industries.

Designed for use in applications where failure is not an option, high reliability connectors provide superior performance in tough conditions. However, the next time you need to choose a new product, ask whether the gold standard is the best solution, or even if a high-reliability connector is needed at all. The connector industry is huge and diverse, and the right solution not need have a high price tag to deliver high performance.

www.mouser.co.uk

Mark Patrick
Technical Marketing Manager
EMEA Marketing

As Mouser Electronics' Technical Marketing Manager for EMEA, Mark Patrick is responsible for the creation and circulation of technical content within the region – content that is key to Mouser's strategy to support, inform and inspire its engineering audience.

Prior to leading the Technical Marketing team, Patrick was part of the EMEA Supplier Marketing team and played a vital role in establishing and developing relationships with key manufacturing partners.

In addition to a variety of technical and marketing positions, Patrick's previous roles include eight years at Texas Instruments in Applications Support and Technical Sales.

A "hands-on" engineer at heart, with a passion for vintage synthesizers and motorcycles, he thinks nothing of carrying out repairs on either. Patrick holds a first class Honours Degree in Electronics Engineering from Coventry University.

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SMD heat sinks now application specific

CTX Thermal Solutions' MD, Wilfried Schmitz, introduces the benefits of extruded and cold extruded aluminium application specific SMD heat sinks

CTX has expanded its line of SMD heat sinks. In addition to standard SMD heat sinks for all common D-PAK modules, the supplier now offers extruded and cold extruded aluminium SMD heat sinks designed and produced for specific thermal requirements.

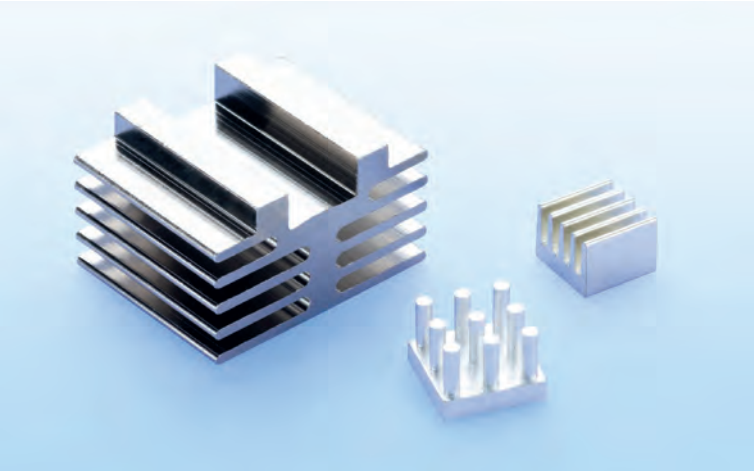
CTX Thermal Solutions' MD, Wilfried Schmitz, said: "In the past two years, the demand for custom SMD heat sinks has increased considerably. CTX meets this demand with application specific SMD heat sinks manufactured from continuous cast aluminium alloys or high-grade aluminium. Like standard SMD heat sinks, the extruded or cold extruded heat sinks are available in bulk or as tape-and-reel material."

Three options are offered for bonding the semiconductor and heat sink. A manual bond is achieved by applying a thermally conductive adhesive to the semiconductor contact surface and then placing the SMD heat sink on the electronic element to be cooled. For automated processing, SMD heat sinks are provided with a double-sided adhesive thermally conductive foil for bonding to the semiconductor. Alternatively, extruded and cold extruded SMD heat sinks can be pre-tinned to enable manual or automated soldering to the PCB to create a secure bond to the semiconductor element.

Compared to standard SMD heat sinks—stamped and formed from copper then tinned—extruded or cold extruded aluminium SMD heat sinks feature important advantages. Both processes allow implementation of highly individual heat sink geometries with large surfaces, making them as efficient as copper heat sinks. Application-specific SMD heat sinks have the added advantage of much lower material and process expenses.

www.ctx.eu

In the past two years, the demand for custom SMD heat sinks has increased considerably



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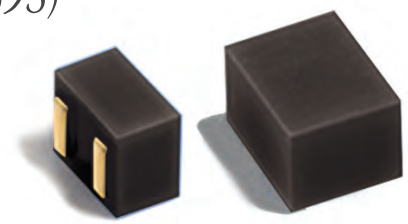

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Inside **DigiKey's** Product Distribution Center expansion (PDCe)

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A **Shift** in the Market and **Investing in the Future**

by **Mike Slater,** vice president of global business development at **DigiKey**

The last three years have been nothing short of chaotic around the world. Many business decisions seem to have been made reactively rather than strategically as the world navigated unprecedented times. As we move onto what's next and can begin to step back and assess the past three years, as well as look forward, what's clear is that we're at a point of transition.

As a distributor for electronic components and automation products, DigiKey has been in a unique position during the pandemic. Overall, our industry has been in an upcycle and now, along with the rest of the world, we're looking at a downturn. However, while we may be in a slower growth period, at DigiKey we don't pull back during these times, we build for the next cycle understanding it's exactly that, just a cycle.

In my business development role, I have the opportunity to talk to and hear from customers, suppliers, and rep organizations. So, I'm going to share what I'm seeing and hearing from people who have been on the frontlines of the industry.

What Customers are Saying

Overall, our customers are anticipating a slow market through the end of year, and common themes we've heard include:

- Inventory is at a record high, but orders are slowing. This is a contrast from the supply shortage many had experienced over the past couple of years.
- The industry is still experiencing supply chain issues with advanced semiconductor products and power supplies, and this continues to be a challenge.
- Demand for products is decreasing.

Even with the downturn, there are still market segments where we're seeing growth, including medical, biotech, agriculture and energy.

What Suppliers are Saying

Similar to DigiKey customers, suppliers are expecting a slowdown, but not necessarily a steep drop. Suppliers and distributors have excess inventory, more than ever before. But there are still several markets that are strong and continue to show growth, including military and aerospace, medical and automotive.

At DigiKey we've also been talking with suppliers about their plans for the future, including planned product changes, introductions and retirements. The last thing an engineer wants to do is design in a part that is soon obsolete. We're happy to be able to pass these insights along to customers and help them plan ahead.

Doubling Down – Investing in the Future

While there is variation in what people are seeing and predicting for the market through 2023 and beyond, it's widely agreed that the peak is over. How steep the drop, how long and how dramatic this cycle will be is still up in the air.

What we do know is that even with this shift in the market, DigiKey is ready for what's ahead and isn't slowing down. During downturns, we keep investing, we keep inventory, we keep pushing big projects and we invest in technology that benefits our customers and suppliers. At DigiKey we recognize this is an opportunity to grow.

It's also a good time for customers to think ahead and plan for the future. While most electronic components and automation products are plentiful, it's a good time to identify alternative parts through DigiKey's myLists, our list management and parts solution, rather than wait until it's crunch time or there's another supply chain issue. Because as we know, it's always a cycle.

We exist to serve design engineers and customers worldwide. We're committed to that purpose and aren't about to slow down.

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Time to focus on PCB and EMS

IPC's president of European operations, Sanjay Huprikar, argues that revitalising and growing the PCB and EMS segments is essential to building a robust manufacturing ecosystem

A major finding from a new IPC report states key segments of the European electronics manufacturing industry face significant challenges and require more support, considering their vital role in Europe's strategic autonomy and the twin transitions to a greener, more digital economy.

The report says the recently enacted European Chips Act is a welcome step. But 'the near singular focus' on the semiconductor industry 'has obscured critically important segments of the electronics ecosystem', specifically printed circuit boards (PCB) and electronic assembly (EMS), without which semiconductors cannot function.

Over the last 20-years, the European PCB sector experienced a steep decline, shrinking from approximately 20 to 30 per cent of global production to just two per cent today. Over this time, the EU has become 'highly dependent on China', which now accounts for some 65 per cent of total EU PCB requirements.

The EMS sector has experienced 'solid' average annual growth in recent years, fuelled by factory investment by large global companies and also by the growth of the downstream markets the sector serves, including automotive, industrial, aerospace, defense and healthcare. However, the EU imports roughly 90 per cent of required EMS products and services.

President of European operations, Sanjay Huprikar, said: "Revitalising and growing the PCB and EMS segments is essential to building a robust European electronics manufacturing ecosystem, which in turn is essential to ensuring supply chain resiliency, advancing the twin transitions and promoting European innovation. It takes all elements in the supply chain—from silicon to systems—to successfully produce the electronics we all depend on in so many ways."

IPC's report delves into aspects of the EU's PCB and EMS sectors, including:

- Europe's reliance on the PCB and EMS sectors of other nations, especially China, and its vulnerability to global supply chain disruptions related to trade wars, health crises, and natural disasters

- Europe's leadership and opportunities in 'embedded systems' in automotive, industrial, aerospace/defense/security, telecommunications and health care

- Changes in employment, growth rates, market share and the number of companies in the European PCB and EMS sectors

- Government policy decisions that need to be considered including: investment in research, development and innovation; incentives to invest in future factories; workforce development; and international trade policy

www.ipc.org

Compact colour displays for handheld devices

Display Visions describes its compact graphic display (TFT015-22AI) as bright, sharp and economical with power.

The IPS colour display's active area measures 28mm². Despite this small size, the 240 by 240px resolution provides a detailed, crisp graphic display with 16 bit colour resolution. Maximum brightness of 1,100cd/m² ensures a high-contrast display even under bright sunlight or operating room lamps. The company states unlike other LCD screens, contrast remains nearly the same even at very oblique viewing angles thanks to AACS technology. External installation dimensions are 32 by 35 by 3.2mm.

The 16bit RGB, 18bit or 8bit parallel and SPI interfaces are available for control. Supply voltage is 3.3V. Due to the low current consumption, typically 20 to 80mA, the displays suit installation in battery-operated handheld devices. Temperature range stretches from -20 to 70°C.

Display Visions guarantees availability for at least ten years.

www.mouser.com

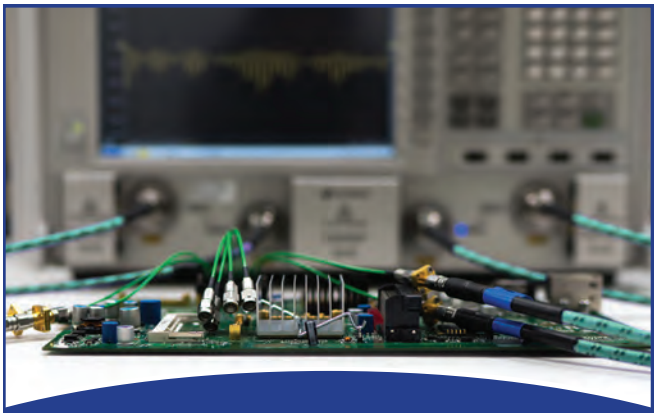
A boost to PFC choke choice

Würth Elektronik has expanded its WE-TORPFC inductor series with 17 new parts. These toroidal inductors suit continuous-conduction mode (CCM) boost converters and are capable of producing up to several kW of power. Unlike traditional bobbin-wound power factor correction (PFC) inductors, this new series uses flat wire windings, resulting in lower winding losses and better cooling.

The series is designed for elevated temperatures–up to 155°C–and can handle operating voltages up to 1,000VDC. With multiple sizes available, inductances ranging from 118 to 720µH and rated currents up to 48A, this new series suits active power factor correction, industrial AC/DC, solar inverters and a variety of other applications. This series also includes a robust mounting system evaluated through AEC-Q200 reliability testing.

All parts are in stock and free samples are available on request.

www.we-online.com



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Today's market shortages and lead-times of over 52 weeks make it clear that no one's supply chain is safe. Given major constraints that are being experienced by both design and supply chain departments, many OEMs are realizing that partnering with the right distributor is the missing link in their supply chain. Partnering with a distributor that knows reverse logistics, has global reach, a good reputation, and third-party testing capabilities to ensure that your products meet your end user requirements is needed in order to be successful.

Sourcing from the open market can be daunting with counterfeit parts and sub-standard materials posing as a constant threat to your supply chain. Material procured from the open market that is improperly tested can cause loss of relationships, increased liability, major delays, and line down situations. Many distributors test material in house or not fully leaving your supply chain exposed. Perfect Parts works with 3rd party fully accredited test labs which are specialized in performing comprehensive testing including those which are for high reliability applications. By utilizing third party laboratories you can rest assured that there is no conflict of interest when testing material for your supply chain.

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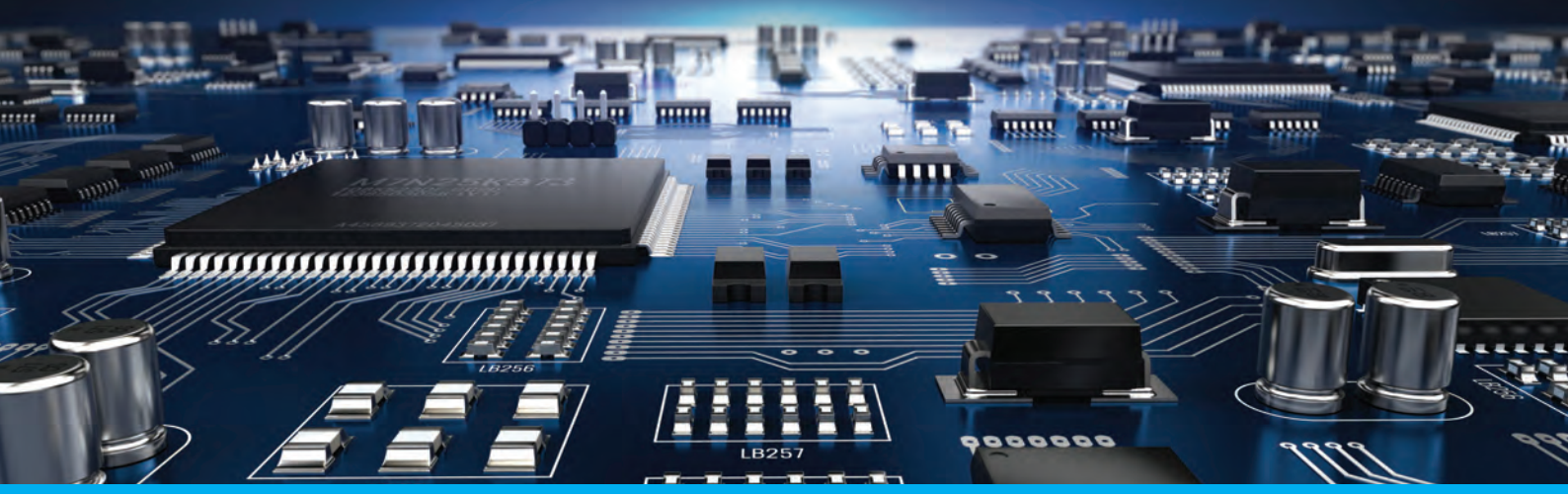

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Ready for Space 2.0 evolution

Avnet Silica's market segment manager aerospace and defence, Paul Leys, explains how the dawn of Space 2.0 has escalated demand for adaptive compute acceleration platforms

Avnet Silica's market segment manager aerospace and defence, **Paul Leys**

Marking a new era led by commercial interest more than governmental initiatives, Space 2.0 is catalysing rapid progression in sectors like reusable rockets, satellite internet connectivity, earth observation platforms and space tourism. As a result, the skies above us are busier than ever.

Applications such as internet connectivity services, Earth observation, navigation, avionics, defence and security require significant computing power and advanced hardware acceleration to manage dense data streams. These applications also need machine learning capabilities to enhance autonomy in crowded orbits.

Notable contributors to the proliferation of internet connectivity services are Elon Musk's Starlink, OneWeb, and Amazon's Project Kuiper. Starlink has already launched over 3,580 satellites into low-earth orbit (LEO). OneWeb deployed 36 satellites in March 2023 with its 18th rocket launch, completing its 618-strong constellation. Amazon's Project Kuiper plans to deploy a constellation of 3,236 satellites over coming years.

This commercial momentum, labelled Space 2.0, imposes a significant shift with a tilt from bespoke to mass-produced satellites, reduced time-to-market and a push for greater functional integration. Electronic components need to withstand harsh space environments and provide long-term support and supply guarantees.

One method of tackling these complex challenges is programmable logic. Xilinx produced its XQR VERSAL adaptive compute acceleration platforms (ACAPs) after its 2022 acquisition by AMD. These ACAPs, comprising adaptable SoCs for space applications, are built on a 7nm process, minimising the effect of radiation-induced single event upsets (SEUs). Variants within the family can host a mixture of CPUs, DSP and ML accelerators, programmable logic, memory resources and advanced peripherals and I/O facilities. Importantly, configurability is not affected by radiation exposure, letting a payload's processing functions be regularly updated in use in space.

The components feature a robust processor system, ML capabilities and on-chip networking facilities. The processor system employs a 64-bit dual-core Arm Cortex-A72 for managing complex algorithms and a 32-bit dual-core Arm Cortex-R5F for real time tasks. The platform management controller oversees device and power management, error handling, configuration and analogue measurements.

Each part has an AI engine that handles ML and AI workloads, with an architecture that supports various levels of parallelism. The Network on Chip (NoC) provides about 400Gbit/s of on-chip bandwidth and facilitates off-chip data access.

For space suitability, Xilinx's space-grade parts are adapted for the harsh environment, meeting the US Department of Defense's MIL-PRF-38535 Class B manufacturing quality standard. Rigorous qualification testing and characterisation against radiation have been conducted for the XQR VERSAL parts.

The dawn of Space 2.0 has escalated the demand for adaptive compute acceleration platforms—hardware that is powerful, flexible and reconfigurable to handle general tasks and dedicated resources for specialised tasks such as signal processing and machine learning inference. Xilinx's XQR VERSAL parts, coupled with strong safeguards against radiation-induced errors, suit swiftly evolving Space 2.0 applications.

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> **Each part has an AI engine that handles ML and AI workloads, with an architecture that supports various levels of parallelism**

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Aligning with military and aerospace sourcing requirements

Rochester Electronics offers purchasing professionals in the military and aerospace sectors a guide to supply chain management best practices for semiconductor components

The military and aerospace industries have long had a close connection to the semiconductor sector. Many programs of 60-years ago helped drive early semiconductor development. Over the decades, both industries experienced tremendous advancements. However, over recent decades, the industries' requirements and objectives have diverged.

Today, top semiconductor manufacturers are driven by high volumes, higher performance, lower power requirements, smaller plastic packages and cheaper costs. Expected product lifecycles can be as short as one year or long as five to ten-years. Military and aerospace industries can certainly benefit from technological advancements but semiconductor lifecycles do not align to most programs.

Supply chain management is facing greater challenges than ever. Military and aerospace systems require a longer development time and can have a longer product lifecycle than any other industry. The supply chain faces: component obsolescence in aging systems; prioritising the funding for long-term procurement/maintenance; coordinating the timing of and transition to newer systems; and two-year budget cycles. Consequently, supply chain management must be treated as a critical, integral part of any program.

The military and aerospace industries are at a transition point where they must consider the benefits of out-sourcing and COTS (commercial-off-the-shelf) products versus organic development and controlled solutions. Designing with multi-sourced solutions and selecting the right partnerships are also key parts of the decision process. The correct balance will vary depending on product and program but, as seen in recent years, there are benefits to maintaining control (particularly domestic control).

From the perspective of semiconductor components, supply chain management best practices include:

• Dual sourcing: When possible, procure at device level or from dual authorised supply chain sources

• Stock in the market: Ensure up-to-date visibility of all instantly available stock if supplies fail

• Advanced warning system: Share critical parts lists with trusted suppliers and partners, who can advise on extended lead times or other market issues that threaten supply chains

• Track component lifecycles: Do not solely rely on the algorithms-based lifecycle tracking. Seek support and confirmation from authorised end-of-life suppliers and partners. For example, components correctly listed 'discontinued' by the OCM may still be in production from authorised end-of-life sources, 10 to 20-years after their formal EoL

• Program protection plan: While PPPs are strongly suggested for MIL programs, they need to be implemented to be effective. Partnering with an authorised aftermarket manufacturer should be part of the PPP Rochester Electronics has always aligned with military

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and aerospace industries' sourcing requirements. As an AS6496-compliant distributor and licensed manufacturer, Rochester offers military-grade semiconductor and package solutions, even after the original OCMs have discontinued them.

Rochester stocks millions of military-grade components in its daily inventory, comprising thousands of distinct part numbers. The company's in-house high-reliability hermetic assembly line offers package styles including ceramic DIP, side brazed DIP, flat pack, CQFP, PGA, ceramic leadless chip carrier and metal can. This allows for continued manufacture of previously obsolete components, all produced in partnership with the original OCM to provide a 100 per cent authorised and guaranteed solution.

Custom flows are also offered, built to match the needs of source-controlled drawings based on Rochester's commercial and industrial inventory. In-house qualification and test facilities comply with industry standards. Rochester is a QML manufacturer certified by DLA Land and Maritime to MIL-PRF-38535, offering Class Q and Class V microcircuits for military and aerospace applications.

Customers can leverage the company's test and design engineering experience to help with alternatives (grades, speeds, finishes, packages) and creation of additional testing parameters to qualify alternate solutions.

Rochester also supports fundamental design changes, such as replacement of obsolete key components with ASIC solutions. It is possible to transition to an ASIC identical in fit-form-function with no software changes or errata. This means that aerospace DO-254 re-qualifications, even for safety-critical (DAL-A) applications, can be greatly simplified with minor changes.

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CoN LED modules

LED manufacturers have evolved their focus from just energy efficiency to the quality of light—pivotal to human-centric lighting (HCL). Emphasising the well-being, comfort, and health of individuals, HCL considers the colour of the light produced by LEDs to be of significant importance. A high-blue component light is ideal for workplaces, increasing activity and productivity, while a warm-hued light is soothing for homes.

Although LED light quality is subjective, the industry has made efforts to standardise it. The Colour Rendering Index (CRI), one such measure, compares natural daylight to the spectrum of different wavelengths produced by a light source. While it has been criticised for not predicting colour appearances as accurately as other standards like TM-30, CRI is still a widely used metric due to its simplicity. White LEDs now commonly have a CRI of 80 or more, with some LED manufacturers quoting figures as high as 98.

To further quantify the similarity between an LED light source and natural light, Bridgelux has developed the Average Spectral Difference (ASD). ASD is determined by comparing the radiant power or brightness of the light source and natural light over a range of visible light wavelengths. Lower ASD figures are considered better, with Bridgelux's Thrive™ LED showcasing an exemplary ASD figure of 8%.

To assist engineers in designing high-quality illumination that resembles natural light, EBV Elektronik has designed the CoN LED Module. This tuneable white LED module, which complies with the Zhaga LED interface standards, improves lighting quality while maintaining energy efficiency. It comprises two channels, each containing 27 LEDs with different colour temperatures, housed on an aluminium-core PCB and equipped with Linda optics from LEDiL for superior thermal management and colour mixing.

The CoN LED Module is intended to complement onsemi's Connected Lighting Platform, particularly the LIGHTING-1-GEVK kit. This platform is a modular development kit that integrates an AC/DC power supply, an LED driver board, and a wireless sensing and connectivity board. It provides high-power lighting with efficient power conversion greater than 90% at full load. The platform supports wireless connectivity with Bluetooth Low Energy (BLE) and complies with multiple industry standards, making it suitable for battery-less applications developed using an energy harvesting BLE switch.

The Bridgelux Thrive SMD 3030 LEDs used in the CoN LED Module are designed to closely emulate natural light with an ASD of only 8%. This is a stark contrast to the typical CRI 98 LEDs which have a higher ASD of 18%.

To sum up, the LED manufacturing industry's shift towards the quality of light signifies a significant focus on human health, both physical and emotional. Emulating natural light as closely as possible is often the optimal solution, with measures like ASD being critical. Design engineers can leverage LED modules from EBV Elektronik to deliver high-quality light, combining efficient, integrated platforms that provide a balance of performance, features, and power efficiency.

www.ebv.com/CoN-LED

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FTDI	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	50	N/A	0 €	N/A	50	2,500+	Y
Harwin	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	600	N/A	0 €	N/A	50	2,500+	Y
Molex	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	2,550	N/A	0 €	N/A	50	2,500+	Y
Phoenix Contact	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	2,200	N/A	0 €	N/A	50	2,500+	Y
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Littelfuse	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	11,450	N/A	0 €	N/A	50	2,500+	Y
Vishay	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	3,150	N/A	0 €	N/A	50	2,500+	Y
ENCLOSURES												
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Hammond	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	3,350	N/A	0 €	N/A	50	2,500+	Y
Metcase Enclosures	OKW Enclosures	+44 (0) 1489 583858	www.metcase.com	EU	N/A	288	£40K	0 €	100%	5	22	Y
New Age Enclosures	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	150	N/A	0 €	N/A	50	2,500+	Y
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IQD Frequency Products	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,500	N/A	0 €	N/A	50	2,500+	Y
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Microchip	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,450	N/A	0 €	N/A	50	2,500+	Y
Murata	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	550	N/A	0 €	N/A	50	2,500+	Y
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Osram Opto Semiconductor	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,300	N/A	0 €	N/A	50	2,500+	Y
Rochester Electronics		+44 1480408400	www.rocelec.com	EU	Y	1000 +	N/A	$250	N/A	50+	600+	Y
Toshiba	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	450	N/A	0 €	N/A	50	2,500+	Y
Vishay	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	2,350	N/A	0 €	N/A	50	2,500+	Y

Manufacturer	Distributor	Telephone	Website	Location	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
PASSIVES												
AVX	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	17850	N/A	0 €	N/A	50	2,500+	Y
Bourns	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	15,100	N/A	0 €	N/A	50	2,500+	Y
Coilcraft	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	5,750	N/A	0 €	N/A	50	2,500+	Y
EPCOS / TDK	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	5,450	N/A	0 €	N/A	50	2,500+	Y
KEMET	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	23,650	N/A	0 €	N/A	50	2,500+	Y
Kemet	RS Components	08457 201201	www.rs-components.com	EU	Y	N/A	£161m	0 €	N/A	50+	2,500	Y
Murata	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	18700	N/A	0 €	N/A	50	2,500+	Y
Ohmite	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	6,550	N/A	0 €	N/A	50	2,500+	Y
Panasonic	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	25,450	N/A	0 €	N/A	50	2,500+	Y
Taiyo Yuden	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	5,100	N/A	0 €	N/A	50	2,500+	Y
TDK	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	13,050	N/A	0 €	N/A	50	2,500+	Y
TE Connectivity	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	11,500	N/A	0 €	N/A	50	2,500+	Y
TT Electronics	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	5,050	N/A	0 €	N/A	50	2,500+	Y
Vishay	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	43850	N/A	0 €	N/A	50	2,500+	Y
Würth Elektronik	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	6,750	N/A	0 €	N/A	50	2,500+	Y
Würth Elektronik	Würth Elektronik	+49 (0) 7942 945 0	www.we-online.com	EU	Y	N/A	N/A	0 €	100%	250	4,000	Y
Yageo	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	21,450	N/A	0 €	N/A	50	2,500+	Y
POWER & BATTERIES												
RECOM Power GmbH	Various Distributor	+43 7612 88 325 700	www.recom-power.com					0 €	100%	3	560	Y
Sanyo Electronic Industries Co., Ltd.	Sanyo Electronic Industries Co., Ltd.	+81 36699 8080	www.eta.co.jp	JP	N	1,000	€3000k	20 €	90%	10	100	Y
Bel Power Solutions	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	600	N/A	0 €	N/A	50	2,500+	Y
CUI Inc.	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	2,200	N/A	0 €	N/A	50	2,500+	Y
MEAN WELL	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	4,400	N/A	0 €	N/A	50	2,500+	Y
Murata	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1500	N/A	0 €	N/A	50	2,500+	Y
RECOM	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	3,150	N/A	0 €	N/A	50	2,500+	Y
TDK-Lambda	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,900	N/A	0 €	N/A	50	2,500+	Y
TRACO Power	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	4,000	N/A	0 €	N/A	50	2,500+	Y
Vicor	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	2,300	N/A	0 €	N/A	50	2,500+	Y
XP Power	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	2,200	N/A	0 €	N/A	50	2,500+	Y
SENSORS												
ams	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	150	N/A	0 €	N/A	50	2,500+	Y
Analog Devices Inc.	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	300	N/A	0 €	N/A	50	2,500+	Y
Bosch	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	25	N/A	0 €	N/A	50	2,500+	Y
Honeywell	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	2,200	N/A	0 €	N/A	50	2,500+	Y
Maxim Integrated	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	350	N/A	0 €	N/A	50	2,500+	Y
NXP	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	300	N/A	0 €	N/A	50	2,500+	Y
Sensirion	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	80	N/A	0 €	N/A	50	2,500+	Y
STMicroelectronics	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	75	N/A	0 €	N/A	50	2,500+	Y
TE Connectivity	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	650	N/A	0 €	N/A	50	2,500+	Y
Texas Instruments	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	850	N/A	0 €	N/A	50	2,500+	Y
SWITCHES & KEYBOARDS												
Apem	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	2,850	N/A	0 €	N/A	50	2,500+	Y
C&K Switches	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	5,550	N/A	0 €	N/A	50	2,500+	Y
CHERRY	RS Components	08457 201201	www.rs-components.com	EU	Y	600	N/A	0 €	N/A	50+	3,500+	Y
E-Switch	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	2,350	N/A	0 €	N/A	50	2,500+	Y
EAO	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,800	N/A	0 €	N/A	50	2,500+	Y

Buyers' Guide

Manufacturer	Distributor	Telephone	Website	Location	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
Honeywell	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	4,700	N/A	0 €	N/A	50	2,500+	Y
NKK Switches	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	4,000	N/A	0 €	N/A	50	2,500+	Y
Omron	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	4,700	N/A	0 €	N/A	50	2,500+	Y
Panasonic	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	550	N/A	0 €	N/A	50	2,500+	Y
TE Connectivity	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,350	N/A	0 €	N/A	50	2,500+	Y
TERMINAL BLOCKS												
Molex	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,850	N/A	0 €	N/A	50	2,500+	Y
Phoenix Contact	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	13,550	N/A	0 €	N/A	50	2,500+	Y
TE Connectivity	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,750	N/A	0 €	N/A	50	2,500+	Y
THERMAL MANAGEMENT												
Bergquist Company	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	250	N/A	0 €	N/A	50	2,500+	Y
Delta Electronics	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	700	N/A	0 €	N/A	50	2,500+	Y
ebm-papst	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,450	N/A	0 €	N/A	50	2,500+	Y
Materials Direct	Materials Direct	+44 (0)1908 222 211	www.materials-direct.com	EU	N/A	N/A	£1,000,000	0 €	N/A	5	55	Y
Sanyo Denki	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,450	N/A	0 €	N/A	50	2,500+	Y
Universal Science	Universal Science	+44 (0)1908 222 211	www.universal-science.com	EU	N/A	N/A	£1,000,000	0 €	N/A	5	55	Y
TRANSFORMERS & INDUCTORS												
Bourns	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	4,900	N/A	0 €	N/A	50	2,500+	Y
Coilcraft	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	5,500	N/A	0 €	N/A	50	2,500+	Y
EPCOS / TDK	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,300	N/A	0 €	N/A	50	2,500+	Y
Murata	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	6,900	N/A	0 €	N/A	50	2,500+	Y
TDK	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	4,050	N/A	0 €	N/A	50	2,500+	Y
Vishay	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	1,200	N/A	0 €	N/A	50	2,500+	Y
Wurth Elektronik	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	3,400	N/A	0 €	N/A	50	2,500+	Y
WIRELESS SOLUTIONS												
DIGI	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	200	N/A	0 €	N/A	50	2,500+	Y
Espressif	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	30	N/A	0 €	N/A	50	2,500+	Y
Laird Connectivity	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	100	N/A	0 €	N/A	50	2,500+	Y
Lantronix	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	25	N/A	0 €	N/A	50	2,500+	Y
Microchip	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	150	N/A	0 €	N/A	50	2,500+	Y
Murata	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	30	N/A	0 €	N/A	50	2,500+	Y
Silicon Laboratories	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	150	N/A	0 €	N/A	50	2,500+	Y
Texas Instruments	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	20	N/A	0 €	N/A	50	2,500+	Y
u-blox	Mouser Electronics	0049 (0)89 520 462 110	www.mouser.com	EU	Y	10	N/A	0 €	N/A	50	2,500+	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
Elvia PCB Group	+33 233 763 200	www.gepcb.com	M/B	France, Tunisia, China	AS9100, PRI-NADCAP, ISO-TS16949, ESA, UL, ISO9001, ISO14001	S/M/L	Y	1-30	Y	F, F/R	Y	Y	Y
Graphic Plc	00441363 774874	www.graphic.plc.uk	M	UK/China	AS9100, NADCAP, ISO 9001, AISO14001, OHSAS 18001, Mil 31032, Mil 55110, Mil 50884	S/M/L	N	4-10	Y	Y	N	Y	Y

Contract Manufacturers Buyers' Guide

Manufacturer	Telephone	Website	Turnover	Location	Approvals	Employees	Number of Surface Mount Lines	BGA Capacity	Lead Free Manufacturer	Prototyping	Design Capability	Full Turnkey	Cables and Harnessing
Alan Anderson Manufacturing Ltd	+44 (0) 333 322 7222	www.aa-manufacturing.co.uk	£21m	Hertfordshire UK	ISO9001:2015 , IPC-A-610	40	2	Y	Y	Y	Y	Y	Y
AWS Electronics Group	+44 (0)1782 753200	www.awselectronicsgroup.com	£40m	UK & Slovakia	AS9100, ISO9001, 13485, 14001, TS16949, IPC-A-610 Class 3, NADCAP	430	11	Y	Y	Y	Y	Y	Y

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