BEST OF BRITISH
BUYING INTO ELECTRONICS INNOVATION
PAGE 22
All of your lists in one place

myLists offers enhanced functionality and a consolidation of features you may have used in Bill of Material lists, Price and Availability lists, and Favorites lists.

New features include:

- Increased number of line items for BOMs up to 1,000 parts from 300 previously
- Alternatives suggested in-line for parts when available
- Attrition calculator to plan for overages that account for parts lost or damaged during manufacturing

digikey.co.uk/mylists
From an electronics purchasing perspective, what has the Covid19 pandemic taught me? Mainly two things. It introduced swings in supply and demand which were outside the default limits of manufacturing resource planning (MRP) systems, including their ecommerce modules. It also taught me that some of the rock solid foundations of the global supply chain were actually built on sand.

Some MRP systems coped and some pillars held firm but not all. Electronics companies whose whole existence is based on continuity, such as suppliers to the military and energy infrastructure, turned on their disaster planning protocol and motored on. I should know, I was actually on site with just such a company when the first lockdown was announced and I witnessed them switch into disaster planning that second.

For some companies the consequences have been severe. How do I know this? Because readers are calling me, a magazine editor, for advice on where to buy parts that were available yesterday but not today.

The answer is always the same. I direct them to the advertisers and editorial contributors to this magazine who have certified systems in place to manage the sourcing of hard to find parts. I can’t list all the options here, there are too many. However, they range from finding an authorised distributor who has stock in a different region to actually restarting production of an obsolete component using the original tooling and test procedures. Ultimately it all depends on cost and volume which are application specific. Ultimately, there is always an answer, and you’ll find it by talking to the companies on the following pages.
Powell Electronics is now offering Positronic’s versatile Scorpion modular connector system. Components can be configured as power connectors (6 to 120A), signal level connectors or a combination of the two in a variety of power/signal contact configurations. Modular tooling offers multiple keying options, while providing a one piece insulator for use in the finished connector. The Scorpion series includes modules in standard profile (14.6mm) and low profile (8.2mm) versions. Blank module options let users space power and signal contacts to meet creepage and clearance values required for specific applications. The series includes board-to-board, cable-to-cable or board and panel-to-cable or board versions. An outlet hole enables air cooling onto a power contact. Termination options are solder PCB mount, crimp and press-fit. Mating options are blind mating, float mount, panel mount and cable connector with a unique locking system. Precision formed and solid machined contacts feature shielded, high voltage and hyperboloid contact versions.

www.powell.com

To expand their presence in Europe, Ohmite and Arcol have signed with Power Rep, a commercial company focused on industrial electronics. Arcol’s director of sales for Europe and Asia, Darrel Oliver, explained: “Power Rep will be representing the Ohmite/Arcol brands in Italy, Turkey, Malta and Greece to promote our products in those territories. Having someone in-country to represent Ohmite/Arcol product is a major advantage. They will be able to provide focused, personalized support.”

“We look forward to working closely with the Power Rep team to get the product line to our European customers.”

Power Rep’s owner, Walter Beretta, added: “Power Rep’s introduction as the sole European representative of Ohmite/Arcol products will bring positive effects in the level of presence and customer support in Europe.”

www.ohmite.com

Mouser is now shipping Maxim’s MAX25530 four-channel automotive backlight driver. It integrates four I²C-controlled, 150mA LED backlight drivers and a four-output thin-film-transistor liquid-crystal display (TFT-LCD) bias in a single 40-pin, 6 by 6mm chip to help reduce the footprint of automotive dashboards, central information and navigation displays.

The device features a positive boost converter, negative boost converter, two charge pump drivers for powering up TFT bias and a boost/SEPIC controller for powering up to four strings of LEDs in the display backlight. For bigger and higher-resolution displays, TFT bias and LED driver are needed. The device supports larger screen sizes and higher resolution by providing positive analog supply voltage and negative analog supply voltage, both of which are required for low-temperature polysilicon panels (LTPS) that deliver higher resolution and lower cost than amorphous silicon panels now currently in use.

www.mouser.com
This year’s Executive Conference theme Charting the Course Forward captures the industry’s main challenge: to imagine and prepare for post-pandemic business conditions where continued volatility and supply chain disruption are bound to be the new normal. The program reflects the enormous task companies face as they map their strategic plan for 2022. The scarcity of skilled labor, component shortages, inflation and continued global geopolitical uncertainty will require leaders to take full advantage of the most current forecast data and innovative thinking.

October 24-26, 2021 – Loews Chicago O’Hare Hotel

A must-attend industry event, the Executive Conference unites senior management teams from the electronics industry’s leading companies – representing the entire supply chain. Charting the Course Forward will provide important insight on innovative solutions and strategies to transform your business.

Registration Now Open at ECIAExecConference.org
Fast, online PCB manufacturing service launched

Okdo has introduced a rapid PCB manufacturing and assembly service aimed at OEMs, professional engineers, makers and hobbyists. Provided in partnership with international PCB manufacturer Ocean Smille, Okdo offers a 48-hour build time and fast delivery from one-off prototype boards to bulk quantities of complex, tested assemblies.

The service supports bare and assembled PCBs up to 12-layers. Board sizes are available from 2 by 2mm to 54 by 54cm, with thicknesses from 0.6 to 2mm. Track widths are offered down to 0.1mm, with BGA pad sizes down to 0.25mm, 0.2mm drills, 35µm copper outer layers and 17.5µm copper inner layers. PCB materials include FR4, aluminium and flexible, while surface finishing options include leaded or lead-free HASL and ENIG.

Okdo’s senior VP product and digital, Richard Curtis, said: “We understand how important PCB manufacturing services are for our global design customers and we are delighted to expand our design services in partnership with Ocean Smille, who offer a range of PCB manufacturing options from rapid prototyping to volume production services.”

The live online quote tool gives a price for each order in real time.

www.Okdo.com

Catering for a post-Covid world

Anglia Components is expanding its range of ultraviolet LED solutions through a new partnership with Bolb. The new component range caters to the increased demand for sanitization devices as lockdown lifts.

Bolb’s co-founder and CEO, Ling Zhou, said: “Bolb UVC LEDs are now being integrated into a new generation of portable and home appliances, medical devices and industrial processing equipment for the benefit of a healthier world. We look forward to assisting Anglia customers with such vital and potentially life-saving, designs.”

Anglia’s marketing director, John Bowman, added: “UVC LEDs are gaining attention because they provide robust, toxic-free disinfection. The addition of Bolb’s exceptional products to Anglia’s line up is an important step as we look to offer customers innovative solutions for sanitisation for sale at the NEC Birmingham, 8 to 9 June 2022.

www.nineteeengroup.com

Technology hub sees growth

Torbay Hi-Tech Cluster has grown over the past 18 months. The Electronics Photonics and Innovation Centre now has 70 per cent occupancy, a 35 per cent increase during the past 18 months. It has welcomed companies such as Spanish-owned Nanusens, specialising in MEMS technology. Clients are a mix of established organisations, motivated small and medium-sized enterprises and start-ups.

tda.uk.net

In Brief

Trade shows co-locate

Messe Frankfurt UK, Nineteen Group and Rapid News Group have announced a three-year partnership to collocate their UK manufacturing and engineering events. This will see Automechanika Birmingham, Design Engineering Expo, Engineering Expo, Manufacturing Expo, Med Tech Innovation Expo, and TCT 3Sixty come together at the NEC Birmingham, 8 to 9 June 2022.

www.nineteeengroup.com

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tda.uk.net

Industry 4.0 to lead IoT in 5-years

Farnell has published new research on the Internet of Things (IoT) which reveals the top three industry segments leading the way are industrial automation and control (25%), home automation (18%) and artificial intelligence (12%). Security continues to be the most important developer consideration (29%), followed by connectivity and interoperability.

www.element14.com

Highlighting CEM service and quality

Southampton-based CEM, Esprit Electronics, has launched a new website designed to create a user-friendly and responsive resource for customers, suppliers and industry. The site covers Esprit’s experience across sectors ranging from marine and medical, to environmental and mobility, with case studies highlighting service and quality.

www.espritelectronics.com

Sensing portfolio expands

RS has introduced a selection of sensors used in industrial, healthcare and transportation applications. Designed and manufactured by Amphenol Advanced Sensors, the portfolio includes temperature, gas, moisture and pressure sensing devices.

The Thermometrics brand comprises temperature measurement devices, ranging from chips to value-added assemblies for temperatures from -196 to 1150°C.

A second brand, Telaire, offers CO2 sensor technology and air quality sensors such as dust and relative humidity devices. These products are deployed in commercial and residential building ventilation systems.

One Telaire product is the new T3022, designed for low-cost CO2 sensing. It offers IP65 protection, non-dispersive infrared measuring technology, 5V input and I2C digital output.

The NovaSensor line includes pressure measurement devices designed to offer accuracy and reliability. These MEMS devices include surface mount, hybrid and media-isolated types, available in uncalibrated to fully calibrated versions, plus amplified analogue and digital-output types.

uk.rs-online.com

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Meet suppliers, be inspired

Manufacturing & Engineering Week (M&E Week) takes place 6 to 10 June 2022 at the NEC. The exhibition is designed to provide a dynamic, interactive series of virtual and live events over five days showcasing end-to-end manufacturing and engineering solutions. Whatever your design, engineering or manufacturing challenge, the show offers an opportunity to connect with experts and leave with ideas and solutions to apply.

Thousands of new products will be on display from hundreds of brands letting visitors see manufacturing and engineering suppliers under one roof. The event team comprises over 100 years of focused engineering, design and manufacturing industry knowledge, understands the sector and is guided by an advisory board panel of experts.

The event is supported by associations and media including Make UK, IMechE and the IED who also bring a wealth of expertise covering the manufacturing and engineering sector.

Make UK’s chief executive, Stephen Phipson CBE, said: “There has never been a more important time for our sector to pull together and to work together, to create a shared agenda, help promote and encourage manufacturing and engineering innovation, and see our sectors grow and Manufacturing and Engineering Week will do exactly that. I am delighted to be part of the M&E Week advisory board and that Make UK is a partner for this ground-breaking event.”

The week will feature virtual sessions on Monday and Tuesday (6 and 7 June 2022), followed by live events on Wednesday and Thursday (8 and 9 June 2022) with a round up and key takeaways finishing the week on Friday (10 June 2022).

Manufacturing Expo: Created specifically for manufacturing process and management professionals to keep up-to-date and discover technologies and equipment to ensure manufacturing sites are efficient. From site management and legislation to maintenance, materials handling and streamlining, attendees can hear from industry leaders and attend how-to sessions and discover new suppliers to improve productivity, cut costs, streamline and be more competitive.

Design Engineering Expo: For future-thinking design engineers to meet, share ideas, source innovative solutions and be inspired. It showcases leading-edge innovation, allowing design engineers to speak directly with those who are breaking engineering boundaries. The UK’s design engineering community can connect with suppliers from design services, electronics, embedded design to test and measurement.

Engineering Expo: Whether in defence, food, medical, automotive, aerospace, transport or more, Engineering Expo is designed to provide the UK’s engineering community with practical advice to reduce costs, streamline and optimise future engineering. From R&D, design, materials, testing and measurement, through to manufacturing and production, attendees can hear inspiring keynotes packed with invaluable content and meet suppliers driving the industry forward.

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Mouser Electronics’ Mark Patrick explains how DFM can address procurement challenges generated by the conventional design process

A design for manufacture (DFM) strategy aims to deliver a product that is easy to make. To achieve success, communication between engineering, purchasing and production teams is vital. Documenting the design and manufacturing guidelines also helps reduce BoM cost and overcomes potential challenges early in the process.

For purchasing, there are many things to discuss with the engineering and production teams. For example, a specific device might be technically perfect but difficult to source. Stopping production because a component is missing could delay a product launch—worse still, it may impact revenue or give competitors an edge.

The ‘build v buy’ consideration is usually a discussion for engineering but the consequences may vary widely. Discrete circuit designs take extra engineering and test effort and add to the BoM, while a ready-made module is a single BoM line item and often size optimised.

Conformance to safety and type approval standards is another benefit of modules. Using a module can speed the development/testing phases and simplify the BoM. Either way, each part must have a complete documentation package, including relevant certificates.

When delivery leadtimes start to extend, counterfeit components can begin to work their way into the supply chain and external stakeholders is crucial. The earlier you can identify a potential problem, the more time is available to solve them.

Mouser offers many online tools that help simplify DFM tasks. Forte, Mouser’s BoM tool, offers a free and convenient method of managing the product’s entire bill-of-materials. It provides a host of valuable and time-saving features that help minimise procurement risk. Mouser also provides comprehensive design information for each component, including PCB footprints, symbols and 3D CAD models, which are all free to download.

www.mouser.co.uk

When delivery leadtimes start to extend, counterfeit components can begin to work their way into the supply chain
Effective ways to combat ESD

Farnell product manager, James Plant, explains how to create an ESD-safe environment where sensitive devices are protected from damage.

Anyone using, handling, storing or transporting electronic components will know that potential damage from electrostatic discharge can be a major problem. What makes the issue particularly difficult is that damage can escape detection during quality control inspections and components appear to work normally, only to fail later. Avoiding this is key to ensuring a product’s quality and reliability, while also minimising returns, reducing warranty costs and keeping customers satisfied.

The solution is to adopt measures known to prevent ESD during component manufacturing, testing, shipping and handling. By following correct practices, it’s relatively straightforward to create an ESD-safe environment where sensitive devices are protected from damage.

To the uninitiated, the vast range of electromagnetic compatibility products from suppliers such as Multicomp Pro, Desco, SCS, Menda, Emit and Simco-Ion can be bewildering, so the remainder of this article provides readers with a guide to their options and the benefits they offer.

Anti-static bags such as the zip-top resealable units from Multicomp Pro are designed to incorporate a static dissipative coating which prevents static build-up on the bag’s surface, protecting the product inside. RoHS-compliant bags are formed using blow-moulded polyethylene with anti-static additives and are developed to dissipate a static charge to ground, preventing static charge building up on the package or device. Also, the material will not charge when rubbed against other materials.

Another essential product is a one size fits all anti-static wrist strap from Multicomp Pro that grounds users so that static electricity cannot build up on their body. The product is RoHS-compliant and comes with an adjustable strap, coiled 1.8m earth lead and spring-loaded 10mm press studs for a secure and comfortable fit.

For workers on the move, ESD toe and heel grounders from SCS come with a two-layer sole capable of being repositioned. Ideal for high-volume use, the grounder also has a 457mm conductive ribbon which provides a continuous path-to-ground so electrostatic charge is removed from the body.

Protection can be improved further by using two-layer bench mats: Multicomp Pro’s ESD bench matting disperses electricity through anti-static (conductive) and static-dissipative materials with synthetic rubber. Available in green or grey, the mats neutralise ESD by causing it to flow at a slower rate across the surface of the mat.

Other options include: Desco’s earth bonding plug which provides a common ground point for ESD workstations by replacing live and neutral pins with insulated plastic pins; and Raaco’s stackable anti-static ESD bin which is made from conductive plastics to dissipate electrostatic charge and prevent static build-up, reducing static while components are in storage.
To control static charge in mini-environments, suppliers such as Simco-Ion and Emit offer a range of ionizers including ionizing air bars, bench top ionisers and overhead ionizing air blowers, air guns and nozzles. The use of ESD air ionizers in electronics work areas removes build-up of potentially damaging static charges. Ionizers deliver a balanced stream of positive and negative ions and are used primarily to control static charges on insulating materials such as standard plastic. Ionizers protect electronic devices from electrostatic potential that ESD wrist straps and table mats just can’t eliminate.

Farnell’s ESD portfolio contains around 2,000 products, available for same day despatch. Farnell customers can also access 24/5 technical support and free access to online resources, data sheets, applications notes, videos and webinars.

uk.farnell.com

Another essential product is a one-size fits all anti-static wrist strap from Multicomp Pro

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Obsolescence

Tackling component obsolescence

In this article, Vanilla Electronics introduces its process for managing component obsolescence

Society is living through a time of rapid change and development, where products are superseded as quickly as they are released, sometimes without any direct or close alternative. While this is inconvenient for everyday consumer products, it can be detrimental to manufacturers producing products with long lifecycles who require component availability for many years.

If a manufacturer has exhausted its options for alternative, active components, Vanilla works with the company to design a sourcing strategy for end-of-life or obsolete parts. When sourcing obsolete components, the risk of receiving counterfeit product is higher, so it’s important to work with trusted suppliers that conform to quality expectations, including traceability, testing and validation.

Below are four ways Vanilla helps manufacturers source obsolete or end-of-life components with complete confidence.

Monitoring reported parts: Having invested in automated tools and as a member of trade organisations such as the Electronic Resellers Association International (ERAI), Vanilla has access to the world’s largest databases of suspect counterfeit and nonconforming electronic components. These databases are constantly monitored and highlight new suspect parts or detection methods to stop the purchase of counterfeit parts. Batch information, date codes and vendors can be checked before proceeding with a purchase.

Approved supplier list: When sourcing obsolete components, it can be daunting to approach new suppliers. Vanilla has developed its supplier base over an 18-year period and has developed a global network of suppliers which it trusts and works with regularly.

Inspection and test: Vanilla uses industry accredited checklists, visual inspections, XRF, de-cap and x-ray to verify parts are fit for use in customers’ products.

Pilot runs: As a final check, the company’s in-house team of IPC qualified technicians and test engineers can assemble and test a part on a functional PCB, further guaranteeing the safety and functionality.

This stringent process is why Vanilla has never delivered a counterfeit part to a customer.

It is important to stay up to date with changes to avoid supply chain disruptions. Vanilla uses analysis tools to predict components’ lifecycles (years to end of life) as well as predicting the life cycle of bills of materials. Embedding Vanilla into an NPI strategy helps reduce the chance of future obsolescence.

www.vanillaelectronics.com

Society is living through a time of rapid change and development, where products are superseded as quickly as they are released
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Mitigate obsolescence across embedded computing

Aitech USA’s general manager, Pratish Shah, explains how military COTS products increased the likelihood of supply continuity and reliability

In military, defence and aerospace industries, where programs can take years and millions of dollars to develop, test and qualify, obsolescence is a valid concern. Embedded systems aren’t like the latest cell phones, easily discarded when the next upgrade comes along. They comprise rugged products that take time and money to create and effort to qualify for use in a military program. The components must be available for years, even decades, as programs move from low-rate initial production (LRIP) to full production cycles.

The lifecycle of COTS products needs to be managed according to a well-defined and forward-looking program. At Aitech, for example, the COTS Lifecycle+ program is divided into three distinct program phases: Active, Supported and Extended Support, each providing product availability for at least four years. The combined lifecycle ensures a minimum COTS product lifetime of 12-years from product introduction.

Employing total program and lifecycle support services ensures that products designed-in today will meet the functional, environmental and operating requirements of specifications tomorrow (Fig 1).

Electronics systems have always consisted of both active and passive components. In time, these components are replaced by the next generation of more technically advanced components, resulting in the obsolescence of the earlier devices. This is a natural progression, but by implementing a structured approach that plans for the future and looks towards the next electronics evolution, you can effectively guard against and properly plan for obsolescence on your terms.

More than ever before, common hardware standards are providing military and defence organizations with streamlined system development and communication, further helping to reduce obsolescence. Technology shifts are happening at an unprecedented pace and embedded systems and components critical to modern warfare need to keep up with these advancements.

In the past few months, we have witnessed a rapid change in the global component market. Component lead times are rapidly increasing, due to the global macroeconomic situation. This impacts the lead time for all types of products that use these components. Widely used COTS components, though, are less likely to be affected, due to the wide use of those commonly used components. By choosing military COTS products, you leverage economies of scale and benefit from an increased likelihood in continuity and reliability of supplies.

Development of open standards ensure that we are building to a common platform that will deliver practical applications like communications, C5ISR, SINGINT, EW and more, used on air, ground and sea platforms. Companies like Aitech have been working with open standards for several decades to support the common mission of developing products that help the military build equipment, while managing obsolescence. The communities established within open standards organizations, like PICMG, VITA and SOSA (The Open Group Sensor Open Systems Architecture), all work towards the common goal of lengthening the operational life of a system, while incorporating innovative technology upgrades (Fig 2).

No matter how one looks at it, component obsolescence typically means added costs—in many instances unplanned and unbudgeted—that translate into program delays and cost overruns. The burden to ensure longevity of these highly integrated, rugged embedded systems is shared across the supply chain and relies on collaboration across the partner network: from the actual parts availability through to design resources and upgrades.

The need for warfighters to access the most advanced technology built to the highest standards and reliability is not ever going to change. While system designers may not be able to eliminate all the factors affecting obsolescence, being cognizant of them will optimize time to market, while managing costs.

Component lead times are rapidly increasing, due to the global macroeconomic situation

Fig 2 - Open standards-based products offer obsolescence management via integration across different manufacturers

Domestic and international supply chains have been disrupted due to COVID-19, and the global component market has been impacted with shortages and lead times increasing rapidly. As lead times skyrocket, the component supply is affected, thereby affecting overall supply continuity. This is now the reality that military and defence organizations face today.

Meanwhile, the need for warfighters to access the most advanced technology has never went away. While system designers may not be able to eliminate all the factors affecting obsolescence, being cognizant of them will optimize time to market, while managing costs. Aitech’s COTS Lifecycle+, needs to start early

Military applications can be hard hit by component obsolescence

Aitech USA’s COTS Lifecycle+ requires teams to start early to avoid lengthy schedule delays and cost overruns. The burden to ensure longevity of these highly integrated, rugged embedded systems is shared across the supply chain and relies on collaboration across the partner network: from the actual parts availability through to design resources and upgrades.

Component lead times are rapidly increasing, due to the global macroeconomic situation

Fig 2 - Open standards-based products offer obsolescence management via integration across different manufacturers

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Global distribution view reveals major role of Asia and China

Presenting a global view of the Top 50 authorized electronic component distributors is a daunting challenge. I was not able to identify a Top 50 list of worldwide distributors across the Americas, EMEA and Asia, with companies headquartered in Asia often overlooked regardless of the large role they play globally.

The primary goal of this article was to include major authorized distributors from all three regions. The second goal was to provide total revenue data for the top electronics component country markets in Asia which accounts for over 75 per cent of the Top 50 authorized distributor global revenues in 2020. The Americas and EMEA come in far behind at 13.4 and 11.4 per cent respectively. Some 39 of the Top 50 authorized distributors are headquartered in Asia and account for over 63 per cent of distribution revenues in this analysis.

Research methodology and results

The research methodology used to underpin this article is as follows.

1) Surveys were used to gather information although participation by companies headquartered in Asia was low.

2) Research of published financial data for public companies, with some private companies also providing top-level financial data.

3) Inputs from major manufacturers and distributors was solicited to identify top distributors and provide guidance on the revenues of private companies.

4) Web-based research provided data that supported modelling and analysis used to create estimates where survey or published data was not available.

Worldwide Revenue Share by Component - 2020

- Semiconductors: 77.8%
- Interconnect: 3.1%
- Passive: 2.3%
- Electro-mechanical: 7.1%
- Computer/Systems: 6.4%
- Other: 3.3%

Total Revenue = $152.8 B

Revenue Share by Headquarters Location - 2020

- Americas: 30.5%
- Taiwan: 3.1%
- China: 14.3%
- Japan: 16.5%
- Europe: 34.6%
- Singapore: 0.7%
- South Korea: 1.2%

Total Revenue = $152.8 B
Top level results summary

The early recovery by Asian manufacturers drove stronger distribution revenue growth than the Americas and EMEA. Combined global revenues for the Top 50 Worldwide Authorized Distributors grew by 6.4 per cent in 2020. By comparison, the Top 50 Authorized North America Distributors experienced a decline of 5.9 per cent in North American sales. However, this same group of Top 50 North America distributors combined to achieve worldwide sales growth of 4.5 per cent as Asian demand compensated for North American losses.

Total worldwide revenue for the Top 50 Authorized Distributors in 2020 grew to $152.8B from $143.5B in 2019. Thirty-seven of the Top 50 distributors achieved revenue growth in 2020 with the highest from Nanjing Sunlord Electronics at 36 per cent growth and the steepest decline at Restar Group with -16.4 per cent. Worldwide, semiconductors account for nearly 78 per cent of revenues. Strongest revenue is generated by the mobile communications market at ($32.2B) followed by industrial automation ($24.7B); computers/data processing/peripherals ($23.9B); and consumer electronics ($23.5B).

The top five worldwide distributors maintained a 51 per cent share of revenues. Strongest growth as a group came from companies ranked 6 through 10 with combined growth of 11.5 per cent. The strongest growth among the top five came from WPG (21.2 per cent) followed by Macnica (13.3 per cent). Avnet experienced a -3.7 per cent decline in 2020. There are distributors with significant revenues that did not achieve a Top 50 ranking. If the Top 50 account for 90 per cent of worldwide revenue, the global electronic component authorized distributor market would be estimated at $170B.
## Top 50 Authorized Distributors

### Sales Share by Region (Percent)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>Region</th>
<th>Americas</th>
<th>Asia</th>
<th>EMEA</th>
<th>Other</th>
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<td>WPG Holdings</td>
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<td>13.56</td>
<td>1.0</td>
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<tr>
<td>7</td>
<td>Supreme Electronics</td>
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<td>4,668.7</td>
<td>21.2</td>
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<td>9</td>
<td>CEG/颇尔（DPB）</td>
<td>China</td>
<td>3,800.0</td>
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<td>17.5</td>
<td>2.4</td>
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### Type of Distributor

- **1 = Broadline**
- **2 = Specialized**
- **3 = High Service/E-Catalog**
- **4 = Limited Line**

### Top 50 Authorized Distributor Report 2021 Global Edition

**Rank 2020**

<table>
<thead>
<tr>
<th>Rank</th>
<th>Company</th>
<th>Total Sales</th>
<th>Growth 2020/2019 (Percent)</th>
<th>Share of Top 50 Total Sales (Percent)</th>
<th>Americas</th>
<th>Asia</th>
<th>EMEA</th>
<th>Other</th>
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*Type of Distributor: 1 = Broadline; 2 = Specialized; 3 = High Service/E-Catalog; 4 = Limited Line

(1) Avnet includes Farnell (2) Nexty Electronics includes Toyota Tsusho and Tomen (3) Restar Group includes UKC Electronics and Restar Electronics (4) Best of Best Holdings includes Honestar & AsiaCom Technology Alliance
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No excuse for counterfeit

John Denslinger reminds buyers there are many systems in place to help avoid counterfeit components regardless of the Covid induced supply chain disruptions

Among the many benefits of connectivity, perhaps e-commerce stands at the forefront of technological achievement. It provides users with convenience, options, tracking and buying power with astonishing simplicity. For procurement, the story is much the same: e-commerce is the new DIY norm for sourcing components, specs, cross references, test documents, product availability, shipping information and, of course, pricing. DIY does have risk though, so one must understand caveat emptor—the principle that the buyer alone is responsible for checking the quality and suitability of goods before a purchase is made.

Sourcing components isn’t always easy. Procurement must constantly manage a complicated supply chain, challenging specs and just-in-time delivery, rarely with senior management involvement. Have a major shipping delay, a product failure or cause a line to go down and suddenly procurement is the epicenter of everyone’s attention. The pressure to find the quick-fix is powerful.

Caution, caution! Panic sourcing makes you a prime target for bad actors promoting counterfeit products as authentic. These bad guys are back again in full force thanks to an unfortunate sequence of industry disruptions: tariffs, Covid and semiconductor shortages.

Tariffs under the previous administration were employed to pressure reforms in global trade and promote IP integrity. The actual rhetoric was probably more damaging by creating supply chain uncertainty and an expensive restructuring of long-established supply lines.

Covid was the next unknown to hit and its variants still are. During the vaccine development phase, consumers curtailed spending, industries suspended production and governments limited basic commerce. In the next phase as vaccines were administered, re-opening became inconsistent and prone to quick policy shifts by all levels of government. Manufacturers geared up but labor shortages and lingering doubts about demand strength persisted.

Most recently, there was the global semiconductor shortage that seemingly surprised the world. As recovery accelerated, it’s now obvious capex spending during the Covid years did not keep pace with actual demand. In hindsight, the fiscal uncertainty surrounding tariffs and Covid ultimately played a major role derailing normal investment, planning and execution. Worse yet, the chip supply gap to America’s industries is now projected to last well into 2023.

All this to say, there’s no excuse for counterfeits entering your operations. Buying product directly from the manufacturer is your most secure avenue. Sourcing authorized distribution is an equivalent alternative.

Lastly and perhaps one of the toughest sourcing tasks may be EOL products. Be sure to check out companies specifically authorized and licensed by manufacturers. Rochester Electronics and Flip Electronics are two prominent ones offering their own unique end of life components and services. Again, the key word is ‘authorized’.

If your component is not sourced from one or more of the above, beware. Odds are, it could be counterfeit. There really is no excuse for fake product entering a manufacturing environment.
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BCL Enclosures’ new series of rugged, die-cast aluminium alloy enclosures is designed to protect electronic instruments. Rated to IP54 against dust ingress and water splashes from any angle, these enclosures provide excellent EMC protection. For easy PCB mounting, the side walls have a draft angle of two degrees or less. Manufactured from aluminium alloy to BS1490, the enclosures are supplied in a natural die-cast finish with lap-joint construction. Lids are retained by M3.5 by 12 countersunk screws. The enclosures are easy to machine to suit individual applications.

Seven sizes are available, ranging from 188 by 120 by 78mm to 52.5 by 38 by 27mm.

Aluminium enclosures tough yet easy-to-machine

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www.bclenclosures.com

AC/DC supply offers 300 per cent peak power

Components Bureau has introduced Cosels’ AEA600F power supply designed for applications requiring a high level of safety. The AC/DC 600W product offers 24, 36 and 48V outputs with respective current ratings of 25, 16.7 and 12.5A. Output voltage can be adjusted using a built-in potentiometer.

The product can deliver 300 per cent peak power for up to 1,000ms, suits body floating applications and complies with 2MOPP and 1MOPP safety requirement. The AEA600F is certified to the EN62477-1 Over Voltage Category Three (OVC III).

The AEA600F uses active power factor corrector and the switching stage uses an LLC resonant topology deploying the latest generation of power semiconductors, offering efficiency of up to 95 per cent.

For additional power up to six units can be connected in parallel. By adjusting the master output voltage the other units automatically adjust to an equal value.

www.componentsbureau.com

Adding colour film technology to PMVA displays

GTK has enhanced its PMVA display options by adding colour film technology. This custom film sits behind the PMVA glass and enables up to 12 colours, which compares favourably with printing technology which only allows a maximum of four colours. PMVA displays have the added advantage of excellent contrast ratios and a wide temperature range from -30 to 85°C.

PMVA displays are fundamentally monochrome but colour printing, LED arrays and colour film, lets OEMs add colours, resulting in reliable and cost-competitive products.

GTK’s business manager for displays, Clive Dickinson, said: “This is a great addition to our display capabilities, as PMVA technology and its price point compares very favourably with TFTs. The new colour film technology opens up new possibilities for OEMs with the increase in colour combinations. This technology is ideal for a wide range of applications, including automotive, process controls, instrumentation, home automation, industrial controls and many more.”

www.gtk.co.uk

Low phase noise oscillators suit 5G

IQD has launched new low phase noise oscillators, the IQXO-408 and IQXO-455, available in industry standard packages measuring 2.5 by 2.0mm and 3.2 by 2.5mm. These CMOS clock oscillators can perform with a close in phase noise as low as -113dBc/Hz @ 10Hz and far out phase noise as low as -175dBc/Hz @ 100kHz. They are available at either 1.8, 2.5 or 3.3V with a phase jitter down to 40fs RMS (over 12kHz to 5MHz).

As application requirements drive greater data rates, more ultra-low phase noise oscillators are required. Such applications are prevalent in connected environments such as fibre transceivers, gigabit Ethernet and 5G base stations.

The company states common uses for the IQXO-408 and IQXO-455 include IoT, 5G, PLL, frequency multiplier, clock recovery, gigabit Ethernet, fibre, studio grade and high-end consumer audio equipment.

www.iqdfrequencyproducts.com

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Requirements for Soldering Electrical and Electronic Assemblies

Repair Rework and Modification of Electronic Assemblies

Requirements and Acceptance for Cable and Wire Harnesses

Qualification and Performance Specification for Rigid PCB’s

Acceptability of Printed Boards

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Hylec-APL’s new DFH02 fuse holder features a transparent insulation cover which protects the fuse and simplifies installation and removal. The holders provide a secure and safe method for mounting fuses on all PCB types. Easier to install than fuse clips, holders are low-cost and ensure a reliable electrical and mechanical connection.

The 22.6mm pitch device can be directly mounted to the PCB (horizontal orientation) or thru-hole mounted (vertical orientation). Electrical rating is 6.3A at 250VAC maximum. Base material is glass-filled PA66, offering mechanical strength and dimensional stability. It meets UL94V-0 flame-retardancy standards. The transparent insulation cover is rated UL94-V2.

Dimensions are 13.5 (h) by 9.0 (w) by 22mm (l). Total height, with cover, is 15.0mm.

www.hylec-apl.com

Cliff Electronics has introduced a versatile USB-C male to female connecting cable which supports charging at 60W, USB 3.1 5Gb/s data transfer speeds and can be used as a video cable for 5k@60Hz video output (Thunderbolt 3) and audio transmission.

When used in a system equipped with Cliff FeedThrough connectors—XLR and SLIM versions—the cable can be used to connect a monitor in the same way as existing HDMI and VGA FeedThrough connector versions. Cable lengths range from 0.3 to 2m.

Cliff Electronics’ MD, John Hall, said: “USB-C ports are now appearing on many new devices including monitors, laptops and flash drives and 25 per cent of new cars are predicted to have them by 2025. Major mobile phone manufacturers are now designing USB-C connectors into their latest models enabling high speed charging and a one cable solution for charging.”

The cables can be used with a range of Cliff USB-C XLR and DualSLIMS footprint female to male FeedThrough connectors, available in metal or plastic.

cliffuk.co.uk

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cliffuk.co.uk

Fuse holder features transparent cover

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www.hylec-apl.com
Derby based Tioga Limited, founded in 1996, has developed into one of the UK’s leading Contract Electronic Manufacturers.

Offering a broad spectrum of electronic assembly, the heart of Tioga’s manufacturing facility is based in Derby right in the centre of the UK in a beautiful listed railway building. The site has been custom converted and fully refurbished into a modern, extensive and sophisticated plant housing state of the art equipment.

Our core competencies far exceed just manufacturing; this encompasses design, engineering support, global procurement and supply chain, manufacturing, test, configuration, warehousing and distribution. In short, we are able to take on board the management of customers’ products in their entirety.

Dave Oakley has taken the new role of Manufacturing Director at Tioga.

We would like to welcome Dave to the Tioga Team, he is replacing Helen Higginbotham after 36 years of service. At a time when the industry is going through some tough times with Covid and major supply chain issues he does have a challenge and of course Helen is a hard act to follow.

Good Luck Dave, we are all behind you!

Visit our Website to view our New Corporate Video.
www.tioga.co.uk
British manufacturing: a roller coaster ride

Texcel explains how its investment in people, relationships, software and machinery is helping it navigate today’s everchanging market

UK manufacturers are on a roller coaster ride right now, with numerous ups and downs. The good news is the outlook for British manufacturing is extremely good with record increases in output in 2021. The challenges are predominantly supply chain related, due to Brexit and the pandemic.

Texcel’s ‘new normal’ is constant change and the company has systems in place to continuously review production programmes. The ERP system has been enhanced, offering agility in procurement and manufacturing schedules. The company’s procurement experience and is working closely with customers on forecasting and forward ordering.

The combination of financial stability and long-standing relationships with key suppliers means Texcel has increased its stockholding of essential components. Likewise, the company is continually re-investing in capital equipment to improve productivity and efficiency.

The cumulative effect of agility, investments and employees means the company has increased output and client support during these challenging times.

www.texceltechnology.com

Welcome to the virtual factory

Nano Electronic Services’ virtual factory concept is designed to save customers time, money and aggravation

‘Time is money’ is an aphorism that originated in a 1748 Benjamin Franklin essay Advice to a Young Tradesman and it remains valid today. In many engineering companies, people wear multiple hats and perform a number of repeat tasks. By removing some of this repetition, it allows the employee to focus on key aspects of a project rather than repeating the same thing over and over.

Nano Electronic Services appreciates ‘time is money’ and looks to save customers time and aggravation when sourcing electronic assemblies. By breaking the link between customer and individual suppliers, NanoES has created a virtual factory. Instead of sending multiple RFQs, send one and NanoES does the rest, identifying the best supplier and negotiating the best price, all with full transparency.

www.nanoelectronicservices.com
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During 2020 and with the impact of the pandemic, Electronics Sourcing readers have contacted MMG Publishing to request help and assistance to source components due to workloads / lack of stock or hard to find components. To assist readers requirements, Component-Sourcing is a new free sourcing service provided by the publisher of Electronics Sourcing magazine.

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Solving global supply chain challenges

Incap Electronics UK’s managing director, Jamie Maughan, is confident that open communication is key to maintaining customer relations during unpredictable times.

The pandemic and challenges in component availability have impacted the global EMS supply chain. In this article, Incap Electronics UK shares guidance on how to tackle these challenges.

Incap Electronics UK’s managing director, Jamie Maughan, recognizes that while 2020 was particularly unpredictable for all business sectors, the impact of the pandemic is ongoing: “Even though we are half-way through 2021, the business-environment around us at Incap UK has remained extremely dynamic, without strong foresight for the future.

“Due to the pandemic’s impact, plus global component shortages, electronic component allocation, rapidly growing IoT sector and shorter product life cycles, the global supply chain is currently facing challenges which threaten the daily work of companies in different sectors.”

Maughan describes that in a situation where the price of raw materials for EMS components is constantly increasing and manufacturers are trying to deliver their products and services to everyone, while it is not always possible in the desired quantities, solutions must be found to maintain successful customer relations.

Maughan added: “We are not able to change the global supply chain, but we are able to adjust according to the situation. The key here is in open communication. We have established a smooth communication process with our customers and suppliers to find solutions for securing our stock with necessary details or finding alternatives to components we need. We submit newsletters with our supply chain overviews and keep our stakeholders on top of the situation.”

Maughan believes that open communication is the key factor in every business, not only EMS, and strongly suggests companies keep it as a cornerstone of their business strategy.

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TT Electronics has added three new product families and three series expansions to its variable resistor portfolio. Additions include one new encoder series and two new single turn potentiometer families, along with the broadening of three existing potentiometer families. These new products are ideal for rugged industrial applications such as welding equipment and machine controls, plus a variety of professional audio applications, including electric guitars, amplifiers and mixers.

As an example, the EN05 series miniature rotary encoder is an innovative solution for precision control of small portable equipment. They are designed for long life (100,000 cycles minimum) in a 5.8mm wide package. Its compact size and hollow shaft design make the encoder ideal for applications where space is limited but precise control is required, such as computer accessories and electronic devices.

TT Electronics’ VP product management and engineering, Barry Peters, said: “With more technical variations than ever before, our portfolio offers designers greater flexibility to enhance the quality and reliability of their end products.”

www.ttelectronics.com

Lane Electronics can modify 8STA connectors to customer’s requirements in their in-house machine shop, on short lead times and with no MOQ on stocked items.

Souriau 8STA circular connectors share the same materials and design features with larger mil-spec connectors such as the popular D38999. They perform equally reliably under extreme conditions and are designed for applications where high performance, small size and light weight are key.

Typical applications include Motorsport and UAV, engine control units, portable communications equipment and data acquisition systems. The 8STA Size 01 is the smallest circular connector available with three #26 removable contacts. It is the perfect solution for size and weight reduction in extreme vibration environments.

Key features include 13 shell sizes, up to 128 contacts from 3 to 200A and six/seven colour coded keyway orientations. Both free and panel-mount shell styles incorporate a compact integrated back shell for a heat shrink boot and the fixed halves are available with dual or space saving single hole panel-mount fixing.

www.fclane.com

Allegro MicroSystems’ new giant magnetoresistance speed sensor measures the rotation of ferromagnetic gears. The ATS19480 speed sensor IC provides a single-channel solution for hybrid and pure electric vehicle transmissions, with applications extending to two-wheelers, off-road vehicles and machines requiring speed-only information.

An industry-leading air gap 50 per cent larger than existing options improves design flexibility, expands design margin/tolerance capability and facilitates a wider range of sensor installation locations. This helps reduce system complexity, size, weight, cost and energy consumption.

Allegro’s magnetic speed business unit director, Peter Wells, said: “As our newest single-chip GMR solution for gear tooth sensing, the ATS19480 optimises performance for emerging electric vehicle applications. It’s unique to the market and outperforms competing technologies because of the high air gap and level of accuracy.

“Our new speed sensor allows designers to do things that haven’t been possible until now. It can be placed virtually anywhere; transmissions can be smaller and lighter than ever before, which is especially important in applications where designers want the speed-only protocol. It’s a real game changer.”

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Customising capacitors in the UK

Charcroft’s Debbie Rowland explains how UK design and manufacture of custom capacitors and assemblies simplifies procurement for audio, rail and industrial

Customisation is a valuable engineering option to meet high component specifications or to fit a new/legacy footprint. For buyers, customisation carried out in the UK can make sourcing faster and simplify procurement paperwork.

One of the problems with sourcing custom capacitors for audio, rail and niche industrial sectors is the comparatively low volumes. While some global component manufacturers produce capacitors for these sectors few, if any, have the bandwidth to manufacture custom capacitors or assemblies in such low volumes.

There are smaller component manufacturers which focus almost exclusively on high-end audio but high-level customisation is not a standard service.

Development of a custom capacitor is driven by the customer. One reason a custom capacitor or assembly is essential is to ensure the component delivers the right parameters in the available footprint. It could be a higher capacitance, voltage or current rating with an optimized equivalent series resistance (ESR).

The answer may be found in the special design of a single capacitor or by combining multiple capacitors in a single case with custom packaging to fit a space envelope.

Designing a capacitor presents multiple options, starting with the choice of dielectric film, metallisation material and pattern, plus key dimensional characteristics directly impacting the capacitor’s performance. Multiple termination options exist and further testing and conditioning can affect the part’s stability. Capacitors can be matched together where stability is critical, such as railway signalling applications.

For audio applications, minimising unwanted resonance is key. The factors which impact resonance have been identified and measured through years of research and development, resulting in treatments applied during winding manufacturing. Using multiple, series-wound windings can also reduce resonance by shortening the active area, while packaging inside a custom acrylic tube further dampens resonance.

As recent acquisitions by Charcroft, the focus for ClarityCap and ICW Film Capacitors is audio and rail/niche industrial respectively. All these capacitors are designed and manufactured in Wrexham, UK, enabling interaction in the same time zone/language, plus fast turnaround.

A shipment of customised passives from Europe can take up to a week. Instead, ClarityCap and ICW ship directly from the Wrexham plant using parts from Charcroft UK-held franchised distribution stock. This can enable a one-day turn-round and means an urgent custom part can be provided to the customer in 24-hours.

Iterations are fast too. In a recent customisation, six iterations were completed in three weeks, including initial specification to drawing.

There are smaller component manufacturers which focus almost exclusively on high-end audio but high-level customisation is not a standard service
Capacitors can be matched together where stability is critical, such as railway signalling applications.

For audio manufacturers, a capacitor’s sound is only the start of the wish-list: look is often just as important. There is a breakthrough audio capacitor being designed and manufactured by ClarityCap in the UK. For the capacitor’s looks to match its sound quality, it will be housed in a British Racing-Green case with a gold-glitter fill at each end. Capacitor branding includes adding the customer’s logo and corporate colours, plus the customer’s choice of leads and well-known audio interconnect brands.

www.charcroft.com

Bank of four capacitors

www.gelec.co.uk
Plan, plan, plan

Following 18-months of turbulence, FermionX’s commercial director, Will Patrick, is confident UK manufacturing industry will bounce back, more agile and flexible than ever.

There’s no denying, it’s been a tough 18-months. As an industry, we have navigated our way through Brexit, a global pandemic and are now experiencing unprecedented component shortages. Like many British businesses, FermionX had to adapt quickly. Not just changing internal processes but also coping with the strain imposed on the global supply chain.

As an industry, we need to ensure we’re more flexible and agile with our operations, especially when it comes to supply chain and obsolescence management. Working closely with suppliers and customers to seek alternative solutions, without compromising on quality where budgets may have been cut and delays in components starts to take its toll.

Regular communication is vital. It has been a difficult time for everyone and there are many unknowns. That’s why any forewarning of potential issues arising down the line, lets businesses relay this information to their customers.

Forward planning and early scheduling help reduce delays on projects and ensure business continuity. Working closely with account managers and procurement teams on production forecasting spreads lead time risks through the supply chain. The businesses seeing the least disruption are the ones with robust forward ordering. Whilst not a luxury everyone can afford, it helps ensure business continuity for everyone. It’s a frustrating time for us all in the industry but we’ve got to work together and do what we can to support one another.

The pandemic has also taught us how fragile life can be, which is why investing in the future is so important, whether that means investing in capital to expand the service offering; upskilling or expanding your team to add further capacity; or simply adapting the services to help customers grow and thrive over coming years.

Despite the uncertainties, electronic manufacturing remains one of the UK’s most exciting industries— with growing demand in electric vehicles, product miniaturisation and advances in medical and laboratory equipment. The world looks to the UK to deliver the highest quality products.

FermionX remains fully committed to keeping the UK’s electronics manufacturing industry moving and is proud to be playing its part in recovering lost ground. We’re looking forward to supporting and finding solutions for our customers and building on the services we offer.

FermionX continues to offer socially-distanced site visits, virtual tours and remote quality control audits.

As an industry, we need to ensure we’re more flexible and agile with our operations, especially when it comes to supply chain and obsolescence management.

www.fermionx.com/ecs
We’re proud to be a part of the UK electronic manufacturing industry

In what has been a tough year for everyone, we’re committed to getting the electronic manufacturing industry thriving again. And look forward to finding solutions to help our customers (old and new).

Talk to our team today, to see how we can support your production requirements.

Get in touch today
Tel: +44 (0)1903 524 600
Email: sales@fermionx.com
www.fermionx.com
What's New

Powering machine vision

Sick's InspectorP611 2D vision sensor is described as an ultra-compact, ultra-powerful all-in-one device for conducting reliable inline machine vision inspections, even in tight spaces or mounted on robot arms.

Sick’s UK product manager for imaging, measurement and ranging, Neil Sandhu, said: “It might be the smallest of the InspectorP600 family of programmable 2D vision sensors, but the InspectorP611 packs the power of its larger siblings into a miniature device that fits in the palm of your hand.

“Their design is such that, whether you are a novice or an expert, it is quick and easy to configure your machine vision application using the onboard image processing tools provided within the Sick Quality Inspection SensorApp. It’s also simple to download additional free tools for specific applications, such as glue bead inspection, while more experienced users have the flexibility via the programming interface to access time-saving, ready-made code so they can fast-track customised inspections. Meanwhile even inexperienced users can progress to Deep Learning, starting from a low cost of ownership.”

www.sick.co.uk

Cable assemblies are corrosion resistant

Designed to withstand extremely harsh environments, Nautilus cable assemblies with stainless steel (303) SMA connectors offer peak performance against corrosion. They are rated to IP67, IP68 and—for the first time in the Nautilus range—IP69K for high pressure and high temperature washdown protection.

GradConn’s global sales and distribution manager, Andy Hamlin, said: “Nautilus stainless steel is a glimpse into our strategy to shift IP-rated cable assemblies into new and exciting markets. We are proud to introduce IP69K capabilities to the Nautilus range for the first time to help diversify our offering. Incorporating stainless steel with other connector variants is in development and is just one of several enhancements we have in store for Nautilus this year.”

The company is addressing demand for assemblies used in increasingly demanding environments including sewage and waste management, mining, marine, food preparation, and agri-tech/hydroponics.

www.gradconn.com
HOW MUCH MORE COULD YOU SELL IF YOU HAD A FLEXIBLE PARTNER?

NOTE Group offer three flexible manufacturing locations in the UK, Windsor, Stonehouse and Haddenham.

- Flexible Product Fulfilment Solutions
- Global Network of Manufacturing Locations
- Product Lifecycle Management
- Development & Engineering Collaboration
- Flexible Supply Chain Solutions

• Committed
• Proactive
• Quality Focused
• Flexible

To discuss your manufacturing requirements call Andy Thwaites on 07766 311419 or visit www.note-ems.com for more information
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## Buyers' Guide

### ICs & SEMICONDUCTORS

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### POWER & BATTERIES

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ManufacturerTelephoneWebsiteTurnoverLocationEmployeesISO Approvals
Challenger Solutions Ltd01254 352523www.challengersolutions.co.uk£10mEssex/SE40
CML Innovative Technologies Ltd02089 474070www.cml-ltd.com£24mEssex/SE, China45
Carinthia Ltd+44 (0)1438 656655www.carinthia.com£3.5mUK/ Far East72
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Lemo Limited01448 346600www.lemo.com£2.9mSE120
M-TK (Assembling Ltd)01381 451317www.m-t.com£2.4mSE90
PELkon01553 833424www.pelkon.com£1.5mE-Middletons310
Safran EMS Ltd01841 233120www.safranems.com£2.7mSE77
TEXCEL TECHNOLOGY PLC+44 (0)1262 617000www.texceltechnology.com£1.5mSE131
Tonga Limited01533 266884www.tonga.co.uk£2.9mDerby110
Wilson Process Systems01424 722220www.wps.co.uk£2.5mSE100

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CML Innovative Technologies LTD 28 Components Sourcings
Coppia Ltd 24 Design Engineering Expo 19
Digi-Key Electronics FC, IFC, 20 eBOM.com 36
ECIA (Trusted Parts) 35
Erlonadie Electronics Ltd 33
Euroquartz Ltd 35
FerminX Ltd 35
Galco IBC

Advert Index

AdvertAdvanced Rework Technology Limited 23
Anglia Components 26
Best Windings Limited 41
Bondline Electronics Ltd 31
CML Innovative Technologies LTD 28
Components Sourcings 27
Corintech Ltd 39
Cupio Ltd 24
Design Engineering Expo 19
Digi-Key Electronics FC, IFC, 20 eBOM.com 36
ECIA (Trusted Parts) 35
Erlonadie Electronics Ltd 33
Euroquartz Ltd 35
FerminX Ltd 35
Galco IBC

AdvertG English Electronics Ltd (Gelec) 33
Hammond Electronics 8
Hirose Electric Europe B.V. 7
Kemtron Ltd 31
Mouser Electronics 7
Nano Electronic Services 26
Nemco Ltd 29
NOTE Group 37
OKW Enclosures Ltd 17
Rebound Electronics 11
Reochester Electronics 13
Schurter Electronic Components 31
Tate Circuits 27
Tioga Technology 27
Tiong Ltd 25
Vanilla Electronics 15

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MCL Circuitry01462 394512www.mclcircuitry.co.ukMSE ISO9000: 2015 SML Y 4-10 Y N/A Y Y Y Y
Cartridge Circuit Company Ltd01231 431030www.cartridgecircuit.co.ukMSE ISO9000: 2015, UL, ISO 14001:2015 SML Y 4-16 Y N/A Y Y Y Y
DK Daniel Printed Circuit Boards01921 510060www.dk-digital-flux.co.ukMUEurope, AsiaISO 9001:2001, UL, TS16949, ISO/SEML Y 4-18 Y N/A Y Y Y Y
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