

ELECTRONICS

MAY 2023

# sourcing

AN MMG PUBLISHING TITLE

NORTH AMERICA

## TOP 50 AMERICAS DISTRIBUTORS REPORT 2023







**Goodbye frustration.**  
Hello instant digital connections.

**Streamline your procurement process with APIs from Digi-Key.**

Get your free API eBook at [digikey.com/api](https://www.digikey.com/api)



Digi-Key is an authorized distributor for all supplier partners. New products added daily. Digi-Key and Digi-Key Electronics are registered trademarks of Digi-Key Electronics in the U.S. and other countries. © 2023 Digi-Key Electronics, 701 Brooks Ave. South, Thief River Falls, MN 56701, USA

 **ECIA MEMBER**  
Supporting The Authorized Channel





## On the cover – May 2023

Top 50 Americas Authorized Distributors Report 2023  
page 23

# Editor's Word



## Battle for planet purchasing begins

This issue of *Electronics Sourcing* has dedicated the bulk of its page count to the *Top 50 Americas Authorized Distributors Report 2023* (starts page 23), authored by the ECIA's chief analyst, Dale Ford. Throughout the feature, executives comment on a wide range of topics from inventory management and ESG to energy reliability. Reading through the article one word appears more than most: data. Likewise, John Denslinger's article (page 20) is dedicated exclusively to artificial intelligence.

So it begins, the ultimate clash for purchasing supremacy is about to be fought between human and artificial intelligence. I'm close to this for a number of reasons. Firstly, alarm bells are ringing left, right and center suggesting services such as ChatGPT are on the verge of obsoleting my role as a writer and editor. Secondly, as a software developer I'm looking to see how AI could benefit the applications I design.

Thirdly, and most importantly for my *Electronics Sourcing* audience, I've thought for a long time that the end-to-end lengths of some component supply chains are so long and tortuous they are breaching the capabilities of human management.

As other articles in this issue confirm, the electronics industry continues along its cyclical waveform of over and under supply. What matters is the frequency and amplitude of the waveform. As AI starts reaching into the supply chain I expect to see a steady decrease in both measures leading, ultimately, to a straight line sometime over the next 50-years.

*Jon Barrett*

## Contact

### EDITORIAL

**Managing Editor:** Jon Barrett  
jonb@electronics-sourcing.co.uk  
**Contributing Editor:** Amy Barker  
amyb@electronics-sourcing.co.uk

### ADVERTISING

**Director of Sales:** Emma Evernden  
emma.evernden@electronics-sourcing.co.uk  
**Sales Executive:** Alex Mosqueda  
alex.mosqueda@mmgpublishing.co.uk  
**Sales Executive:** William Leary  
william.leary@mmgpublishing.co.uk

### PRODUCTION & DESIGN

**Production & Design Manager:** Josh Hilton  
josh.hilton@electronics-sourcing.co.uk

**Electronics Sourcing** **mmg**  
PUBLISHING

**Junior Creative Artworker:** Tom Claydon-Smith  
tom.claydon-smith@electronics-sourcing.co.uk

### CIRCULATION

**Data and Software Analyst:** Thomas Smart  
thomas.smart@electronics-sourcing.co.uk  
**Circulation Account Manager:** Liz Poole  
liz.poole@electronics-sourcing.co.uk

### PUBLISHER

**Mark Leary**  
mark.leary@electronics-sourcing.co.uk  
**Director of Operations:** Denise Pattenden  
denise.pattenden@mmgpublishing.co.uk

Issue 128, Vol.14 No.05

Published 12 times per year  
by MMG Publishing US Ltd

MMG PUBLISHING US Ltd  
Normandale Lake Center  
8400 Normandale Lake Boulevard  
Suite 920, Bloomington MN 55437  
Tel: 866.364.0951  
Fax: 952.378.2770  
@Electrosourcing

Printed in the United States  
ISSN 2835-0650  
© 2023 MMG Publishing US Ltd



ELECTRONICS  
SOURCING  
IS INDEPENDENTLY  
ABC AUDITED  
2005/2022

**ecia**  
Connect Influence. Optimize.

## NEWS



Buying into resistor  
manufacturing

04

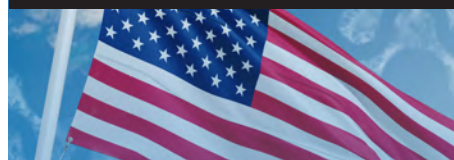
## HARSH ENVIRONMENTS



Intelligent solutions for  
harsh environments

12

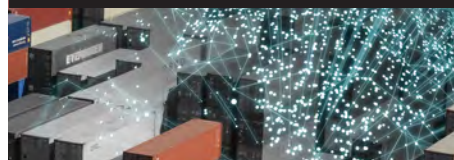
## TOP 50 AMERICAS AUTHORIZED DISTRIBUTORS REPORT 2023



Distributors deliver  
back-to-back 20 per  
cent growth years

23

## TOP 10 AMERICAS INDEPENDENT DISTRIBUTORS REPORT 2023



Capacity challenges persist

68

## BUYERS GUIDE



All the facts and figures  
to help you buy

95

Articles appearing in this magazine do not necessarily express the views of the Editor or the publishers. Every effort is made to ensure the accuracy of information published. No legal responsibility will be accepted by the publishers for loss arising from articles / information contained and published. All rights reserved. No part of this publication may be reproduced or stored in a retrieval system or transmitted in any form without the written consent of the publishers.





## Buying into resistor manufacturing

Bourns has acquired substantially all of the operating assets of Riedon a manufacturer of resistors headquartered in Alhambra, California. Riedon's products are used to help enhance efficiency and reliability.

Bourns Protection Division's president, Craig Shipley, said: "As a leader and innovator of custom, high quality resistive solutions, Riedon's products are well known for their stability over time even within extreme environments. Including Riedon's broad portfolio of thick-film, thin-film, wire-wound and shunt resistor products gives us a valuable

addition to Bourns' resistors product line. This acquisition represents an important step in our continued protection portfolio growth strategy."

Bourns' president, Al Yost, added: "The acquisition complements Bourns' existing resistors product line and enables us to offer our customers a broader and deeper range of resistive and current sense product solutions. It also puts Bourns in a favorable position to better meet the technology and advanced product demands of high growth markets."

[www.bourns.com](http://www.bourns.com)

## Adaptor boosts backshell options

Sager Electronics is now stocking Conxall's Multi-Con-X extra-large backshell expanded line of high-performance, sealed circular plastic connectors.

The company states Multi-Con-X has set the industry standard for sealed circular plastic connectors for nearly 50-years. This new adapter allows the much larger backshell from the Mega-Con-X to be used with the Multi-Con-X. It is offered in a kit with one of two backshell sizes or as part of a complete connector kit. Multi-Con-X is compatible with any Multi-Con-X cable plug or cable-to-cable connector. Available options cover a wide cable diameter range from 10.2 to 14.5mm. Includes screw-down cable clamp and elastomer strain relief.

[www.sager.com](http://www.sager.com)

## Instant access to auto comms

Mouser Electronics is now shipping Jody-W3 host-based automotive modules from u-blox. The modules are designed for increasing numbers of wireless high-speed, high-data communication connections for automobiles and industrial IoT applications from manufacturing automation and machine control to security and surveillance.

The modules offer concurrent dual-band (2.4 and 5GHz) multi-radio capability, featuring WiFi6 with 2x2 MIMO and dual-mode Bluetooth 5.1. They suit data intensive in-vehicle infotainment and telematics applications like: creating in-car hotspots; implementing WiFi display features like Apple CarPlay; and streaming video across multiple devices.

Using NXP's AW690/88Q9098/88W9098 chipsets, the series supports a higher density of high data devices with less data congestion, while simultaneous Wi-Fi, Bluetooth 5.1 and Bluetooth Low Energy (LE) capability provide increased multichannel communication performance for wireless and cloud connectivity.

Measurements are 19.8 by 13.8mm, while maximum ambient operating temperature is 85°C. These modules comply with u-blox' qualification policy, based on AEC-Q104 and ISO/TS 16949 AEC-Q104 standards.

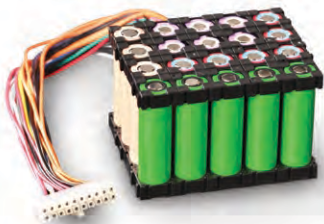
[www.mouser.com](http://www.mouser.com)







WITHOUT THE RIGHT **BATTERY SOLUTION**  
IT MAY AS WELL BE A PAPER WEIGHT.



## BATTERY SOLUTIONS

From standard batteries to custom battery packs and battery systems, Sager Electronics are experts in matching your power requirements with proven, ISO-certified, cost-effective solutions. We offer all battery chemistries including Lithium Ion, LiFePO4 (LFP), Lithium Primary, Nickel-based, Sealed Lead Acid (SLA) and Pure Lead. If your project goes beyond off-the-shelf, our engineering team will work with you to design and manufacture the perfect custom solution.



[sager.com](http://sager.com) | **POWER YOUR WAY**







### In Brief

#### Investing in printed electronics

East West Manufacturing has acquired Eastprint Incorporated, a printed electronics solutions provider. The acquisition differentiates East West's capabilities in printed electronics and human machine interface technologies, with applications across membrane switches, printed electronics, in-mold electronics, biosensors and wearables. East West also benefits from Eastprint's customer relationships in markets including medical products. [ewmfg.com](http://ewmfg.com)

#### Rare earth finds inform lithium demand

OCI's CEO, Oliver Chapman, comments on recent developments with rare earth minerals finds in India: "Recent news of rare earth mineral finds in India, in Jammu, Kashmir and the Ananthapur district illustrates that the supply of rare earth minerals will grow with demand and that more regions will emerge as sources of supply." [www.oci-group.co.uk](http://www.oci-group.co.uk)

#### Build electronics better

Hundreds of experts from around the world will discuss electronics manufacturing standards in more than 80 meetings at IPC SummerCom in Milwaukee. Facilitated by representatives from OEMs, PCB manufacturers, EMS providers, design firms and other organizations, IPC standards development committees establish benchmarks for excellence in electronics manufacturing. [www.ipc.org/standards](http://www.ipc.org/standards)

#### Providing custom enclosures

RS is offering over 4,900 fully customizable electrical and electronic enclosures from Hammond Manufacturing. Hammond can factory modify over 2,100 electrical enclosures and 2,700 electronic enclosures that RS has in stock or available for drop-shipping during the order fulfillment process. Most modifications can be completed in just a few weeks. [us.rs-online.com](http://us.rs-online.com)

### Cable-assembly product line extended

Molex has extended its cable-assembly product line with solutions from I-PEX, a specialist in high-frequency, high-speed transmission connectors. Together, the organizations offer I-PEX MHF 4L LK and MHF I LK cable assemblies, available in multiple configurations using standard MHF receptacles and Molex RF connector interfaces.

The MHF I series of micro-RF coaxial connector systems takes advantage of I-PEX's patented locking mechanism to add another layer of connection reliability and security. Inspired by operation with drones, the patented locking system suits rigorous connectivity demands

across the automotive, consumer electronics, data center, medical, smart appliance, and telecommunications industries.

Molex' group product manager, RF connectivity, Donna Wallburg, said: "Molex is pleased to team with I-PEX in taking robust and reliable connectivity to the next level. As part of our continued collaboration, we offer a one-stop source for solutions that address the most rugged RF applications while keeping pace with ever-increasing RF cable assembly demands."

[www.molex.com](http://www.molex.com)

### Tantalum nitride anti-moisture resistors on short lead times

Current market conditions are making it challenging to find common components such as precision chip resistors. If the application requires robust

stability and moisture withstanding, tantalum nitride technology is a great solution. Unfortunately, tantalum nitride resistors can have long lead times and aren't typically available from stock.

Stackpole's RTAN series is an AEC compliant precision chip resistor with popular resistance values available from stock in the 0805 and 1206 sizes. Lead times are typically 12 to 16-weeks depending on chip size.

The RTAN's sputtered resistive element is made from tantalum nitride, providing a resistor with high stability and reliability that is also impervious to moisture. The series suits harsh environmental conditions, especially where high humidity or moisture is a concern.

Applications include instrumentation, aerospace, test equipment, industrial controls, portable communications diagnostic equipment and portable medical devices.

[www.seielect.com](http://www.seielect.com)



### Powering up the charging infrastructure

Newark is stocking Eaton's newest range of electric vehicle chargers. The range is designed to provide fast-charging capabilities alongside environmentally friendly solutions. Additionally, the chargers provide the data-driven insights needed to manage the impact of charging on a building's infrastructure.

Newark's global head of technical marketing, Cliff Ortmeyer, said: "In the ever-expanding market for electric vehicles, it is important to provide the highest quality products and accessories to our clients. We are excited to have the Eaton EV charging range available so our customers can effectively charge their electric vehicles with top-of-the-line products while minimizing energy costs."

Currently, the United States has over 2.5 million battery and plug-in hybrid vehicles with the demand for charging continuing to increase. Through the offering of these products, Newark can help customers plan for EV charging implementation. To provide further insight into EV charging for its US customer base, Newark also offers additional information and resources on its website.

[www.newark.com](http://www.newark.com)



# For the Eighth Time Bourns is the Pinnacle of Global Excellence

## BOURNS®

Congratulations to Bourns, an exceptional supplier partner leading the pack to earn this year's Global Operations Excellence Award by achieving the highest score for overall global performance.

### 2022 Best Quality and Diamond Awards



**KOA**®  
KOA SPEER ELECTRONICS, INC.



### 2022 Americas Supplier Excellence Awards



Platinum Award

**BOURNS®**

**KOA**®  
KOA SPEER ELECTRONICS, INC.

**YAGEO**

Bronze Award

 **Littelfuse®**

 **ECIA MEMBER**  
Supporting The Authorized Channel

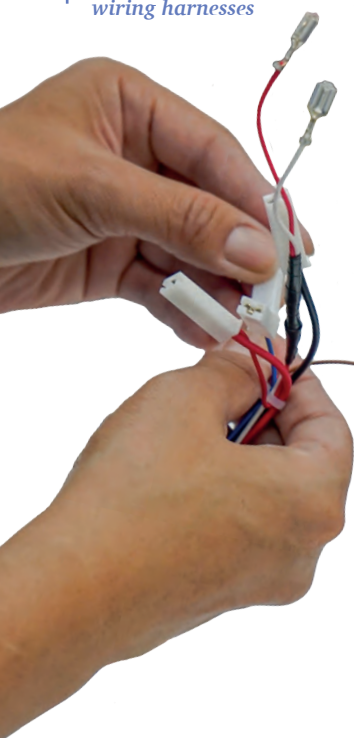
 **The  
Electronic  
Component  
Specialists**

1.800.CALL.TTI • tti.com



# Optimizing wiring harnesses

*In this article, TTI's supplier marketing manager, John Sandy, walks readers through the support services distributors can offer during the design and manufacture of wiring harnesses*



When building wiring harnesses, how helpful would it be if a capable distributor could streamline and simplify the process. With the recent supply chain issues, an authorized distributor should also have the parts to hand.

Connector selection is something most engineers are familiar with, needing little help. After that, they source samples and test them for fit and function. If additional help is needed, look to an authorized distributor with a broad and deep selection of styles and capabilities in inventory.

Quality distributors stock connectors from manufacturers that even provide pre-crimped housing and contacts as a single part number, helping ensure the connector fits and functions as imagined.

Select distributors can provide online customization tools

to specify orientation, cable lengths and anything else needed to retrieve a drawing and quote. From there, the distributor will obtain all part numbers and inventory in stock and ensure requirements are met and products are delivered exactly as needed.

Once the product is received, prototype testing can begin. This may need production quality off-the-shelf (OTS) cable assemblies in lengths that are close to that required in the final design. The distributor can provide them, including over-molding and discrete wire? Whatever engineers need, the distributor should have an option.

In addition to offering a wide range of components and seasoned expertise through each design step, an accomplished distributor should offer two things invaluable in today's fast-moving, ever-changing electronics world—available parts and an available



TTI's supplier marketing manager,  
**John Sandy**

partner—ensuring supply chain hang-ups don't slow down processes and customers have an invested source they can depend on.

For decades, TTI has worked hard to be the electronics component resource of choice that engineers rely on to provide the widest and deepest variety of quality parts exactly when customers need them along with experienced specialists to help them with all their needs.

[tti.com](http://tti.com)



## High-Performance Power Inductors for Harsh Environments

- Current ratings up to 110 Amps with exceptionally low DCR
- Through-hole (TH) mounting for rugged board attachment
- Ideal for automotive and other high-temp applications
- Low loss ferrite cores provide flat L vs I
- Magnetic shielding to minimize EMI

**Free Samples @ [coilcraft.com/AGP](http://coilcraft.com/AGP)**

# Coilcraft





# The Critical Link in Your Supply Chain

---

Fusion is your best source for quality electronic components.

Contact us today







# Distributors thirst and prep for demand-creation snapback

*Component distribution is their bread-and-butter business but high-value demand-creation is what distributors thirst for as electronics industry seeks a return to normality*

After a lull in demand-creation activities during the recent round of component shortages, when supply chain management functions—especially procurement and order fulfillment—took precedence over most other OEM support activities, distributors are angling for a swift return to more value-added services, which help them deepen relationships with component suppliers and OEM customers and defend operating margins.

As in many other economic segments, distributors have learned over the years to prioritize their customers' immediate needs in times of crisis. The Covid-19 pandemic triggered numerous problems throughout the global economy, which filtered through to the electronics industry and eventually resulted in difficult sourcing situations at OEMs. Component suppliers that had shuttered facilities or slashed production during the outbreak could not as quickly fulfill new orders pouring in from equipment manufacturers that were themselves seeking to satisfy unexpected demand.

As in the past, distributors pivoted quickly to support harried customers. OEMs' and suppliers' immediate procurement needs crowded out whatever else component distributors would have rather focused upon. As the shortages intensified late in 2021 and continued through the first half of the next year, distributors directed the bulk of their resources, including working capital and personnel, to assist OEMs navigating through the storm. Supplier needs also

became a priority. Industry observers said distributors rolled out creative sourcing strategies that helped mitigate the severity of the shortages.

Actions taken in the last two years included innovative—some would say frantic—sourcing of scarce parts, inventory stocking ahead and in anticipation of customer requirements, and close coordination of demand-supply dynamics with semiconductor manufacturers. Distributors even engaged in atypical practices such as non-cancellable orders with suppliers to calm nerves at vendors hesitant to increase manufacturing capacity. Having been burned in the past when they complied with OEM requests for high production and the addition of new facilities, suppliers needed financial assurances that they would not be left holding the bag if demand fell. Distributors understood, teaming up with OEMs to give suppliers a sense of shared risks.

Most distributors who assumed these risks took hedging measures, making sure OEMs would be on the hook for such commitments to suppliers. They still faced risks, though, as suppliers increased the amount and dollar value of non-cancellable orders, forcing distributors and their customers to assume a greater percentage of the financial exposure. At Arrow Electronics Inc., the world's biggest component distributor, the value of "purchase obligations" with suppliers increased in 2022, to \$13.4 billion, from \$11 billion, in 2021.

Avnet's Chief Executive Officer, Phil Gallagher

**"In the recent quarters, we've been consuming a lot of cash because we have to invest in the business with working capital"**



"Non-cancellable inventory purchase orders were in line with the year-earlier period, and remain elevated above historic levels, primarily due to significant increases in prices and lead times for orders during both 2021 and 2022," the company said, in the SEC filing. "Additionally, many vendors continue to limit cancellations, although many of the company's non-cancellable purchase orders are backed by customer purchase orders with Arrow, that are also non-cancellable."

**Working capital jumps**  
Naturally, working capital expenses at most distributors have risen to support their also much higher sales. Distributor executives say they have allocated more of their working capital to inventory, leading to swollen

stocks at the leading market players. Investments also went into warehouse expansion and the automation of delivery services, according to industry executive. Anything to satisfy the customer and grease long-term relationships, industry sources said. Of course, demand-creation activities were not neglected. They only took the back seat while more pressing needs became the primary focus, they said.

"In the recent quarters, we've been consuming a lot of cash because we have to invest in the business with working capital," said Phil Gallagher, CEO of Avnet, during an industry presentation in March. "Our priority was to make sure the business has what it needs to continue. It was not only for working capital but also for digital tools, and





IT systems to make us more efficient. Agility is key. Resilience is key. We have a dedicated team that works with the customer on these different transitions.”

Inventories surged as manufacturers, component suppliers and distributors struggled to ensure availability of supplies. At Avnet, inventories increased 35 per cent in the December 2022 quarter, to \$4.97 billion, from \$3.68 billion, at the end of March. An analogous situation played out at Arrow Electronics, which reported inventories of \$5.3 billion in the fourth quarter of 2022, compared with \$4.7 billion, at the end of the first quarter of the same year.

Component suppliers reported similarly elevated component stocks. Inventories at Texas Instruments, for example, jumped to \$2.8 billion, in the December quarter, from \$2.1 billion, as at the end of March. Industry executives attributed the increase in inventory values to pricing pressures. Average selling prices, (ASPs), rose as demand exceeded supplies, giving component suppliers and raw material vendors pricing leverage in procurement negotiations.

“We’ve continued to see our inventory increase quarter-over-quarter for the last six to eight quarters,” said Rick Seidlitz, corporate controller at Arrow Electronics, in a presentation to the financial community earlier this year. “A lot of that has been in support of growth. A lot of the inventory growth is tied directly to pricing increases rather than increasing units. Let us call it healthy growth in our inventory. We had a period when price increases just kept coming. As we exited the year, they slowed down, but they did not stop. We are not seeing the price decrease yet.”

Privately-owned companies like Digi-Key do not typically disclose their working capital ratio as a percentage of sales, but indications are that the Thief River Falls, Minn.-based company also saw a hefty increase in payments to suppliers—to support the surge in 2022

revenue to a record \$5.1 billion. Public distributors like Arrow are compelled to publish details, however. The company said its working capital, measured as a percentage of sales, rose to 19.3 per cent in 2022, up 3.5 percentage points, from 15.8 per cent in the prior year.

“The recent global semiconductor shortages have resulted in some suppliers increasing the amount of non-cancellable orders, which limits the company’s ability to adjust down its inventory levels in event of market downturns, and could have a negative impact on the financial results of the company, particularly if the company is unable to pass such non-cancellable terms to customers,” Arrow said.

Still, observers say the pendulum is swinging back, albeit slowly, as the market is not fully shorn of the shortages that drove the last torrid expansion. Pockets of shortages still exist in the supply chain and extended lead-times have not returned to normal levels, according to executives at Arrow Electronics.

“It is just a difficult environment for everybody to operate,” said Arrow’s Seidlitz. “There is room for improvement. Broadly speaking, though, it has stabilized but I do not know if we will ever get back to the old normal.”

#### Back to the future

Little wonder distributors are eager to resume regular operations and refocus on value-added functions like demand-creation. While they did not intentionally cut back on demand-creation in recent years, such functions retreated a bit into the background. Now, distributors want to talk about and promote their demand-creation activities.

Future Electronics is one of the companies eager to let the world know it was active in assisting suppliers with demand-creation services through the shortages. Fortunately for the Canadian company, STMicroelectronics came in at the right time with a thundering gift when

it gave Future an award in January “for its outstanding performance in demand creation in the Asia-Pacific region in 2022.” The award was for a sub-group of ST’s general purpose microcontroller the companies said, in a statement.

“Future Electronics is a long-term partner of Demand Creation preferred by many manufacturers,” the company said, in the statement. “In addition to supporting large-scale customers, it also continues to focus on the mass market, providing small and medium-sized customers with high-quality localized services, complete technical support, and stable supply chain value-added services.”

Distributors have good reasons to get excited by the opportunity to brandish their demand-creation credentials in the face of the world. Distribution is traditionally a low-margin business and any service that can help pump up profitability is treasured. Demand-creation is one of those functions, notes Avnet’s Gallagher. In fact, the company’s decision to acquire UK-based distributor Premier Farnell in 2016 was due to its position as a demand-creation specialist.

“Demand-creation is 32% of our business,” Gallagher said. “This is where we have our 2000-plus engineers. They are doing design, working with our suppliers to get the products designed in at the end customers. Suppliers are leaning in on that [because] we give them the scale they do not get on their own.”

#### Supporting demand-creation

Distribution executives say their demand-creation services are so profitable that it is unlikely to become an orphan business. In fact, the reverse is likely as reflected in the huge investments franchise distributors continue to make to support demand-creation activities. The biggest distributors and even mid-tier companies in the sector have over the years added thousands of field application engineers or even acquired design engineering focused enterprises.

Arrow, for example, in 2018 acquired San Jose-based design engineering firm einfochips, bringing onboard “over 1,500 IoT solution architects, engineers, and software development resources,” as the company noted in a statement announcing the purchase. Companies like Avnet, Digi-Key, Future, Mouser, Sager, TTI have beefed up their engineering teams and regularly market demand-creation services such as product conception and development, design-for-manufacturability, component engineering, green fulfillment, regulatory compliance, and the like.

Those services will be even more in demand over the next several years as the industry pokes its head out from a downturn that is expected to hurt demand and sales in certain segments in 2023 and part of 2024. With the global economy swooning, the high-tech sector is also expected to receive some blows and climb down from the elevated sales reported recently by OEMs and their supply base.

The ensuing competition for reduced enterprise and consumer demand will be intense. To win, component manufacturers will have to fight harder for every design socket, which will boost the need for demand-creation services provided by distributors. Having a presence in most commercial capitals of the world and in far-flung locations as well as a deep bench of sales representatives who partner with small and medium-tier customers and start-ups will help distributors’ quest for a boost in demand-creation activities.





# Developing intelligent industrial solutions for harsh environments

*IIoT applications require a different component portfolio than traditional solutions to withstand harsh conditions. This article highlights the critical components*

IIoT has made possible innovations in artificial intelligence and IoT technologies, pushing intelligence into harsh environments where traditional solutions cannot survive. In industries like oil/gas and factory automation, electrical systems face challenges like vibration, chemicals and temperature extremes.

Connectors are fundamental components to most IIoT applications and should be engineered to transmit data and power reliably in demanding conditions. Ruggedized connectors with IP67/IP68 or dynamic IP69k-rated environmentally sealed connectors suit underwater, agricultural, outdoor metering, medical equipment and other applications that require frequent washing or exposure to moisture.

IIoT applications use large arrays of sensors to collect data for internet transmission to a cloud-based computing resource. Sensing technologies

such as accelerometers, encoders, temperature, liquid level, particle counters and humidity must perform reliably in extreme situations to ensure public safety and business continuity. Sensors must be small, resilient, low-power and able to collect/deliver data in challenging environments such as extreme heat, cold, blistering winds, high humidity or even chemicals.

Electrical switches—such as snap action, toggle, tactile and pushbutton—must also offer chemical resistance, ingress protection and other resistant properties. Sealed switches are typically required to meet the challenges of extreme environments. Engineers should also consider requirements such as terminal type, actuator type, IP rating and whether they require illumination, all influencing material selection.

IIoT products often lack access to a main power source and must power themselves, typically using energy harvesting or batteries. Energy harvesting

is promising for industrial applications because energy is taken from the environment, leveraging movement energy from equipment, solar panels, heat or other local sources. Where energy harvesting isn't suitable, batteries are often the largest part of an IIoT sensor system, giving engineers a limited choice of which to use.

IIoT applications can be subjected to electrical interference from switching circuits, welding tools and motors etc. Engineers need to consider which network connectivity best suits their applications. If hardwired connectivity is best, engineers need to deal with protection against unwanted disconnection through vibration or accidental force. Standard technologies such as Ethernet and USB were designed for home or office environments. Industrialized connectors use locking mechanisms that increase the retention force.

Wireless connectivity is an option and innovative antenna

solutions are required to offer optimal radio functionality while withstanding harsh environmental conditions. At their simplest, a single element antenna, possibly a chip-antenna, is designed into a flexible printed circuit. However, radio solutions that use multiple-input, multiple-output antennae are becoming an essential element of wireless connectivity.

To conclude, the selection of components for IIoT applications requires careful consideration for harsh environmental environments. Components like connectors, sensors, switches, power sources and network connectivity require engineering to operate successfully in extreme environments. Engineers should also consider factors like resistance to dust and liquids, seal integrity and resistance to electrical interference while designing IIoT components.

[www.newark.com](http://www.newark.com)



# Nearshore or Offshore, We've Got the Right Solution

Product Lifecycle Management  
Supply Chain Management  
Traceability  
Project Status Visibility  
**Outsourcing**  
Quality  
Manufacturing  
Responsiveness  
Lowest Total Cost  
Geographic Flexibility  
IP Protection  
Logistics Support

Change has become a constant in the outsourcing equation. At SigmaTron International, we've developed a business strategy that gives your team the flexibility needed to deal with change. Our engineering team can help you cut product development time, improve manufacturability on the front-end or address cost or obsolescence issues over time. Our global facility network gives you choices which can change as your manufacturing location needs evolve. We can also customize a repair depot solution and support legacy product.

SigmaTron's advantages include:

- Agile PLM-driven project launch support
- End-to-end scalable production solutions
- Access to a global network of facilities in the U.S., Mexico, China and Vietnam
- 24/7 visibility into project status around the globe via our proprietary SCORE system
- A global supply chain management strategy that supports electronic and mechanical products
- Robust systems for serialization, traceability and device history recordkeeping
- An experienced team capable of supporting your project's changing needs.

We have built our business around mid-to-high volume accounts who want Tier One caliber solutions, customized service and responsiveness. All of our facilities are registered to ISO 9001 and those building mission critical products are also registered to ISO 13485, IATF 16949 and/or AS 9100D. You will have access to global manufacturing options that support both nearshore and offshore strategies plus a trusted partner who truly values your business.

Call us today at **510-477-5004** or visit us on the web at: **[www.sigmatronintl.com/ca](http://www.sigmatronintl.com/ca)** and download our new white paper: ***Real-time Project Status Visibility: How Robust Are Your Contract Manufacturer's Systems?***

Let us show you how our options can help your company thrive in a changing world.

ONE SOURCE. GLOBAL OPTIONS.®

**SIGMATRON**  
I N T E R N A T I O N A L



Exclusively sponsored by



# Best Practices for Getting Started with APIs

by **Nathan Pray**, manager, digital technology office – B2B, and **Stephane Ratelet**, director, business development/digital solutions - EMEA, at **Digi-Key Electronics**



Nathan Pray

Stephane Ratelet

The supply chain challenges everyone experienced over the past three years have taught the electronic components industry many lessons that we won't soon forget. One of the key takeaways: now more than ever, speed and access to real-time information and data are critical as product availability can change on a dime. APIs can help procurement professionals and engineers ensure they have up-to-date information and pricing about the components they need and that's why Digi-Key developed the most advanced, complete suite of real-time APIs, completely free of charge to customers.

Digi-Key's API solutions provide a digital platform with a competitive advantage to customers. By streamlining the purchasing process, APIs enable procurement, engineering and design teams to all receive critical real-time information on products

they need at lightning speed through automated machine-to-machine connections. Customers using Digi-Key's API solutions save time and bring products to market faster and more efficiently, boosting revenue.

Before getting started selecting and using APIs, it's important to:

1. Determine the process(es) you want to digitalize and select the API solution(s) that addresses those processes. For example, a quoting process alone represents a major timesaver. Also consider where you want processes to be in 5-10 years and what the future could look like.
2. Think about the pain points in your process and select an API to reduce or eliminate the top pain points. For example, frequent changes in status and lead time in the supply

chain are common frustrations. Digi-Key's Order Support APIs provides real-time data on status, lead time and more in one place, saving time and resources required to manually check on these critical details for each product.

3. Assess your internal capabilities to determine if your development team can deploy an API. If not, Digi-Key collaborates with exceptional integration partners to provide customers with cost-effective and fast options to connect to Digi-Key's API solutions with less development investment.
4. Start with one API solution and scale up as your team feels comfortable adding more. Digi-Key's APIs are flexible and can be implemented in smaller pieces to avoid feeling daunting. Once you implement one API, others are easy to add.

Digi-Key's APIs allow customers to connect directly to Digi-Key systems to access automated, real-time product search, price and availability, quoting and ordering, barcoding, product change notifications and more.

Digi-Key further provides an ROI calculator that estimates how much you can save in one year by implementing Digi-Key's price and availability and ordering APIs. Customers have seen an average of \$50,000 to \$100,000 per year in reducing spending on manual tasks to shift resources to more strategic tasks by implementing API solutions.

For more information about Digi-Key's API solutions, visit [www.digikey.com/API](http://www.digikey.com/API) to download a free eBook on implementing API solutions and use the ROI calculator to see the return on investment that implementing APIs can deliver.





We verify distributors  
are authorized.

- ✓ Proof of authorization required for each region
- ✓ Regular audits to verify authorization status



**100% AUTHORIZED SOURCES**

Search authorized distributors at  **TrustedParts.com**





# What's next for memory makers as demand plummets?

*The memory market is in turmoil again but as suppliers cut costs and tamp down on production, they may be sowing the seeds of another round of shortages*

The semiconductor market is in flux, again. Forecasters are calling for as much as a double-digit dip in global sales in 2023 before a recovery in 2024. The memory market is in a worse state, though, and the actions suppliers are taking to restore profitability and rectify the demand-supply imbalance that triggered the current crisis in the sector should concern everyone. It is not just shareholders watching their holdings decline in value that should be worried. Even OEMs that are benefiting from the lower pricing situation should pay close attention to the challenges memory suppliers are facing.

Vendors are reporting sharp sales declines across all memory product segments and—unlike projections for the larger chip market—they are not optimistic that a full recovery might take place before 2025. By then, some memory suppliers would be in dire conditions and many expansion plans could be on hold despite forecasts for continued growth in unit demand. A situation of undersupply could quickly result, warned analysts.

Memory suppliers were surprised at the speed and depth of the decline. US-based Micron Technology first sounded the alarm last year but held out hope for a rapid turnaround. That did not happen. The market has worsened instead. Samsung Electronics' warning early in April of a 96 per cent fall in operating profit for the March quarter finally confirmed what many had suspected could be one of the most severe downturns in the history of the memory market. The problem began back in mid-2022, however, although it has since

worsened, according to a Gartner research review of semiconductor market conditions last year.

"Accounting for approximately 25 per cent of semiconductor sales in 2022, memory was the worst performing device category, experiencing a 10 per cent revenue decrease due to plummeting prices in the second half of 2022 amid tepid demand," the consulting firm said, in a report.

Manufacturers are already taking predictable recovery actions. It is not clear yet how effective the traditional tools of cost-reduction via workforce attrition and cuts in other operating expenses will be. This is because of the swift change in market dynamics that has now turned what was until recently a supplier's market where memory vendors called the shots, dictating pricing and supplies, into a situation where slumping demand has returned purchasing power to OEMs and other buyers. Memory semiconductor customers dealing with a glut in their own inventories are unlikely to focus on efforts to rescue suppliers now and may be less willing to accommodate requests for actions that would halt the slide in average selling prices, according to industry observers.

"The memory market will see significant oversupply for most of 2023 due to weak end-equipment demand, despite the slowdown in production by vendors," said Gaurav Gupta, an analyst at Gartner Inc., in an interview published by the company. "OEMs remain aggressive with inventory management, significantly reducing shelf inventory and increasing

cautiousness with forward orders." Gartner does not expect the demand-supply imbalance that dragged chipmakers into the current mess to be resolved this year. It projects the industry slid into oversupply conditions in the final quarter of last year and sees the situation will remain unchanged through the end of this year. With supply exceeding demand across the industry, except for segments such as chips used in auto manufacturing, it may take several years before suppliers regain the pricing power that shifted to them during the recent shortage crisis, Gupta said.

"Changes in inventory levels directly influence revenue growth," Gupta said. "Sudden changes in supply and demand affect the average selling prices of semiconductor devices and disrupt inventory in the supply chain."

## How bad is the problem?

Semiconductor sales are expected to fall in 2023, marking the beginning of another industry downcycle. That is the consensus of analysts and consulting companies covering the sector. They disagree on the depth of the decline, though, with forecasts ranging from Gartner's expectation for a 6.5 per cent drop to the double-digit 22 per cent decrease predicted by Future Horizons' founder and principal analyst Malcolm Penn.

"We now have unit demand falling, an ASP rout in full swing and excess capacity yet to peak," Penn said, while presenting his annual forecast. "It will take at least two to three quarters for this imbalance to stabilize, which means the whole of 2023 is going

to face strong headwinds." DRAM sales especially are in freefall and, going by recent statements from manufacturers, it looks like it will be the industry's worst performing segment during the first quarter. The segment is being hammered by sharp declines in average selling prices, lower-than-expected demand from the data, mobile phone, PC and other consumer electronics markets and inventory-reduction or rebalancing activities at OEMs.

Samsung announced on April 7 that it sees consolidated sales of "approximately 63 trillion Korean won,"—about \$48 billion—for the first quarter, down 19 per cent from KRW78 trillion (or \$59 billion) in the comparable quarter of 2022. Analysts, meanwhile, were on average expecting the company to report sales of about KRW64 trillion for the 2023 first quarter. The company's guidance of KRW0.6 trillion for operating profit stunned the market even more. In the prior year, it reported operating profit of KRW 14.1 trillion.

Micron's financial performance during its recent quarter was even more disturbing. Revenue fell by more than half, to \$3.7 billion, in the 2023 fiscal second quarter ended March 2, from \$7.8 billion in the preceding year. Its gross profit margins in the quarter turned negative, sinking to minus 32.7 per cent, from the robust 47 per cent reported for the fiscal 2022 second quarter. Operating margin dropped to "negative 56 per cent, down from negative 2 per cent in the prior quarter and positive 35 per cent in the prior year," said chief financial officer Mark Murphy, in a presentation to analysts. As a result, the company



reported a net loss of \$2.3 billion, wiping out the profit of \$2.3 billion posted one year earlier.

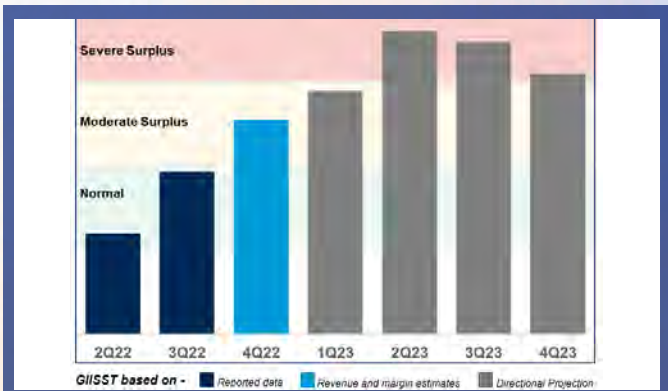
As in the case of Samsung, weak DRAM demand was the primary culprit behind Micron's negative quarterly performance. The company's DRAM revenue of \$2.7 billion, accounting for 74 per cent of total sales, fell 4 per cent sequentially, according to Murphy who attributed the decline partly to "prices declining by approximately 20 per cent." By contrast, Micron in the second quarter of fiscal 2022 reported DRAM revenue of \$5.7 billion, representing 73 per cent of sales for the period. That year, Micron said "near-term supply and pricing trends" were "constructive" adding it was expecting "both DRAM and NAND gross margins to increase sequentially."

This year, rather than getting chased by OEMs desperate for supplies, memory manufacturers are getting slammed by order cancellations and ASP erosions. The pricing leverage they exerted in the prior year has vanished, zapped by distortions in the demand and supply environment. Customers have stockpiled inventories and,

instead of shortages reported last year, have begun showing swollen stocks. OEMs have cut back on orders and are reducing their inventories, a process that will take several quarters, according to Micron executives.

This is why memory suppliers are desperately trying to reduce expenses and return the market to the demand-supply equilibrium that would help sustain their business, observers said. They are severely scaling back production, cutting capital expenditure budgets and taking other cost-reduction actions that may see them reducing their workforce to levels not seen in years.

In the case of Micron Technology, capex for the current fiscal year is now projected to fall as much as 40 per cent from the prior year with spending on wafer fab equipment (WFE) likely to take a significant hit—up to a 50 per cent cut in WFE expenses from the prior fiscal year. This will worsen sales at semiconductor equipment manufacturers. The cost-reduction activities and lower spending on semiconductor equipment will extend to 2024 as memory IC vendors wait



Semiconductor inventory levels

for further demand visibility before boosting capex again, industry executives said.

"In response to the industry environment, Micron has taken a number of decisive actions in fiscal 2023," said Sanjay Mehrotra, Micron's CEO, during a discussion on the company's quarterly financial with analysts. "First, we are further reducing our supply. We have made additional reductions to our fiscal 2023 capex plan and now expect to invest approximately \$7 billion, down more than 40 per cent from last year. We now expect our overall headcount reduction to approach 15 per cent."

#### What must change?

Simply put, inventories must decline, sharply and quickly, if the memory market is to return to some semblance of normality. Manufacturers are pulling out their old playbooks that have worked in restoring profitability in the past. But recent moves mark only the beginning of a necessary and vital correction. Memory vendors say they will tamp down further on fab utilization if pricing continues to fall and if the demand-supply equilibrium essential to stabilizing ASPs failed to materialize.

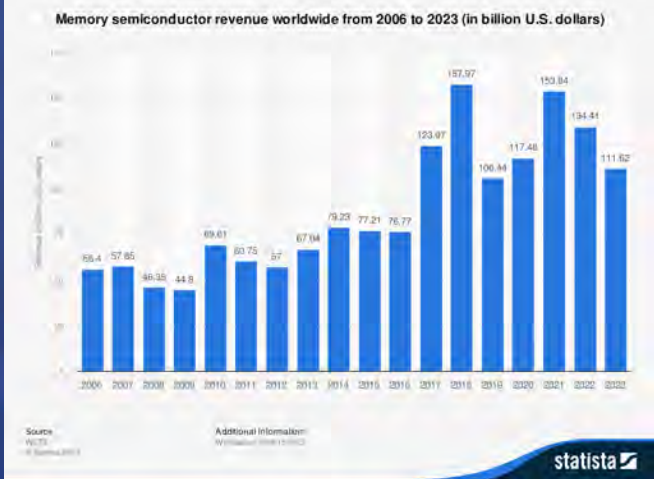
These control measures must be implemented swiftly and successfully because "the [current] profitability levels in the industry today are simply not sustainable," Micron's Mehrotra said. "So, the demand and supply environment must improve. The recovery in the

industry could be accelerated if the supply for DRAM and NAND in terms of year-over-year growth was negative. We believe that the investments required for healthy levels of profitability and supply discipline, will be back and the industry will grow."

Industry analysts are warning that the demand-supply pendulum may swing too hard in the other direction, though, as it has in the past. If memory manufacturers cut capacity utilization too deeply and halt or squeeze capex investments too tightly, the market could quickly see the emergence of another cycle of severe shortages, they noted.

If this happens, memory manufacturers will be the primary beneficiaries. Pricing will go up again, along with sales, operating margins, and market valuation for chipmakers. The industry will be seeing a replay of the dramas it has just lived through and previously experienced numerous times. Only, this time, memory vendors will be the ones smiling all the way to the bank.

"Memory and storage are at the heart of systems and solutions that fuel the global economic engine, drive new efficiencies, create higher productivity and spur advances that make life better for people around the world," Mehrotra said. "We look forward to a normalization of market conditions, and we remain confident in the long-term demand for our solutions based on the value they create across multiple end markets."



Memory semiconductor 2006 to 2023 Source: Statista



# PCB mount battery contacts slide into place

*Keystone Electronics introduces electronics buyers to new nickel plated, spring steel battery contacts designed to slide into molded cases*

Keystone Electronics has met increasing demands for higher energy, lower weight cylindrical battery usage with the introduction of its latest leaf spring contacts designed to slide into molded cases with wire leads or mount directly onto a PCB as a surface mount contact.

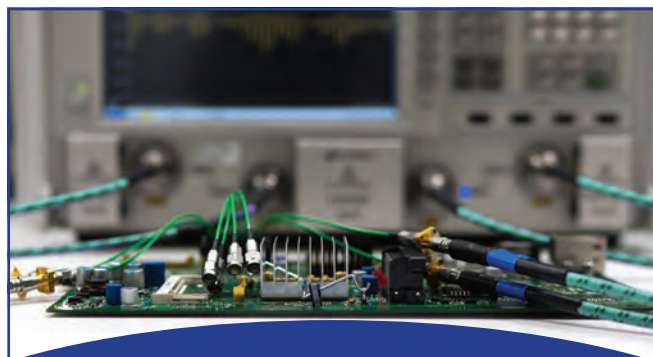
Engineered with a contact design that adjusts to variations in battery length, these contacts ensure low

resistance and dependable connectivity. Manufactured from .012in thick spring steel, the contacts are supplied with nickel plating for superior performance. Contacts are designed to accommodate A, AA and CR2 cylindrical batteries.

For a single cell application purchasers should request Cat No 5233. For dual cell applications, request Cat No 5232. The contacts

are available from stock through Keystone Electronics' global distribution network and ordering partners online.

[www.keyelco.com](http://www.keyelco.com)



Higher density. Lower losses. Higher data rates.  
**It's precise performance, delivered.**



Our CoreHC product family, Card Edge Contact systems, and Gen-Z solutions offer high-density interconnects with lower insertion and return losses at densities as high as 2.5 mm. CarlisleIT leads the way with high-performance interconnect solutions by offering unmatched signal integrity for today's faster and more complex communication systems operating up to 70 GHz.

That's **Performance** with **Purpose**.

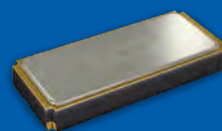
**CARLISLE**  
INTERCONNECT TECHNOLOGIES

CarlisleIT.com      
DESIGN | BUILD | TEST | CERTIFY



E  
C  
X

34Q



AEC-Q200 surface mount  
32.768 kHz tuning fork

ESR of 70kΩ & -40°C ~ +125°C

Automotive, IoT, STM32 &  
mobile applications





# CHIPSTOCK

GLOBAL COMPONENTS LEADER

[WWW.CHIPSTOCK.COM](http://WWW.CHIPSTOCK.COM)

**Independent component distributor and supply chain solutions provider.**



## **Shortage Sourcing**

When the manufacturer or other distribution sources cannot deliver on time, count on us to source the parts for immediate delivery.



## **Factory Direct**

We work directly with manufacturers to deliver the components you need, with 100% quality guaranteed.



## **Excess Inventory Management**

We are continuously purchasing components – work with our team to convert your excess inventory into revenue.



## **Obsolete / End-of-Life Sourcing**

We offer frame orders and immediate delivery for critical, end-of-life or obsolete components.



Artificial Intelligence • By John Denslinger

# Future keystone in procurement and logistics

*In this article, John Denslinger explores a plethora of artificial intelligence 'what ifs' to imagine a radical purchasing future where predictive data-based decision making rules*



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

**W**ebster defines keystone as a wedge-shaped piece at the crown of an arch that locks other pieces in place. It also means something on which associated things depend for support. As staffing shortages, supply disruptions and sourcing pressures escalate, AI offers dependable solutions magnitudes better than any current tools in the procurement arsenal. Artificial Intelligence is the future keystone.

All business functions will be challenged to digitize. It's a reality driven by cost and competitive pressures. Procurement is no exception. In fact, procurement may be a priority for most organizations. The application cases appear endless. What if AI could allow purchasing to flawlessly manage 100 per cent of one-time and recurring global spend? What if AI could deliver real-time sourcing intelligence giving procurement incredible negotiating advantages? What if AI could generate continuous cost reduction opportunities? And, what if AI could also provide a significant corporate ESG contribution in the form of risk mitigation, powerful analytics, sustainability optimization and unbiased reporting? If AI truly delivers on such promises, companies will find it indispensable.

Any discussion of digitizing procurement though must include applying AI solutions to logistics as well since purchasing derives much of its input from the supply chain. Inputs like inventory levels, demand fluctuations, capacity allocations, planned and unplanned shutdowns, traceability, QA/QC results, transportation, and the needs go on and on. What if AI could capture all this input moment by moment, continuously analyze alternatives, optimize logistical plans and deliver real-time procurement guidance? Any short-term investment seems inconsequential given the potential for substantial long-term strategic gains. What business wouldn't invest. And that's not the only gain. What if AI's machine learning capability could pinpoint inefficient supply chain patterns:

disconnects, dropped handoffs, breakdowns, duplications and unnecessary constraints? At the same time, what if AI could constantly interrogate complex networks accumulating vast amounts of new information? Imagine a procurement department able to apply predictive decision-making based on intelligence gathered from a universe of data points versus biased decision-making (unintentional of course) constructed on past history.

The discussion so far has centered on capturing data points within traditional boundaries of business. What if AI could now merge peripheral factors such as weather, geo-political events, regulatory directives, national/global economic indices, raw material markets, energy prices and availability, social media trends, ever-changing tax and tariff policies, disruptive technologies, currency fluctuations and more? Perhaps not all peripheral factors are applicable, but the opportunity to include those that do can enhance strategic planning while mitigating unforeseen risk.

A glowing green circuit board pattern is centered on the page, forming a heart shape. The circuit lines are white and glow with a bright green light. The background is a dark green with a subtle circuit board pattern.

# AT THE HEART OF TECHNOLOGY

Launching new technology is more complex than ever. When it comes to navigating today's design and supply chain challenges, Avnet is at the heart of it all.

Whether you're just starting on a design or working to get your product to market, Avnet delivers the right mix of technology and expertise to help your business succeed.

We deliver what's next in design, supply chain and logistics so you can deliver what's next for all of us. [Learn more at avnet.com](https://www.avnet.com)



# Digital storage obsolescence can be managed

*As a certified and authorised manufacturer and distributor, Solid State Disks offers electronics purchasing professionals a one-stop-shop for legacy memory solutions*

Solid State Disks offers form, fit and function replacements for all types of legacy hard disks, with the added benefits of remote access via local networks and higher reliability through use of solid state technology. Established in 1989, the company offers experience in sectors including aerospace, automotive, defence, embedded computing, industrial manufacturing, nuclear, rail, data servers and telecoms.

Certified to ISO 9001:2015 and NATO NCage, Solid State Disks designs and manufactures CF2SCSI, SCSIFlash and FLOPPYFlash CF based solid-state drives, both featuring proprietary FPGA-based technology designed to deliver greater performance and future-proof applications.

The company's technical team and manufacturing resource are UK based. Solid State Disks is also a trusted and

respected distributor, supplying the latest Flash and DRAM memory from manufacturers including Apriso, Innodisk, Micron, Transcend and Western Digital/Sandisk. As a franchised distributor, Solid State Disks can frequently access reserves other distributors can't.

[www.solidstatedisks.co.uk](http://www.solidstatedisks.co.uk)



**Solid State Disks'**  
sales director, **James Hilken**

[sales@solidstatedisks.com](mailto:sales@solidstatedisks.com)

## NEW SSD's for the replacement of OBSOLETE DISK DRIVES and MODERN INDUSTRIAL FLASH MEMORY

- ▶ Hard Disks
- ▶ Optical
- ▶ Tape
- ▶ Floppy



- ▶ Turnkey Solutions Designed In-House
- ▶ Drop-in Replacement without Modification of the Legacy System
- ▶ New Flash Memory for Old Magnetic Media Drives
- ▶ Minimise the Costs for New Systems & Redesigns
- ▶ Specialist in Modern Industrial Flash



Solid State Disks, Creative House, Station Road, Theale, Berkshire, UK, RG7 4PD

Tel : +44 1189 323499  
[www.solidstatedisks.co.uk](http://www.solidstatedisks.co.uk)

ELECTRONICS

# Sourcing

MAY 2023

## TOP 50

AUTHORIZED DISTRIBUTOR  
REPORT 2023 AMERICAS EDITION



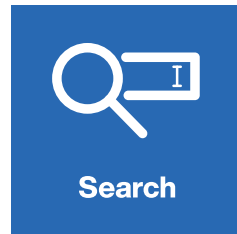
**Widest selection of  
electronic components™**

In stock and ready to ship

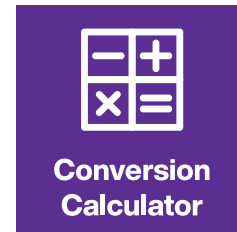
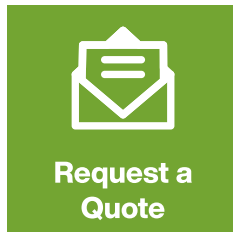
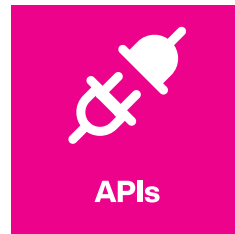
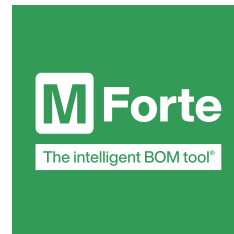


[mouser.com](https://www.mouser.com)





Search



# Ordering made easy

Tools to search, check stock and purchase

---

[mouser.com/servicesandtools](https://mouser.com/servicesandtools)



**MOUSER**  
ELECTRONICS

# Distributors Deliver Back-to-Back 20% Growth Years

*Top Americas distributors deliver crucial value to distressed electronics components supply chain and achieve revenue jump of 21.9% in historically challenging year*

Every day presents a new challenge for distributors as they strive to deliver outstanding support to their customers and partners up and down the supply chain. Gauging by the revenue growth achieved over the past two years it appears that distributors are delivering the vital support and services that are in high demand. Delivering the support customers needed was not easy in 2022 as lead times stretched out to historic levels. Procurement teams all scrambled to secure components critical for their businesses and distributors became essential partners. The proof of the benefits delivered by distribution was highlighted over the past two years as industries and companies that did not engage with distribution experienced painful outcomes as they had to shut down production lines or redesign products for lack of components. The systems and processes that have been refined by distributors over the years formed a strong backbone for the industry as the growing challenges seemed to have no end in sight. As always, industry leaders are identifying lessons learned in order to develop solutions that will be essential for tomorrow's challenges.

It seems that participants in the electronic components supply chain are playing whack-a-mole. The minute one issue is resolved two more pop up that must be addressed. It's enough to

cause whiplash! While lead time issues have abated as the industry entered 2023, new challenges have taken their place as inflation, rising costs, and banking concerns come to the fore. However, in the midst of a chaotic and ever-changing world, distributors were well positioned to deliver stable support across the supply chain. In interviews with industry executives the word "resilience" was used to describe the performance of distributors. Indeed, the industry has not only survived but thrived in many ways. Delivering Americas revenue growth of 21.4% and 20% in sequential years is an amazing achievement. As described here, there will be no end to challenges moving forward. The good news is that supply chain participants can turn to their distribution partners for strength and stability in a highly dynamic world.

Interviews with experienced distribution executives yields important understanding regarding major issues confronting authorized electronics components supply chain participants. As part of the survey to identify the "Top 50 Americas Authorized Distributors," executives were asked to rate the level of severity they anticipate for various supply chain challenges. The results for 2023 are compared to the responses for 2022. The good news is that almost every category saw a reduction in the level of anticipated challenge. Increasing costs, inflation, recruiting

new talent and inventory management were identified as the areas of greatest concern. The results of the survey are shown below and align with topics addressed in interviews with these leading industry executives.

Continues on page 29



**Dale Ford - ECIA**  
Chief Analyst



# ALL TECH ELECTRONICS: SIMPLIFYING DISTRIBUTION

**R**ecently named one of the Top 50 U.S. Electronics Distributors, All Tech Electronics is celebrating 30 years of providing customers with mil spec high-reliability electronics for Defense, Aerospace and Satellite applications. Whether they are delivering off the shelf components to their customers or helping design solutions for non-standard or obsolete products, All Tech's management brings decades of experience into play.

The All Tech founders are all lifetime students of the electronics industries they serve, having witnessed always evolving innovations during the last 40 years. Their combined knowledge and key relationships with important suppliers have driven a successful business model in the DAS market they serve. Specialization and an experienced staff monitor key market metrics to assure All Tech's customers have a thorough understanding of current market trends.

## **A Franchised SDB Distributor**

All Tech's unique position as a franchised distributor and a Small Disadvantaged Business (SDB) affords their customers the ability to meet the requirements of their Small and Small Disadvantage Business goals. Customers utilizing All Tech to supply diodes, transistors, integrated circuits, MPU and memory products provides their customers with an SDB business partner that doesn't require them to compromise quality or price. Their products meet the highest

reliability standards – M19500, JAN, JANTX, JANTXV, JANS, 38510 and 5962 managed in a fully compliant, audited ISO 9001 and AS9120 quality system further securing All Tech's place among the top U.S. electronics distributors.

## **Space Capabilities**

With the explosion of manufacturing for space, All Tech has kept pace and supplies customers with packaged devices that are ideally suited to space and rad hard applications. While they have always supported JANS level diode and transistors as well as RF, Microwave and Power Magnetics products they have recently expanded their product portfolio. Included in that offering are logic, interface, and translation ICs, in all form factors up to and including 300 KRAD. Additionally, they have added MRAM products with space and military quality flows and leading-edge power solutions dedicated for high-reliability applications including Gallium Nitride (GaN) technology solutions. Their Point-of-Load (POL) products combine multiple load capabilities, outstanding radiation performance with high levels of integration and easy to use features.

## **Custom Packaging**

Clients of All Tech Electronics can get parts exactly the way they want them without having to source from multiple providers. There may be cases, for instance, when an engineer wants the functionality that a standard part offers, but it just doesn't fit their application

properly. That's where All Tech's engineering team comes in.

## **Obsolescence Management**

Because it can be years from design to production, All Tech offers a full range of services to help clients minimize the impact that rapidly changing technology can have on their end products. As a full service DMS/Obsolescence solutions provider All Tech delivers all the necessary tools to solve and manage ongoing DMS challenges. Product packaging and assembly as well as die, wafer and package-level testing and up-screening are among the most-requested services. Full traceability and certification eliminate any concern of procuring counterfeit product.

## **Value Added Services**

Component modification and testing needs vary widely, All Tech Electronics provides services to the highest standards:

MIL-PRF-38534 &  
MIL-PRF-38535

For solder coverage:  
GEIA-STD-0006 – requirements for robotic solder finish on electronic components

IPC/ANSI J-STD-001 – for trim and forming and hot solder dip

IPC/ANSI J-STD-002 – for solderability test

ANSI STANDARD EIA-481 – for tape and reel

## **Material Management**

Carrying a fully furnished inventory is often costly, but

having to contend with a possible re-design can be much more expensive. All Tech offers their customers a continuing supply of diminishing manufacturing source (DMS) material through a number of managed Wafer and DIE banking arrangements.

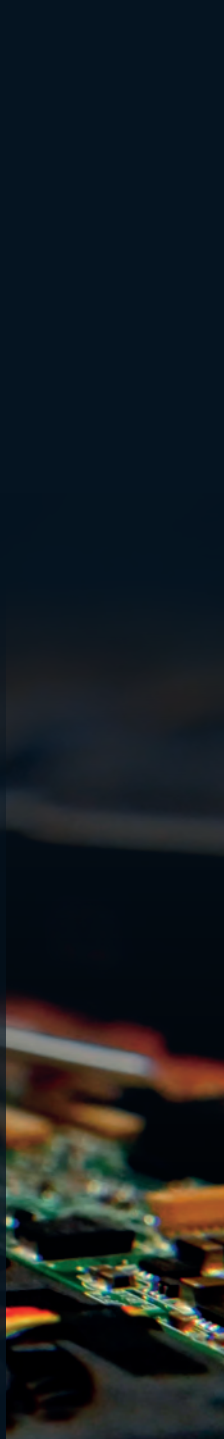
## **Cybersecurity**

All Tech Electronics supports and is compliant with the governing regulations and standards covering industry-wide cybersecurity protection. We are currently working toward CMMC compliance.

Cybersecurity compliance including:

- DFARS 252.204-7012, Safeguarding Covered Defense Information and Cyber Incident Reporting
- NIST 800-171, Protecting Controlled Unclassified Information in Nonfederal Information Systems and Organizations

All Tech Electronics can be reached at (914) 592-7726 or via their website: [www.alltechelectronics.com](http://www.alltechelectronics.com)





# ALL TECH ELECTRONICS

simplifying DISTRIBUTION

30  
YEARS

## Your Franchised SDB Solutions Provider

All Tech Electronics is an AS9120 & ISO 9001:2015 Franchised Certified Small Disadvantaged Business providing products and services to the following standards:

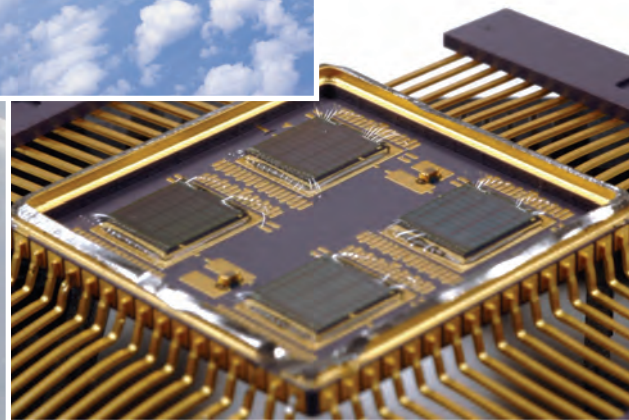
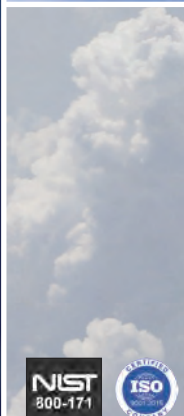
- M19500 - JAN, JANTX, JANTXV, JANS SX, MX
- M38510, 883, DESC/SMD, 5962, Rad Tolerant, Space
- MIL-PRF-38534 & MIL-PRF-38535
- GEIA-STD-0006 — For robotic solder finish on electronic components
- IPC/ANSI J-STD-001 — For trim and forming and hot solder dip
- IPC/ANSI J-STD-002 — For Solderability Test
- ANSI STANDARD EIA-481 — For Tape and Reeling

All Tech Electronics Headquarters:  
8 Skyline Drive  
Hawthorne, NY 10532  
(914) 592-7726  
[www.alltechelectronics.com](http://www.alltechelectronics.com)

- DISTRIBUTION SERVICES
- CUSTOM PACKAGING
- OBSOLESCENCE MANAGEMENT
- VALUE ADDED SERVICES
- MATERIAL MANAGEMENT
- SPACE CAPABILITIES

Since its founding in 1993, All Tech has developed a diverse network of partners to give our customers the best of both worlds – access to the comprehensive resources they need combined with the flexibility and service only a small business can deliver.

### Simplifying distribution.





# A Specialist Distributor, Built on Trust

TTI, Inc. has built a global reputation as a distribution specialist not only because of the company's focus on quality, but because of "the Human Component" – hardworking, knowledgeable people who are committed to delivering quality to the manufacturers they serve. Fulfilling the vision of the company's late founder, Paul Andrews, TTI's core goal has remained the same ever since its founding in 1971: to be the best, rather than the biggest, distributor of interconnect, passive and electromechanical components.

TTI is known for building close relationships with customers, as well as for deep knowledge of industry trends and technologies. These differentiators allow the company to understand and meet today's changing landscape of supply chain and manufacturing challenges.

With a distribution network that achieves greater

than 98 percent on-time delivery, TTI's reputation for quality and service consistently earns awards and recognition from both customers and suppliers.

A short drive from TTI's corporate headquarters in Fort Worth, Texas, is the heart of the company's operations in North America, the recently-expanded Paul E. Andrews, Jr. Distribution Center. Miles of conveyers connect the facility's shipping, inventory and receiving sections, while dedicated space serve cut reel warehousing and production, as well as value added customization of various circular and D-sub connectors for the military and aerospace market.

Globally, TTI, Inc. services customers through more than three million square feet of dedicated warehouse space, housing over 850,000 component part numbers. This global distribution effort is measured by a total quality program to ensure

the right parts reach the right place, at the right time.

In addition, TTI works to maintain a broad and deep inventory of components, which in turn helps buffer customers from swings in lead times and other turbulence in the global electronic components supply chain.

With strong partnerships and a dedication to quality, TTI has grown to become the connectors, passives, discrete semiconductors and electromechanical components distributor of choice for many industrial, military, aerospace and transportation manufacturers worldwide.

[tti.com](http://tti.com)



# Inventory Overhang Solution?

## Transparency / Visibility / Collaboration

**A**s distributors manage through the inevitable market downturn following a peak in a cyclical industry, the key question that emerges is, "What can electronic components supply chain players do to improve management of inventory overhang?" John Drabik, President, TTI Americas, provided a concise summary of inventory history, "We went from Just in Time to Just in Case to Just too Much." The solution to inventory challenges was fairly unanimous among executives as stated by Dayna Badhorn, Regional President, Americas at Avnet, "Transparency between all stakeholders is key. If supply chain providers understand the true need of the customer, it allows for easier adjustment of inventories amongst many players. It allows for customers that still may be waiting for inventory to receive what they need, while alleviating the over inventory for others." The solution sounds simple

enough but the key challenge in achieving the needed visibility in the industry was explained by Chris Beeson, President Electronics & Global Strategic Suppliers for RS Group, "First you have to have willing participants in all segments of the equation. And maybe at times it was more of a supplier of voice and not in conjunction with the distributor voice and/or customer voice. I think the last two years have demonstrated this need. We have an opportunity to get much better. Look at even broad industries like automotive which have all types of capabilities and sophistication. It's a much more collaborative type of approach. Maybe this current cycle is painful enough for all of us so that we've recognized the fact that it's time to energize some solutions into the equation."

Chris Wadsworth, VP, OEM Electronics at Carlton-Bates, takes aim specifically at lead times in identifying the culprit for excess

inventory, "The biggest area of opportunity in my mind is a transparent and active engagement between distribution companies and their manufacturer partners on the accuracy and reality of current lead times. We really need to close the gap on published versus real lead times and actively work on balancing the on hand and on order quantities throughout the supply chain."

Market intelligence was highlighted by multiple executives as a necessary contributor to improving lead-time management. Adam Osmancevic, SVP Global Supplier Development, RS Group, expressed his view that, "We need more use of market intelligence and analytics, cloud and edge computing, and upgrading implementation of full automation in the facilities. Then, potentially upgrade your asset management team for today's environment."

Continues on page 32



**Chris Wadsworth**  
VP, OEM Electronics  
**Carlton-Bates**  
(WESCO)



# Trusted since 1967.

## Stocking parts and solutions.

[www.masterelectronics.com](http://www.masterelectronics.com)



# THE SEMICONDUCTOR LIFECYCLE SOLUTION™

Rochester Electronics is the world's largest continuous source of semiconductors—100% Authorized by over 70 leading semiconductor manufacturers. Headquartered in Newburyport, MA, USA, Rochester has facilities in every major market around the globe.

As an original manufacturer stocking distributor, Rochester has over 15 billion devices in stock encompassing more than 200,000-part numbers, providing the world's most extensive range of end-of-life (EOL) semiconductors and the broadest range of active semiconductors.

Rochester provides a continuous source of supply of both active components, to solve supply chain disruption, and EOL semiconductors, to meet long-term customer needs. With direct sales and support staff in all major markets, complemented by a network of regional and global authorized channel partners, Rochester aims to meet customers' needs over the phone or via its e-commerce platforms anytime, anywhere.

During component shortages and long lead times, when products may be harder

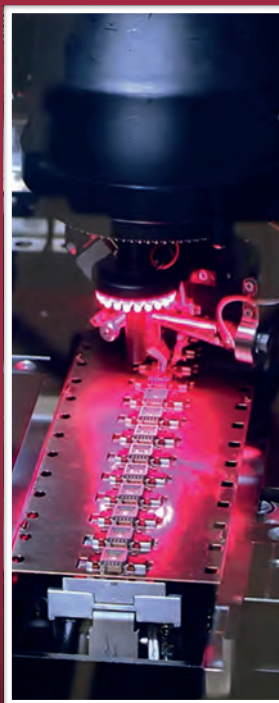
to find and customers may face line-down situations, it is important to know that customers can quickly identify and obtain products risk-free from Rochester Electronics.

Over 10 billion Rochester in-stock devices are classed as EOL by the original component manufacturers, supporting applications where the product lifecycle extends beyond the active availability of a device. Rochester's AS6496-compliant factory-direct offering negates the need for expensive testing.

As a US-based licensed semiconductor manufacturer, Rochester has the capability to replicate and manufacture a wide range of semiconductor components. To date, it has manufactured over 20,000 device types. With over 12 billion die in stock, it has the capability to manufacture over 70,000 device types. Rochester is licensed to manufacture devices no longer produced by the original component manufacturer.

## Manufacturing Spotlight:

- Products are manufactured using design information transferred directly to Rochester from the original component manufacturer (OCM)



- Offering ongoing manufacturing of stock products
- Offering build-to-order products

Rochester is registered to manufacture ITAR products and process workflows include the following certifications:

- ISO-9001:2015
- ISO-14001:2015
- ANSI/ESDS20.20-2014
- IATF-16949:2016
- MIL-STD-883 TM 5004 and 5005 for Levels B, Q, and V
- QML Certification to MIL-PR-38535 cage code (3V146)
- In-House DLA lab certified for Group A, B, C, and D

Rochester offers a full range of manufacturing services including design, wafer storage, die processing, assembly, test,

reliability, and IP archiving providing single solutions through to full turnkey manufacturing, enabling faster time-to-market.

Rochester's design services can replicate the original device, avoiding lengthy expensive system requalification, recertification, or redesign. The end product is a form, fit, and functional replacement guaranteed to the original data sheet performance.

Rochester provides a full range of assembly services including quick-turn IC prototyping, hermetic assembly, plastic assembly, component lead finishing, package, substrate, and leadframe replication.

Rochester offers a wide variety of high-quality testing solutions, including analog, digital, mixed signal, memory, and power, across multiple test platforms to solve customer and supplier challenges.

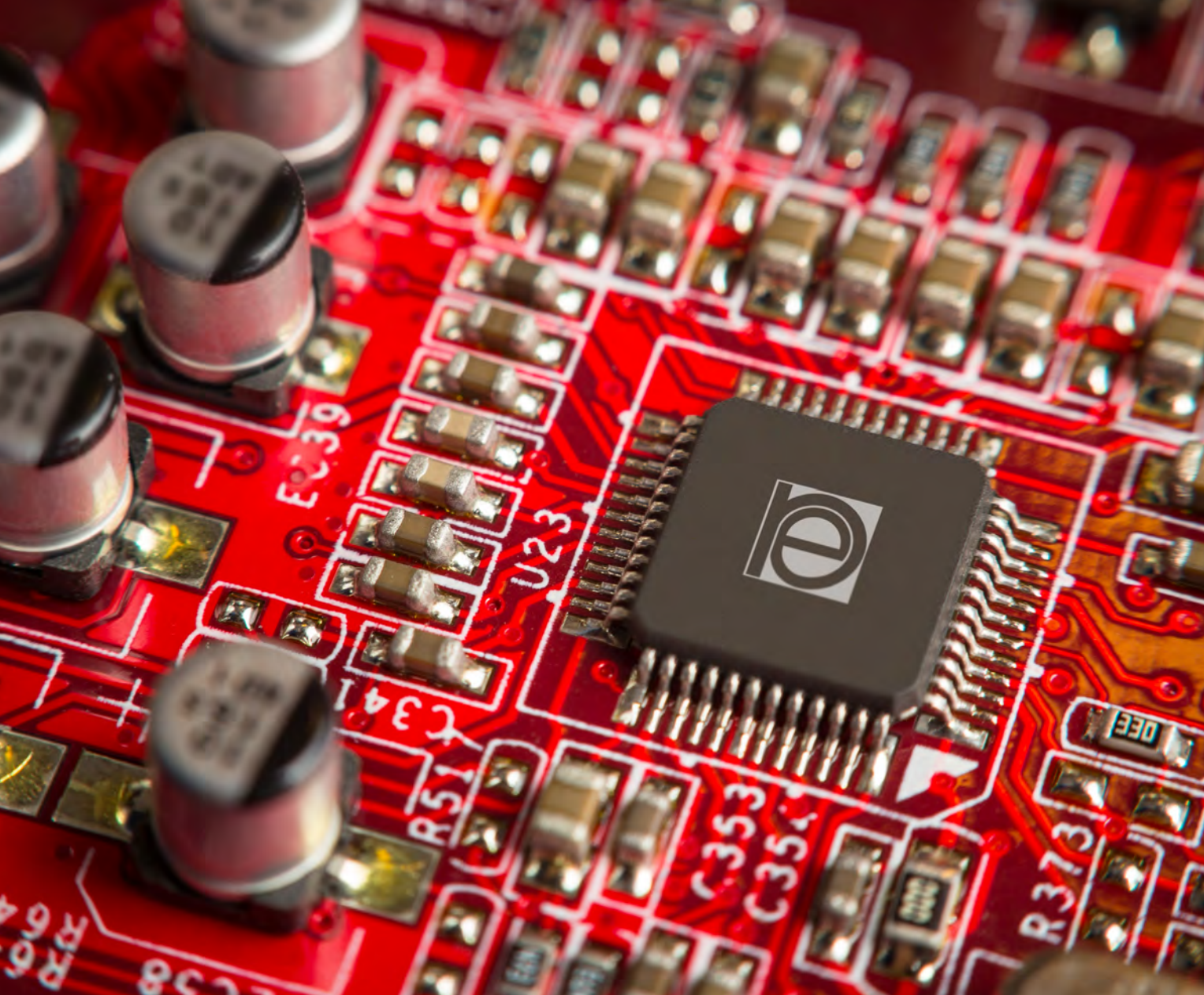
For 40 years Rochester has provided our valued customers with a continuous source of critical semiconductors. We are the Semiconductor Lifecycle Solution; no other company compares to the breadth of our product selection, value-added services, and manufacturing solutions.



[www.rocelec.com](http://www.rocelec.com)







## WE KEEP THINGS MOVING.

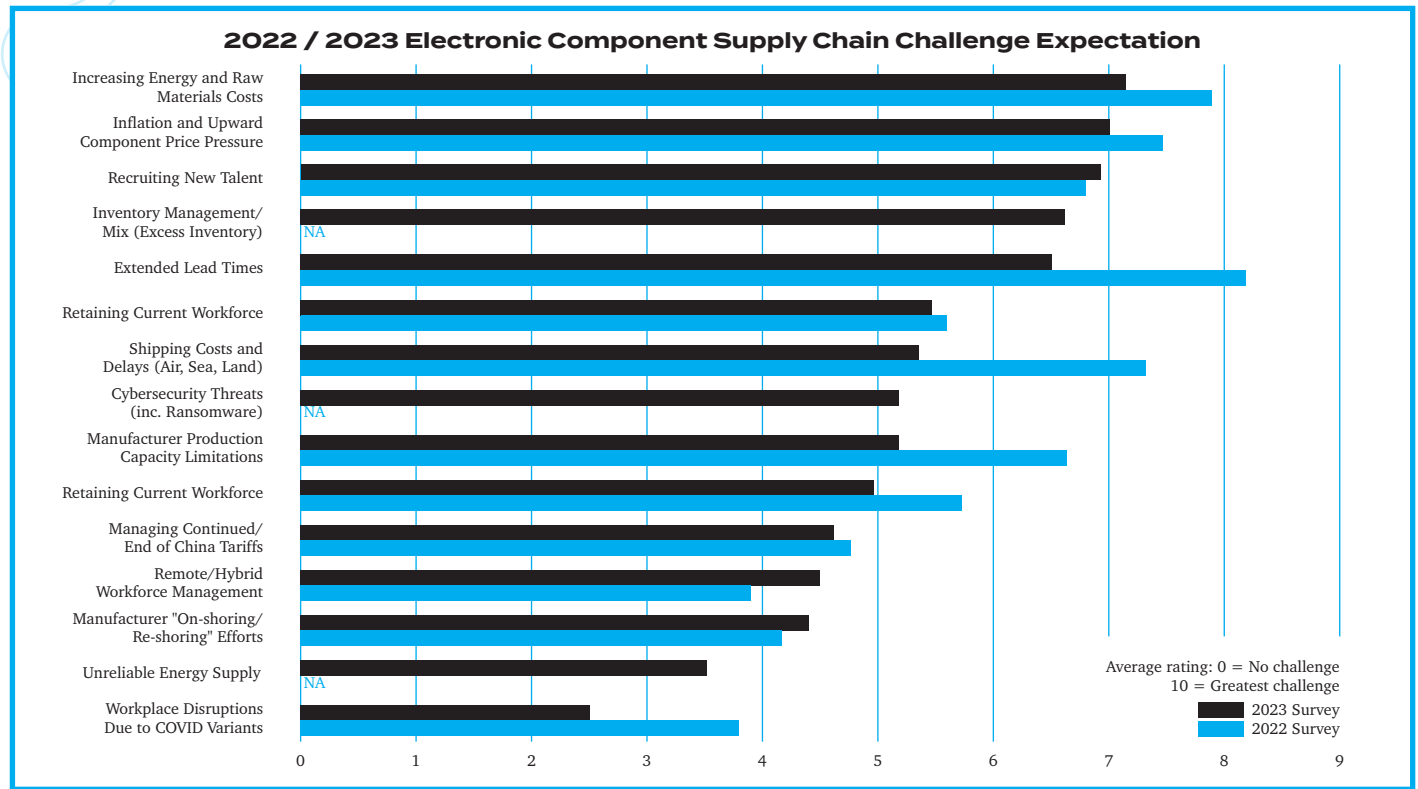
Offering the world's largest continuous source of semiconductors with over 15 billion finished devices in stock, combined with extensive manufacturing capabilities from the world's largest die bank at over 12 billion. The Rochester Electronics' Semiconductor Lifecycle Solution™ keeps your business moving!



 **Rochester  
Electronics®**  
[www.rocelec.com](http://www.rocelec.com)

Authorized Distribution | Licensed Manufacturing | Manufacturing Services





You really need subject matter experts to be in your asset management team and not just number crunchers. You need people who actually know the industry and know the trends." Driving the point home regarding the benefit of actionable intelligence, Lew LaFornara, Senior VP Product and Supplier Marketing, TTI Americas, argues, "It's lead times. They drive so much of everything we do. We all have tons of data. But it's just tons of data. The challenge is how to get that down to something more meaningful and actionable." David Loftus, CEO ECIA, highlights a critical solution to developing actionable information, "There are better and better machine learning algorithms that can analyze current market trends against previous patterns. While this cycle is a bit unprecedented, we do have a lot of historical data in the industry that can be mined to be able to better inform the present and the future."

Finally, Loftus points to one essential area of improvement needed by the industry, "I think first and foremost is we shouldn't hold on to NCNR (Non-cancelable/Non-returnable) requirements too deeply into the cycle, especially past inflection points. I think that while the current cycle is reasonably unprecedented, a lot of manufacturers are sort of stuck on both ends because they've got take or pay agreements with fab partners and they put NCNR requirements on their distributors and their direct customers that then get passed through distributors to their end customers. When you have that amount of over-ordering that takes place on the part of the end customers and you hold those NCNR orders too far into the down cycle it is going to exacerbate the inventory overhang."

## Supply Chain Breakthroughs

Microsoft Corporation recently received Gartner's "2023 Power

of the Profession Supply Chain Award" for its submission "Real Time Visibility Enabling a Sentient Supply Chain." As the pandemic's effects on supply and demand waned in 2022, changing market conditions required Microsoft's Devices Supply Chain team (DSC) to enable a quick pivot from a supply-constrained environment to a fully order-driven model, thereby avoiding significant inventory risks. Microsoft wanted to develop a sentient supply chain that was "all-sensing and monitoring," predictive and able to consistently optimize itself in real time. This meant building end-to-end (E2E) visibility from tracking every raw material to finished-goods sales, returns and repair operations. The results of this transformation included \$550 million saved in inventory risk avoidance, an Azure-driven platform that captures more than 50 million supply chain data points per day and a suite

Continues on page 37



**Mike Slater** VP Global Business Development  
**Digi-Key Electronics**

# DON'T LET OBSOLESCENCE KEEP YOU GROUNDED



COUNTERFEIT AVOIDANCE | AUTHORIZED DISTRIBUTION | COMPONENT MANUFACTURING





# SOURCEABILITY: INNOVATION, INTEGRITY, AND CUSTOMER ENGAGEMENT

Sourceability® is a global distributor of electronic components offering digital tools, services, and data with the power of technology to meet customers' evolving demands, combining the expertise of global distribution with the leading e-commerce marketplace in the industry. The company works with the largest catalog of suppliers to provide the transparency, robust data, and speed that customers need to create a seamless procurement process.

The tools include Sourcingengine™, the electronic component industry's leading marketplace that helps professional buyers and engineers source, negotiate, and transact on one easy platform and gives access to an extensive range of parts with global logistics support. Quotengine™ is an innovative enterprise quoting and Bill of Material (BOM) management tool that provides instant access to the price and availability of electronic components from over 3,500+ suppliers. Buyers can upload parts lists of up to 4,000 line items and purchase parts instantly or submit RFQs to procure parts through Sourceability's global sourcing team to leverage its negotiation power and logistics support. Lastly, Datalynq™ is the industry's premier source for market intelligence and analytics for over 1 billion parts future-proofing

manufacturing lines. This tool has been recognized by Sensors Converge and Fierce Electronics as "Most Innovative Product of the Year" in the Data Acquisition & Analytics category of the 2022 Best of Sensors Awards.

Beyond the unique technological capabilities of Sourcingengine, Quotengine and Datalynq, Sourceability offers a growing list of franchise lines, ERP/API integrations, MOQ management among EMS partners, EOL/LTB program, excess inventory trades, data-driven vendor reduction, and in-depth market intelligence. This gives buyers a comprehensive view of the marketplace for informed decision making.

Its excess inventory portal allows suppliers to upload their excess parts, set pricing and have global visibility to over 100,000 professional buyers – providing users with a white glove experience that moves excess inventory fast and with price transparency. It's one of the only platforms in the industry to provide unmatched reach and a seamless experience for users.

Headquartered in Doral, Florida, the company operates 20 locations across North America, Europe, and Asia, and employs over 350 people worldwide. The backbone of Sourceability is

innovation, quality, and logistics with global distribution centers in Singapore, Hong Kong, and Miami. Regional offices support each distribution center to maintain a deep understanding of customer supply chain needs. The company is led by founder and CEO, Jens Gamperl, a technology leader with over 30 years in the electronic components industry across both Europe and the United States.

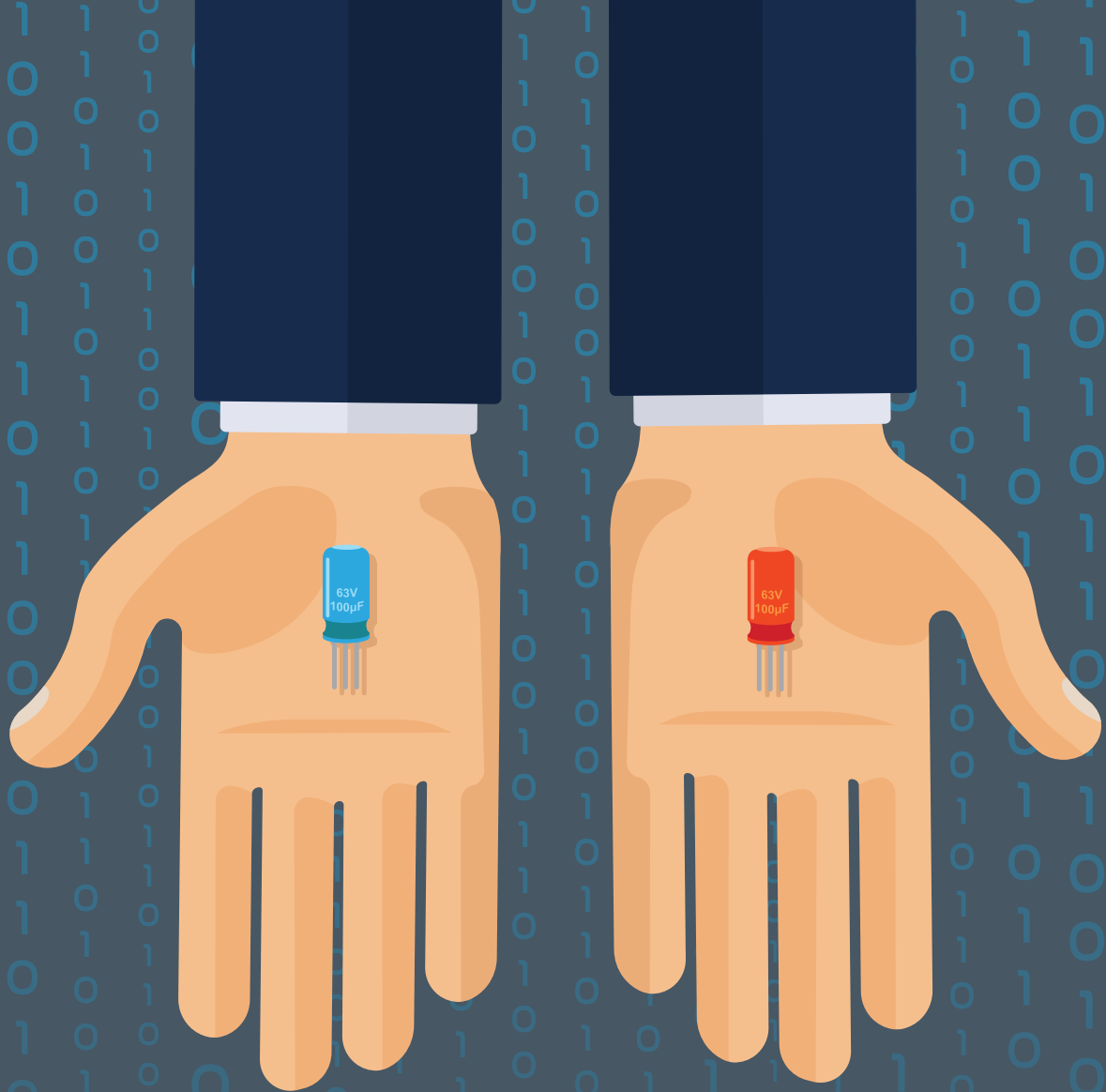
Sourceability has been honored for its growth and innovations numerous times in the past year including being listed as one of Inc. 5000's Fastest Growing Private Companies and named "Outstanding Supply Chain Service Provider" in ASPENCORE's Global Electronic Component Distributor Awards. The company was also ranked #17 on SourceToday's 2022 Top 50 Electronics Distributors list.



SOURCEABILITY™

[www.sourceability.com](http://www.sourceability.com)





SOURCEABILITY™

# Source Your Way

Call our full-service sales team OR Shop our online marketplace

SOURCEABILITY.COM



## Avnet: Delivering what's next

As a leading global technology distributor and solutions provider, **Avnet has served customers' evolving needs for more than a century.** We support customers at each stage of a product's lifecycle, from idea to design and from prototype to production. **Our unique position at the center of the technology value chain** enables us to accelerate the design and supply stages of product development so customers can realize revenue faster.

Avnet started as a radio components distributor, and has adapted to wave after wave of technological change by expanding its capabilities to guide its customers through the greatest technology advances of the last

century. Today, we act as an extension of our customers' teams, and they can leverage our deep technical and supply chain expertise throughout the product lifecycle. This helps maximize their return on investment.

Customers often come to us to accelerate product design or streamline their supply chain, and they can plug in our capabilities to optimize their own. To reduce complexity during the product design process, Avnet offers comprehensive design expertise and services for technology selection and prototype guidance. As products move into production, customers find scale through flexible supply chain services and global infrastructure.

Support doesn't end once a product is launched – we also extend product longevity throughout the entire lifecycle and can support with any redesign requirements. Avnet provides global technology solutions with connected regional support. It's how we confidently deliver what's next... **in supply chain...in design chain...and in distribution.**

Contact your Avnet representative today to find out how we can help you.  
Visit: [www.Avnet.com](http://www.Avnet.com)

### AT A GLANCE:

Avnet designs, makes, supplies and delivers technology solutions to customers of every size, in every corner of the world.

Founded in **1921**

Employees worldwide: **15,300**

Customers: **1 M+**

Units shipped annually: **283 B**

Company locations: **300+**

Headquarters:

**Phoenix, Arizona**

Web: **[www.avnet.com](http://www.avnet.com)**

Phone: **480-643-2000**

Twitter: **@Avnet**

Facebook: **@AvnetInc**

Linkedin: **@Avnet**





**Andrea Barrett**  
VP Social  
Responsibility  
and Sustainability  
RS Group

of self-serve analytics that converts real time signals into actionable intelligence.

In interviews for this report executives were asked, “What supply chain breakthroughs do you believe the electronics component industry has achieved recently?” The responses revealed that not all solutions are based on a specific technology. Systems level solutions can deliver powerful benefits. Powell Electronics CEO, Ernie Schilling, described the “Powell Process” for supply chain integrity, security, and savings. He noted that this solution is much simpler and is already built into Powell’s world class SAP ERP system. He shared six key dimensions of this system that range from empowering “distribution to consult and eliminate all proprietary, sole source devices from the bill of material” to “creation of a task force of a very few elite engineers capable of second sourcing.” Emphasizing the need for system level solutions Ernie declared, “I believe in AI. I believe in technology. But I don’t believe in a magical algorithm, measuring the rain gauges in Taiwan or the

electricity in Singapore to predict the manufacturability of products.”

RS Group’s Adam Osmanec pointed to initiatives promoting sustainable practices and products. “We are actively pursuing major “green” initiatives. Our warehouse in Bad Hersfeld, Germany, is powered in part by a 6,000m<sup>2</sup> solar array which generates 750kW of green photovoltaic electricity and 22% of the site’s annual electricity requirement. We’re also introducing a sustainable range of products across not only industrial products, but also electronic products.” He also sees advancements in inventory management software. He states that, “those who take more advantage of that will be better suited to drive these recent breakthroughs in the supply chain that we’re seeing.”

Chris Wadsworth points out that “simple” solutions can be powerful. He explains that “another breakthrough example that is not as futuristic but is more simple is that customers are opening up specifications that had been locked for decades on older designs. They are opening up their engineering resources to design in newer technology that is much more readily available. Hard to get components are often not produced when demand for newer, more profitable products is hot. Many manufacturers either obsoleted product or pushed out lead times exponentially and as a result customers have been forced to allocate engineering energy to changes which have improved many supply chains around the world.”

In the context of discussing supply chain breakthroughs executives were asked about the potential of ECIA’s

“Paperless Certificate of Compliance Initiative” to deliver breakthrough results for the industry. Mike Slater, Digi-Key Electronics’ Vice President of Global Business Development, touted “ECIA’s “Paperless Certificate of Compliance Initiative” as a great example of how we need to digitize in areas of the business to create a frictionless digital experience. This will both accelerate the entire process and standardize transactions so that as an industry we can eliminate waste.” Chris Wadsworth elaborated on ECIA’s CoC initiative, “I do believe the efforts in the pilot between ADI and Digi-Key are a great example of working to digitize and help automate a manual process and free up resources. A great example of working lean methodology to solve an opportunity to use technology instead of muscle and paper! Such an example opens up other ideas to streamline other manual processes we all deal with every day and just accept. With any new process the commitment of IT resources must come into play and as digitizing continues to evolve in all of our member companies, the ability to partner and execute in these technological advances will become more accepted and implemented. A common language and process must also be agreed upon for our industry so that each company does not have to reinvent the process for themselves but can leverage the work of ECIA partnerships between reps, distributors, and manufacturers. This is a perfect example of that three-legged ecosystem at work.”

David Loftus pointed to another key benefit of this initiative, “It can also translate hopefully into a reduction of a lot of the paper that’s sent with high reliability items for space applications, Mil/Aero, and other areas where

the customer’s customer is demanding that they have total sourcing documentation. To be able to put that into electronic format just makes everybody more efficient and more accurate.” Ernie Schilling looks to the future benefits, “This will inspire far more accuracy and efficiency in our systems and in our customers’ systems. It is core to all future supply chain automations. Inspiring our major customers to adopt these as the standard for internal and ISO9000xxx quality standards is the next step.”

### ESG – ECIA Supports Growth

While not all sectors of the industry are engaged in or supportive of ESG, there is an opportunity for ECIA’s GIPC group to form a committee to assist the industry in implementing this initiative. Executives were asked about their opinion regarding the support ECIA could provide the industry. Chris Wadsworth was very positive in his opinion.

Continues on page 40



**David Loftus**  
CEO ECIA





# Design, Purchase and Maintain

Newark is a high-service electronics distributor of technology products, services and solutions for electronic system design, maintenance and repair.

## **Global access, with service that's close to home**

Newark has operations in the US, Canada and Mexico, serviced from our regional distribution hub in South Carolina. We are committed to supporting local language, currency, product and shipment needs across North America and around the world. As part of Avnet's global operations, our access to stock and strong relationships with suppliers, we are better able to serve your industrial and electronic needs.

## **A commitment to innovation that powers change**

We have a history of innovation and have developed many industry firsts that save precious time for our Design Engineer customers, such as the first online Community for engineers – element14. More recently we continue to bring the latest technologies to market, from development tools that speed up the design process to modular devices that engineers can quickly and easily build into their devices, along with the latest in easy-to-deploy artificial intelligence.

## **DESIGN**

- Access the widest range of exclusive products and latest technologies. With over 10,000 dev kits and evaluation boards you will find everything you need for your design
- Stay up to date - 900 new products added monthly

## **PURCHASE**

- Access our expanded range from world-leading Passive, Semiconductor, Electromechanical, Test Equipment and Connector manufacturers - including TE Connectivity, Vishay, Molex, Analog Devices, Tektronix, Amphenol and Panasonic
- Enjoy local and professional customer service available online, phone, or face-to-face

## **MAINTAIN**

- Access over 69,000 Test, Measurement, Tools and Production Supplies from leading manufacturers
- Minimize downtime in urgent situations with our same day shipping and fast delivery
- Exclusive offers and promotions on popular products

[www.newark.com](http://www.newark.com)





# Newark

AN AVNET COMPANY

MORE SEMICONDUCTORS,  
PASSIVES AND CONNECTORS  
THAN EVER BEFORE

**Build your next board with Newark**



Free shipping on orders  
over **\$150 USD**

\*Terms & Conditions apply. Please visit  
[newark.com/help-delivery-information](https://newark.com/help-delivery-information)  
for more information



[newark.com/boardlevel-components](https://newark.com/boardlevel-components)



## ECIA TOP 50 Americas Authorized Distributors Report 2023

"I believe the industry can work together to define the "hows" and the "whats" in a common platform or format that helps both educate the industry on what ESG means and what a comprehensive EGS program entails. Longer term, a critical element will be to establish a common data platform to record product attributes similar to past RoHS and REACH initiatives regarding the component sustainability footprint." Ernie Schilling paints his vision of the potential of a cooperative initiative. "A cumulative industry solution, inspired by organizations like the ECIA is the best way to go. The cumulative resources of multiple companies, sharing and expressing data in a like manner, consumable and easily expressed is key to gaining momentum. Organizational templates help pull in all business sizes and knowledge resources. I am much more in favor of these templates than I am paying 3rd party auditors. Apply those audit monies toward real change and solutions. ESG must be voluntary expressions of each company's culture that serves to differentiate them in the community, investment market and employment market. Based on individual behavior, businesses, investors, and people will seek out the very best among us."

Andrea Barrett is VP Social Responsibility and Sustainability at RS Group. She has developed valuable resources that are available to the industry on their website. She highlights her view on the needed focus of a group effort. "Cross collaboration is key to progressing ESG goals across all topics. The key thing is understanding the most material issues for the industry and then picking 3-5 issues that the committee will focus on and drive improvements. A suggestion could be:

**E** Sustainable product improvements and standards, greener packaging and logistics, e-waste, and recycling & circularity

**S** Gender and ethnic diversity of the industry and leadership communities; responsible procurement practices in the supply chain

**G** Traceability, conflict minerals

David Loftus sees very practical benefits to a common effort around ESG. "I think there is a need to identify what the mainstream is going to be going forward and try to arrive at a common format for when customers make inquiries and requests for information. Hopefully, this will eliminate

the need to answer a gazillion one-off inquiries from customers. The need is to develop some standards for people to put that information up on their websites for self-service data on the web. When you get into all these one-off requests and when there's not a particular accepted format, it creates tremendous amounts of manual effort on the part of sales support and operations organizations with suppliers and with distributors."

Again, not everybody is supportive of ESG initiatives. Acknowledging this, Chris Beeson points to a neutral role ECIA can play. "There are some smaller distributors that have said, 'I don't want any part of that.' I don't think our role is to dictate. I think our role is to educate. Talk about pros and cons and just show others the industry movement that's taking place. If one chooses to participate or not that's an individual organization's discretion to be able to do that."

Since the earliest days of ESG various ratings organizations have been formed to provide ratings for company compliance/support of ESG principles. The question arises regarding the possible need for ratings organizations specifically focused

Continues on page 44



**Chris Beeson**  
President Electronics  
& Global Strategic  
Suppliers RS Group




**Adam Osmanovic**  
SVP Global Supplier  
Development  
RS Group



Connecting Solutions Together.

Advanced Connector Manufacturing and Distribution

 [eccoconnectors.com](http://eccoconnectors.com)

**DIVERSIFIED SUPPLIER**

# Delivering Parts

It's what we do.

## Operational Excellence

Superior Customer Service  
Same Day Shipments  
No Order Minimums

## Expanding Product Portfolio

World's Top Brands  
Search Millions of SKUs Online  
Design-In Services

## Customizable Solutions

Shortage Sourcing  
Locate Fully Traceable Products  
Inventory Management Solutions

For over 40 years, Brevan has been a trusted partner and supplier for OEMs and customers worldwide. Our commitment to quality and access to global inventory has made us one of the fastest-growing authorized distributors. We bring what the others cannot – personalized customer service and delivery. Scan below and learn how Brevan Electronics can support your business today.



**BREVAN**  
ELECTRONICS

[www.brevan.com](http://www.brevan.com)

1-800-330-7230

[sales@brevan.com](mailto:sales@brevan.com)

USA MEXICO NETHERLANDS HUNGARY SINGAPORE HONG KONG TAIWAN INDIA





## Electronic Products Group

FDH Aero, a global supply chain solutions provider for aerospace and defense OEMs and aftermarket segments, has acquired BJB Electronics Group. With this acquisition, FDH Aero will establish a new electronic products division comprising Electro Enterprises, BTC Electronics Components and BJB.

Combining the best electronic component distributors within the mil-aero market with the best interconnect, wire and cable, and electromechanical product lines creates a trusted, entrepreneurial and reliable one-stop shop for our suppliers and customers.



FDH Aero is a trusted global supply chain partner for aerospace and defense. With more than 55 years of experience, it specializes in components that include hardware, electrical, chemical, and consumable products and services for global OEM and aftermarket customers. FDH is headquartered in El Segundo, California, has operations across North America, Europe and Asia, and employs more than 1,000 people globally.

We believe that tomorrow's global supply chain demands an independent, service-centric approach. Every action we take begins with this core value: A relentless focus on service.



### Company Profile:

1964  
FOUNDED



34 locations / 14 countries



1,000 **Best-in-industry**  
employees



**650,000+ square feet**  
of inventory space.

### Categories:

Interconnect, wire and cable,  
electromechanical, value-add  
connector assembly, and cable  
assembly manufacturing  
product lines and services

# Pleased To Announce the Acquisition of **BJG Electronics Group**

Combining three leading brands to establish a **NEW Electronic Products Division**

*Electro*

**BJG**



## The **Industry-Leading** Electronic Products Group

Designed  
to Deliver

Swift and Easy access to a wider  
range of products & services

Speed, Quality,  
Available Inventory





on the electronics components supply chain. Does one size fit all or is there a need for specialization? There were split opinions on this topic. Some saw the benefit of specialization, but the strongest arguments were opposed to the development of a specialized ratings organization for our industry.

Barrett of RS Group expressed her view very effectively. "I would strongly discourage establishing ratings agencies for individual sectors. Sustainability reporting is already out of control across agencies, companies and sectors and we desperately need

global convergence and standardization. Otherwise, more time is spent on reporting than action. That's not to say that there shouldn't be industry groups that provide support, forums, and standards for the industry. A bit like the responsible minerals alliance or the sustainable apparel coalition. These groups are excellent at developing approaches to tackle specific industry issues, establishing best practice standards and driving ACTION and PROGRESS on key areas."

Ernie Schilling expressed a strong opinion regarding the appropriate focus. "All of us can cite

examples of companies that have high ratings on 3rd party auditing companies, ranked best in the world for some ESG attribute, that are also on the front page of child labor, chemical spills, or 100-million-dollar lawsuits, for which they accept no blame. Instead of paying for these 3rd party entities to sanction and publish our evolution in ESG, it would be better to apply those energies and funds toward real change. Spend the monies on significant internal actions and programs, not the grandstanding and marketing of modest gains. Hopefully this way the real actions will last longer than the attention span of the media."

Within the ESG scope, customers are now asking for the "carbon footprint" at the component level. The question now comes about what approaches can be used to address this challenge? SEMI recently announced a Semiconductor Climate Consortium. Executives expressed a wide range of opinions on this topic. Dayna Badhorn stated that, "working on a template for suppliers to capture compliance information for TSCA will be a huge step. Additionally, we have customers asking what the carbon footprint is of their products. This is our customers' Scope 3 emissions. There isn't an industry standard model to perform the calculation and lack of available data that will provide an accurate carbon accounting is an issue. It would be fantastic if ECIA could help us get to a common model for the industry to provide this information to customers. They might be able to help us build a usable model at the category level using averages, or revenue, etc."

Andrea Barrett offers very helpful information on the direction of industry demands and legislation regarding ESG and carbon footprints along with a possible path forward that is reasonable in scope. "The existing gold standard to understand total carbon footprint is to conduct a lifecycle assessment (LCA) for each component or product. This helps companies to understand the carbon footprint and other environmental impacts of their products at all stages of the lifecycle – raw materials, manufacture and production, distribution, in-use, after-life processing - and includes all the elements upstream and downstream from them. It can be declared in an Environmental Product Declaration and shared with their customers / distributors. The future direction is that carbon footprint of products will be required on product labels and marketing assets. We are still a little way off this, but customer expectation is rising, and legislation is emerging, so companies should try to get ahead of the game now to meet their stakeholder needs, differentiate their brands and ensure they're fit for the future. For example, EU Legislation on sustainable

# 40+ years Helping keep your production facilities up and running

**NTE**<sup>®</sup>  
ELECTRONICS, INC.



### PRODUCT SOLUTIONS

Cross reference search tool accesses alternatives for over 525,000 industry part numbers

Expanded range of high quality product lines



### GLOBAL DISTRIBUTOR NETWORK

From e-commerce to national, regional & local distribution, we have you covered

Large inventory in stock  
Average 24-hour shipping times



### CUSTOMER SERVICE

Professional and knowledgeable staff  
Volume discounts available

Your trusted source for high quality electronic components  
Consumer – Industrial – Commercial – MRO Applications

**NTE**<sup>®</sup>  
ELECTRONICS, INC.

visit **NTEINC.com**  
to see our complete line of products.  
Contact us today at **973-748-5089**  
or **sales@nteinc.com**



**Dayna Badhorn**  
Regional President,  
Americas Avnet

product eco-design includes a digital product passport and carbon footprint is one of the attributes, along with other key elements like percentage of recycled content or recyclability.

“However, LCA is time and cost intensive e.g., it can cost £50k and take 3-4 months for a single product, so full-scale adoption is challenging. The likes of Schneider and Siemens etc. are already making this a core part of their product development strategies. The more that can be shared on this between companies and sectors the more it will lead to full-scale adoption, clearer insights into product carbon footprints and effective carbon reduction strategies. There are other algorithm-type services out there that can also calculate carbon footprints by plugging in assumption data on the raw materials, distribution methods and in-use variations.”

David Loftus steers a moderate course and cautions against aggressive or extreme approaches to carbon footprint efforts. “I’d say ECIA’s position is to evolve with a mainstream and not service extreme proposals. Hopefully we can come to a good agreement about what information is required, should be provided

and is helpful really to society in being able to demonstrate that companies are moving in a positive direction in each of these areas. It’s not to diminish the value of any of the initiatives under ESG in general. I feel that there is a reasonably positive direction that if done in a practical fashion we can engage and try to start servicing these kinds of requests. I think expensive and overwhelming approaches are not an effective use of limited bandwidth on the part of most manufacturers and the channel. I think in the end, common sense and practicality have to play a major part in what we do.” Similarly, Chris Wadsworth expresses his view, “I feel like the industry can bring distribution and manufacturers together to develop a common method to record and communicate attributes like carbon footprint. I like the “keep it simple” method and add to the manufacturers part number attribute taxonomy for feeding electronic servicing methods of data communication. One variable is communicating the standard method to define the carbon footprint as the entire supply chain influences that measurement.”

### **It’s a small - and fragmented - world after all!**

Geopolitical challenges, especially between the U.S. and China, have been amplified during the past year. It seems that we are going down a path that will take us from a global electronics economy to a fragmented/balkanized world where electronics supply chains and production will be increasingly localized. Executives were asked if they agree with this assessment and given the opportunity to

provide their perspective on global concerns.

Dayna Badhorn shared her view that, “This industry has been cyclical in nature on many things. We started with localized inventory and then went to centralized warehousing. Now we see the trend move back to inventory close to the customer. Some of this was caused by supply chain challenges and not just political challenges. We see more growth in countries such as Vietnam, Malaysia and Mexico which demonstrates a global economy but shifting by country a bit. Customers have created Made for China strategies to address geopolitical challenges. I believe distribution has many opportunities for growth with these changes. It makes the supply chain work, particularly around visibility and agility, even more important than ever before.”

Presenting his view on the impact of recent disruptions Chris Wadsworth explained, “The last three years of supply chain disruptions have made it abundantly clear that relying on China is a liability that is less in a company’s control and subject to unexpected and sometimes politically motivated disruption. I feel like companies will continue to drive a much more stable supply chain that provides options and more control. Those options will promote localized sources of supply. The cost of the product has a new definition especially the opportunity cost to not have product when needed. Technology IP will also continue to drive and influence localized behaviors.”

In their discussion, Beeson and Osmanecic pointed to recent government actions and the battle facing the industry. “Moving manufacturing out of China is not a quick process. The ultimate cost of deglobalization will be determined by the rise in geopolitical unrest. The CHIPS

Act is one response to these topics. Is that the right thing to do? A wrong thing to do? We’re going to see more of that type of practice. The CHIPS act is one thing. But it’s still not enough money. \$52 billion sounds like a lot, but in the grand scheme of things... You’re facing a technological war which is far greater than any of the other wars that are being fought out there. This is a major one. If the US loses, there are damaging circumstances that will end up happening. So, this is a war that the US must win.”

David Loftus reflected on the implications of how major world powers are interacting. “There’s no doubt that we’re moving away from the concept of the unified global economy. I certainly hope that some of these extreme political views are brought back toward the mainstream again. There are shipment restrictions that are going on because there are some bad players in the world that are threatening other governments, other economies, and other people that just really have no place in the modern world. In some cases, governments use very blunt instruments to affect change when hopefully

Continues on page 48



**John Drabik** President  
TTI Americas





Galco.com • 800-575-5562

# MILLIONS OF PRODUCTS. THOUSANDS OF APPLICATIONS. YOUR SOLUTIONS EXPERT.

For nearly 50 years, Galco has been a leading provider of industrial and commercial electrical, electronic control, automation, and motion products, with full-service repair and engineering support. Galco provides industries with a variety of industrial electronic control capabilities and innovative solutions they can rely on.

Galco is committed to being a trusted advisor to its customers and manufacturer partners. They also strive to provide the best-in-class customer experience, the highest level of service and technical support, and a broad selection of products.

## BROAD SELECTION OF PRODUCTS

As an authorized distributor of industrial electronic products like circuit protection, enclosures, motors, drives, electronic controls and more, Galco stocks products and brands for thousands of applications, driving billions of lives and hundreds of industries every day.

Galco is continuously adding new product lines to its catalog to better meet demand and help clients solve tough problems, as well as provide alternative solutions in fit, form, and function across multiple brands to help the customer gain more functionality and better value. No matter the application, Galco finds the right part and helps customers get to work.

With simple online ordering, helpful customer service, and 24/7 expert technical support, Galco makes ordering products from top manufacturers easy.

## HIGHEST LEVEL OF SERVICE AND TECHNICAL SUPPORT

To efficiently support customers, Galco invests in its employees with in-depth product training programs and seminars to improve familiarity with new technologies and cutting-edge industrial solutions.

With extensive product knowledge, Galco provides customers with the technical support they need to stay modern, operate reliably, and improve productivity.

Galco offers send-in repair, on-site repair, and engineering services to assist customers long-term, specializing in industrial electronic equipment, motion control and CNC engineering, and control panel fabrication.

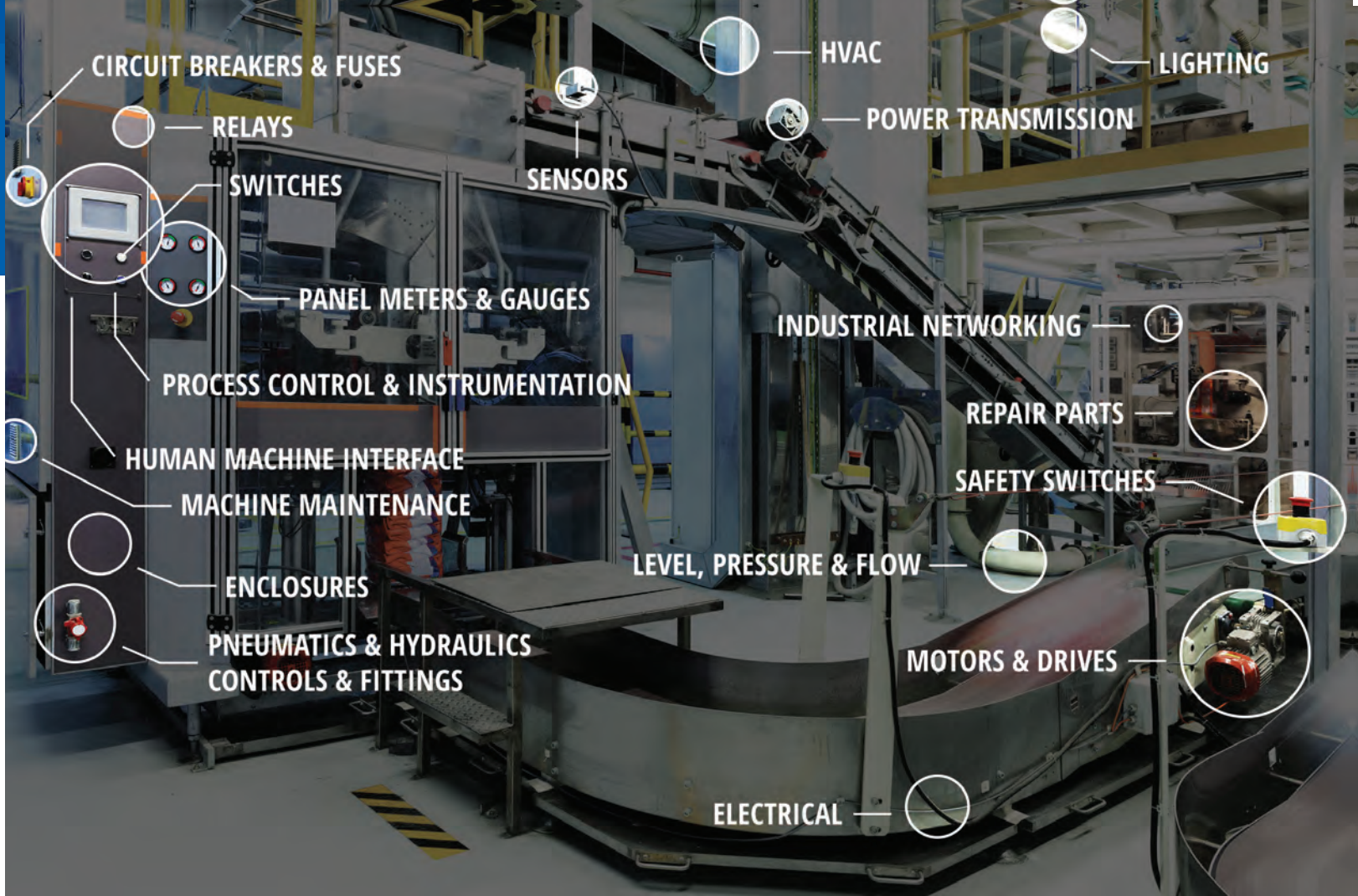
## BEST-IN-CLASS CUSTOMER EXPERIENCE

Galco provides products and services for customers' industrial application needs with reliability and speed in mind. With dedicated phone support, an integrated eCommerce platform, and a robust digital footprint, they assist customers in-channel immediately or guide them to the channel that meets their needs more effectively.

These efforts include GalcoTV, Galco's in-house media department that works every day producing product introductions, technical demonstrations, "How-Tos", and other instructional and informational videos customers need. This rich content is embedded on the website and across various channels such as YouTube, LinkedIn, Instagram, and the Galco Blog.

For additional resources, technical tips, new manufacturer partners, new products, and more visit Galco.com.





# MILLIONS OF PRODUCTS. THOUSANDS OF APPLICATIONS. YOUR GLOBAL RESOURCE.

Your Source for Industrial  
Electronics & Automation



[Galco.com](http://Galco.com) • 800-575-5562







**Lew LaFornara**  
Senior VP Product  
and Supplier  
Marketing **TTI**  
**Americas**

there would be better opportunity for diplomacy and little more pragmatic economic sanctions without going to outright bans that could exacerbate the geopolitical situations. When you're talking about trying to cut China off from vital technology for their economy, the least they're going to do is create a tremendous competitive force to try to be self-sustaining. I wish that governments could be a little more perceptive and try to utilize other methods of sending early signals when we see bad actors on the political stage."

There are pros and cons for distributors in the current global environment. Wadsworth sees an upside as he explains that, "our company's biggest growth opportunity will be gaining manufacturing back stateside as our diversity in customer segments and verticals benefits us both on the infrastructure build out as well as the US sourced component demand that will be returning to support US machinery builders. We are excited to see many companies bringing

production back onshore." On the other hand, Loftus adds a word of caution and emphasizes the importance of the authorized channel. "Unfortunately, it also brings opportunity for brokers, counterfeiters, and others. I think that there's certainly been a realization within the past couple of years that the authorized channel needs to play a much bigger part in many companies' supply chains. Those that had in many ways overlooked that and really forced themselves into unnatural supply chain situations that tried to bypass the channel. I think that the geopolitical situation and the incredibly unprecedented cycle that we've just gone through with the pandemic reinforces the tremendous value that the authorized channel plays in being able to cushion some of these uncertainties and to be able to provide a good backstop to people's procurement processes."

### The New Frontier of Artificial Intelligence

It seems that generative AI is what everybody is talking about now, especially with ChatGPT capturing headlines and imaginations (good and bad) in recent months. (Let's hope we can avoid the "Terminator" scenario!) Of course, AI and Machine Learning are not new and various tools and programs have been adopted in industrial applications already. Executives were asked if they see any developments in the adoption and application of AI in the distribution world in the coming year that could unlock significant supply chain improvements. Could we see a major increase in the

use of AI tools in the supply chain in the near term?

In discussing AI, Chris Beeson noted that, "AI for many of us is not a new concept. But the development has now occurred where you're starting to see producible results. You're starting to see the applications applied to your business practice and that's occurring in inventory management. It's occurring within web development and product development. For some it's a brand new topic and for others that have been on the journey, they're actually starting to reap the rewards of the investments that have been put in place over the last couple of years." Adam Osmanec added, "There was a recent study by Accenture where they surveyed 850 global executives and found that nearly half of them, around 45%, planned to commit at least 1/5th of their AI budgets to meeting regulatory requirements by 2024. You're going to see more and more companies in our industry move to AI and supply chain because it basically eliminates the need for planners to perform the same calculations, taking the guesswork out of planning and buying."

Mike Slater was conservative in his view. "I am not sure we will see a major increase in use in the near term. But I believe that companies that invest in that area and figure out the best use and benefits will make greater strides. As with many technology shifts, it will take time and resources to put the strategy and tools in place to make the best use of that technology." Ernie Schilling took a practical position on the adoption of AI. "The key will be identifying the leading indicators, barometers, and litmus tests

to launch real orders. We have all gained from ERP systems, automation and we have all suffered based on the variable given the most weight. Using AI to calculate sales & marketing's sales forecast BS factor, might be our very best application."

Two experiences in the use of AI in their companies came from Chris Wadsworth and Lew LaFornara. Wadsworth shared, "Our company is committed and investing more than ever in our digital transformation. Helping drive better decisions, faster for our customers and for our internal teams, will continue to be the winning move. AI integrated with quality leverageable data makes this engine run and this will continue to be a focus in all companies. The future will be much different in how we interact, exchange information, and communicate with future decision makers in the companies we all do business with, and we must all realize and invest in this reality." Fornara presented the process and prospect of AI.

Continues on page 53



**Ernie Schilling** **CEO**  
**Powell Electronics**

# LET US REINTRODUCE OURSELVES



## Allied Electronics & Automation is now RS

Imagine a global, end-to-end partner for industry, dedicated to solving problems in every stage of your project's lifecycle.

Inspiration and innovation for:

- Concept and design
- Build and production
- Maintenance and retrofitting

More support, more expertise, and more possibilities, so we can drive your business forward, together. **Imagine that. We can.**

Learn more and shop our solutions online at [us.rs-online.com](https://us.rs-online.com) or call us at **1.866.433.5722**.





# MARSH

Electronics, Inc.

[www.marshelectronics.com](http://www.marshelectronics.com)

## Marsh Electronics Solutions

- ✓ Logistics
- ✓ Engineering
- ✓ Product Production

# MarVac

ASSEMBLIES

[www.marvacassemblies.com](http://www.marvacassemblies.com)

## MarVac Assemblies Solutions

- ✓ Kitting
- ✓ Sub-Assemblies
- ✓ Cable/Wire Harnesses



## OUR SERVICES

Since 1935, Marsh Electronics has proudly delivered extremely high-quality products, service, and value to our customers. This philosophy has helped us grow into a regional industry leader, distributing a wide range of electronic components and solutions throughout the United States.

Our on-staff technical support and vendor relations professionals will work with you to identify the requirement, find a solution, provide a sample for testing, and support you through the qualification process.

Marsh Electronics will streamline the electronic application process with customized application support to fully understand and better evaluate your application requirements.



# MARSH

Electronics, Inc.

[www.marshelectronics.com](http://www.marshelectronics.com)

## Marsh Electronics Solutions

- ✓ Logistics
- ✓ Engineering
- ✓ Product Production

# MarVac

ASSEMBLIES

[www.marvacassemblies.com](http://www.marvacassemblies.com)

## MarVac Assemblies Solutions

- ✓ Kitting
- ✓ Sub-Assemblies
- ✓ Cable/Wire Harnesses



## YOUR SOLUTIONS FOR:

FOOD & BEVERAGE

MILITARY

COMMERCIAL & OFF ROAD VEHICLE

ENERGY

MEDICAL

INDUSTRIAL





# RUTRONIK CELEBRATING 50 YEARS COMMITTED TO EXCELLENCE

**R**utronik is one of Europe's leading broadline distributors of electronic components with offices and logistics centers worldwide. Founded in Ispringen, Germany, in 1973, this independent family-owned company is celebrating 50 years of continuous expansion focused on high-growth future markets.

## How it all began: The 1970s

Helmut Rudel founded Rutronik in 1973 as a "one-man-company". At this time, Rutronik specialized and focused on the distribution of passive components. After about three years, the company already had five employees and generated sales of six million German marks. In the same decade, Rutronik moved to the newly constructed building in Ispringen. This is still the location of Rutronik's now much larger headquarters.

## On the road to digitization: 1980s

Due to technological progress and the great demand for microchips, the semiconductor industry grew rapidly in the 1980s. Right at the beginning

of this decade, Rutronik bought the company Silec/RSC-Halbleiter and eight years later the company landed an order with an order volume of 1 million German marks, sealing the expansion to active components.

## From displays and mobile devices: 1990s

In this decade Rutronik expanded through further company acquisitions. The acquisition of BIT-Electronic AG was strategically decisive for the company's entry into the market for displays and systems. After only a few years, Rutronik also took over Discomp GmbH and the then Alcatel subsidiary Dimacel Composants. In 1999, two more companies were added and by the end of the decade, Rutronik was one of the leading broadline distribution companies in Europe with an extensive range of products, components, and services.

## Wireless communication technologies: 2000s

In the 2000s, Rutronik concluded distribution agreements with leading

manufacturers in the fields of wireless communication and information technologies. In 2005, the wireless division was founded and the product portfolio was expanded once again. In 2008, Helmut Rudel called his son Thomas Rudel to the position of managing director and acted as president of the family business from then on until today.

## Mobility goes digital: 2010s

The 2010s saw the beginning of the upheaval in the automotive industry. Rutronik's Automotive Business Unit was founded in 2014, specializing in the procurement and development structures of its customers in the automotive sector. As a response to the forecasted growth for light electric vehicles, Rutronik invested in research and development of applications for the 48 V on-board network. With the bidirectional HV switch, Rutronik offers a wear-free alternative for mechanical switches that also integrates other functions such as protection against overcurrent.

## Today

With its team of over 1,900 dedicated employees,

Rutronik provides expertise in the distribution of semiconductors, passive and electromechanical components, embedded boards, storage & displays, and wireless products.

Supported by worldwide logistics centers in Europe, Asia, and North America, Rutronik provides customized logistics systems, reliable supply chain management, and 24/7 access to product availability on our online e-commerce site, [www.rutronik24.com](http://www.rutronik24.com).

## North America offices

With the newly relocated USA headquarters in Coral Springs, FL, Rutronik is rapidly expanding in North America and continuing the legacy of growth the company has modeled over the past 50 years.



### Rutronik Inc.

3111 N University Drive  
Suite 1050, Coral  
Springs, FL 33065, USA

+1 954-799-8430  
[sales-na@rutronik.com](mailto:sales-na@rutronik.com)

"We're using AI here, and we're still learning how to take all the data that we have between the family of companies and use that in a way that's effective right? Our analytics team is constantly looking at ways to use AI and machine learning too. I think that's what the industry is going to do. But I think over time we're going to get better at that. It's probably not something in the short term that we'll solve. But I do think over time AI will play a critical role in helping us improve the visibility and the resiliency of the supply chain."

David Loftus views the status of AI adoption as being in the earliest stages. "As far as generative AI, I've done some experiments with ChatGPT. While I think it's a really novel idea, it certainly has a long way to go to be a highly accurate tool. It can certainly provide some interesting framework for people to develop marketing material and make it a little easier. But it must be very closely checked. As far as its application in the distribution world and in supply chain overall it goes back to my point about progressive

companies using artificial intelligence and machine learning today in analyzing ordering patterns against historical cycles. I think that we're just learning to crawl. We're not even toddlers yet in the evolution of how AI and machine learning can be used in trying to make the supply chain more efficient, whether it's manufacturing or whether it's in distribution."

## Energy to Power the Future: Floodlights or Flashlights?

**B**lackouts, brownouts, and skyrocketing energy costs raise concerns that reliable energy may not be reliable in the future. This presents the question about what steps can be taken to mitigate the impact on the supply chain. Mike Slater presents a fundamental view on addressing energy risks. "Having a multifaceted and balanced approach to any problem would mitigate some of the risk and impacts to the supply chain. Having a plan that includes risk mitigation and disaster recovery and then consistently monitoring areas that may impact your plan are key to staying ahead of this." Dayna Badhorn discusses the lessons we should have learned in meeting this challenge. "As an industry, we have seen these disasters across many years. Whether they are geopolitical disruptions, natural disasters – fires, earthquakes, etc., logistic disruptions in ports, or material shortages – we will always have risks affecting our industry. Steps as I mentioned prior are with transparency of information and a solid supply chain in place. We need to not forget the changes we made to supply chains this past year for visibility and agility, to not have history repeat itself again. If customers are investing in getting the right supply chain in place now, it should alleviate some of the disruption that has happened over the past few years."

Continues on page 55

## DESIGNER PLASTIC ENCLOSURES FOR INDUSTRIAL ELECTRONICS



## IP 65 - IP 67 HOUSINGS

Modern and sophisticated plastic enclosures with many unique features. These include recessed lids for keypads, lid retaining straps and clip-on trims which hide all of the fixing screws. Huge range of sizes and styles.



**ROLEC ENCLOSURES INC**  
(888) 658-5774 | [www.rolec-usa.com](http://www.rolec-usa.com)





# Mouser Stocking Widest Breadth of Inventory

Authorized distributor Mouser Electronics specializes in the introduction of the newest products and technologies from its 1,200 manufacturer brands for engineers and buyers worldwide.

The company's extensive product offering includes semiconductors, sensors, optoelectronics, embedded solutions, interconnects, passives, test and measurement, and electromechanical, plus a vast range of other components authorized from the top manufacturers in components. Mouser sells millions of tiny parts that function as the essential building blocks of new product design, with leading-edge components that are smaller, faster and smarter.

During the recent challenges of supply chain issues across the industry, Mouser teams are doing a great job trying to stay ahead of product availability issues. Some sources are very limited in their component

offerings, but that's not the case with Mouser. The company's wide selection of inventory allows choices and alternative solutions for customers. Along with a focus on new product introductions, Mouser continues to expand its industry-leading website, [mouser.com](https://resources.mouser.com/purchasing-resource-library), with search enhancements, tools and technical resources for buyers and engineers. Mouser has developed an exciting new resource site for purchasing professionals, available at <https://resources.mouser.com/purchasing-resource-library>.

## Purchase with Confidence

Now more than ever, buying from an authorized distributor today is the only way to eliminate the risk of counterfeit or gray market products. It has never been more critical to select genuine products that are 100% certified and fully traceable from each manufacturer.

As an authorized distributor with a commitment to customer service excellence, Mouser offers 27 global Customer Support Centers and has the professionals, products and procedures in place to assist throughout the design and buying process.

Mouser also offers a full suite of online tools to help simplify the purchasing process, such as the Price and Availability Assistant, which makes online buying quick and efficient. It's the latest addition to a library of productivity and pricing tools from Mouser that includes the FORTE intelligent BOM tool, ECAD design resource solution, inventory management tool, API services and order automation, all accessible through [mouser.com/servicesandtools/](https://mouser.com/servicesandtools/)

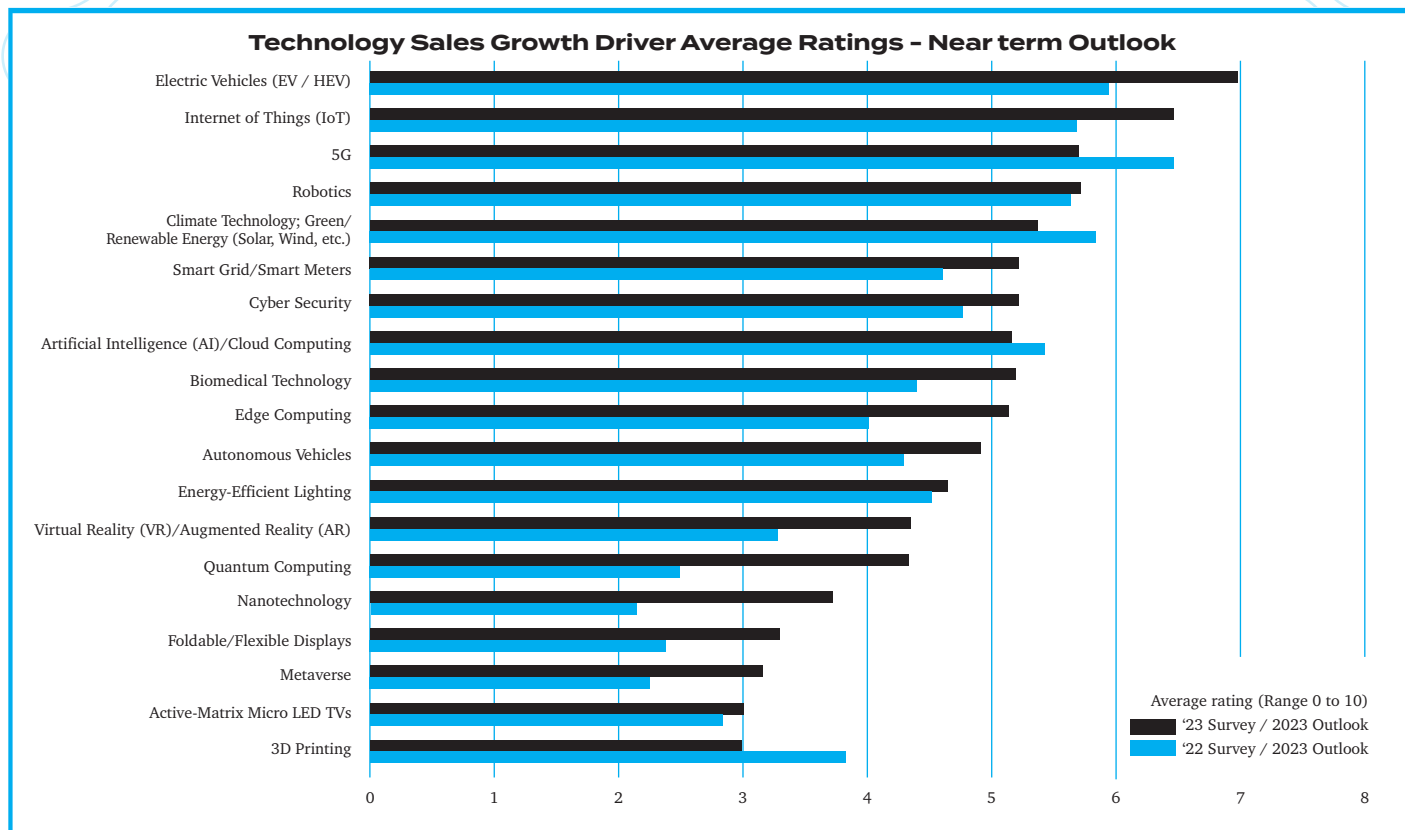


## By the Numbers

- Mouser.com features over 6.8 million components from over 1,200 manufacturer brands
- Stocking industry's widest selection of components – over 1,000,000 parts in inventory
- 27 global branch offices
- More than 6.5 miles of conveyor belts
- Major new expansion underway
- 138 Vertical Lift Modules in Distribution Center – The largest installation in the world
- Shipped out 10 billion pieces in 2022
- Autostore has 76,000 totes with 122 robots and 49 ports for pulling / stocking product
- An estimated 60 million unique visitors come to Mouser's website every year
- The Mouser website sees over 250,000 users on a typical day

The global authorized distributor uses state-of-the-art automation, including an Autostore, to help ensure accuracy and speed for customers.





Although no supply chain was perfect, we did have customers with minimal impact due to a solid supply chain in place prior to the latest shortages.”

Wadsworth looks to the opportunities to develop creative energy solutions. “I believe one of the largest opportunities in our industry is the creative solutions and advancement opportunities to supplement the grid through alternative energy methods and other grid hardening initiatives. We will not get to the 2030 electrification vision without reliable power sources. Amazing advancements will come alive in the next few years. The math just does not work with the current supply and future expected demand across the world. We will all need to be involved in development of the next generation solutions which is a very fun place to be working and investing in the demand generation efforts as industry partners.” Building on this positive perspective,

Osmancevic shares a compelling study, “Deloitte recently had an article that said, ‘Renewable energy can be used throughout the supply chain to decrease long term cost, mitigate risk, support new revenue, enhance brand value, and improve employee engagement as tech and regulations mature. Companies should be reevaluating their energy procurement strategy to take advantage of those benefits.’”

David Loftus sees market dynamics as the key to making choices that will secure a stable future for energy supply. “As far as the ominous reports about electrical infrastructure and other infrastructure I think that the free-market economy will take care of itself. Ultimately, if people start demanding more services and those services don’t keep up, there will be penalties paid - the first in the way of just lost revenue opportunity. A free-market economy is very efficient usually at solving those gaps. But if not, democracy hopefully

has an opportunity to work and usually works at a slower pace. But if governments are not able to keep up with those types of infrastructure demands, then those governments eventually change. That’s the beauty of a democracy. We’re not living in Soviet times where the government said what you’re going to get, and you stand in bread lines and grin and bear it.”

### Finding and motivating the talent that will create the future

Discussions around the significant changes accelerated by the COVID pandemic and their impact on employee / labor issues at distributors generated the most expansive and engaging opinions. It is tragic that so much of what was shared will have to be left on the cutting room floor due to space constraints. There may be a future opportunity to share more of these valuable insights in another ECIA report.

Chris Wadsworth describes the challenges and benefits that have emerged from managing through the pandemic. The struggle to attract operational employees that are critical to our distribution network continues and labor is at an absolute premium. This fact is driving the most significant change we have seen which is higher levels of automation in our warehouses and assembly centers which actually equally benefits many of our manufacturing partners supporting those technologies. Wage inflation has been significant and will not likely return to post COVID levels.”

From the upside Wadsworth shares that, “using electronic tools for meetings (IE, Teams or Zoom) has been a game changer in terms of efficiency and the ability to have a higher number of customer and supplier touches in a given period. Our sales teams are able to leverage these same technologies to

Continues on page 58



# SAGER ELECTRONICS, 135 YEARS AND COUNTING

Sager Electronics is a leading North American distributor of Interconnect, Power, and Electromechanical products and custom solutions provider. Grounded in over 135 years of innovation and service, Sager provides customers and suppliers a unique combination of operational excellence and innovative business solutions through its Distributing Confidence® business model.

## **Proud Tradition of Innovation and Service**

Sager Electronics began in 1887 as a single storefront in downtown Boston that serviced the growing interest in radio technology. Under the vision and leadership of Joe Sager, the company rapidly established a statewide distribution system for home radios and related components. Despite the onset of the Great Depression, Sager continued to grow by bringing new electrical products to Massachusetts' consumers.

## **From Retailer to Distributor**

At the onset of WWII, Sager reacted to the critical demand

for electronic components. The company refocused its operations to supply electromechanical components to the U.S. military. This transition positioned Sager to emerge as the leading regional electronic component distributor at the beginning of the consumer electronics market in the 1950s and 60s.

## **From Regional to National Prominence**

Anticipating the explosive growth in electronics, in 1977, we relocated our headquarters to more spacious facilities in Hingham, MA and began building a national network and infrastructure. This included the prudent acquisition of smaller regional distributors and the creation of regional support facilities to service our expanding network of customers and suppliers.

In 2012, Sager Electronics was acquired by TTI Inc., a Berkshire Hathaway Inc. company. As a wholly owned subsidiary of TTI Inc., Sager operates independently and has made a number of acquisitions to support its business. In June 2014, Sager

acquired PowerGate LLC, a premier North American power specialist distributor. This acquisition preceded Sager's 2015 purchase of Norvell Electronics, a North American power products distributor with extensive design and value-add capabilities. Sager acquired Power Sources Unlimited Inc. in 2017, and in 2019 completed the acquisition of Technical Power Systems, a battery custom solutions provider.

Headquartered in Middleborough, MA, Sager operates a network of field sales representatives and power systems sales engineers, strategically located service centers across North America, two state-of-the-art distribution centers, and custom design and manufacturing facilities.

## **From National Prominence to Distributing Confidence®**

For over 135 years, the key to our success has been our constant commitment to exceeding the expectations of our customers. Our Distributing Confidence®



business model puts our customers' needs at the center of all our activities. From our customized services like bonded inventory programs, VMI, BOM quoting, credit, inventory management and value-added capabilities to our branded line card of authorized manufacturers, Sager Electronics is a full partner with our customers.





Our Components. Your Innovation.



**FOCUSED  
LINE CARD**



**ENGINEERING  
SUPPORT**



**READY-TO-SHIP  
INVENTORY**

## YOUR LEADING EXPERTS IN WIRELESS & IOT SOLUTIONS

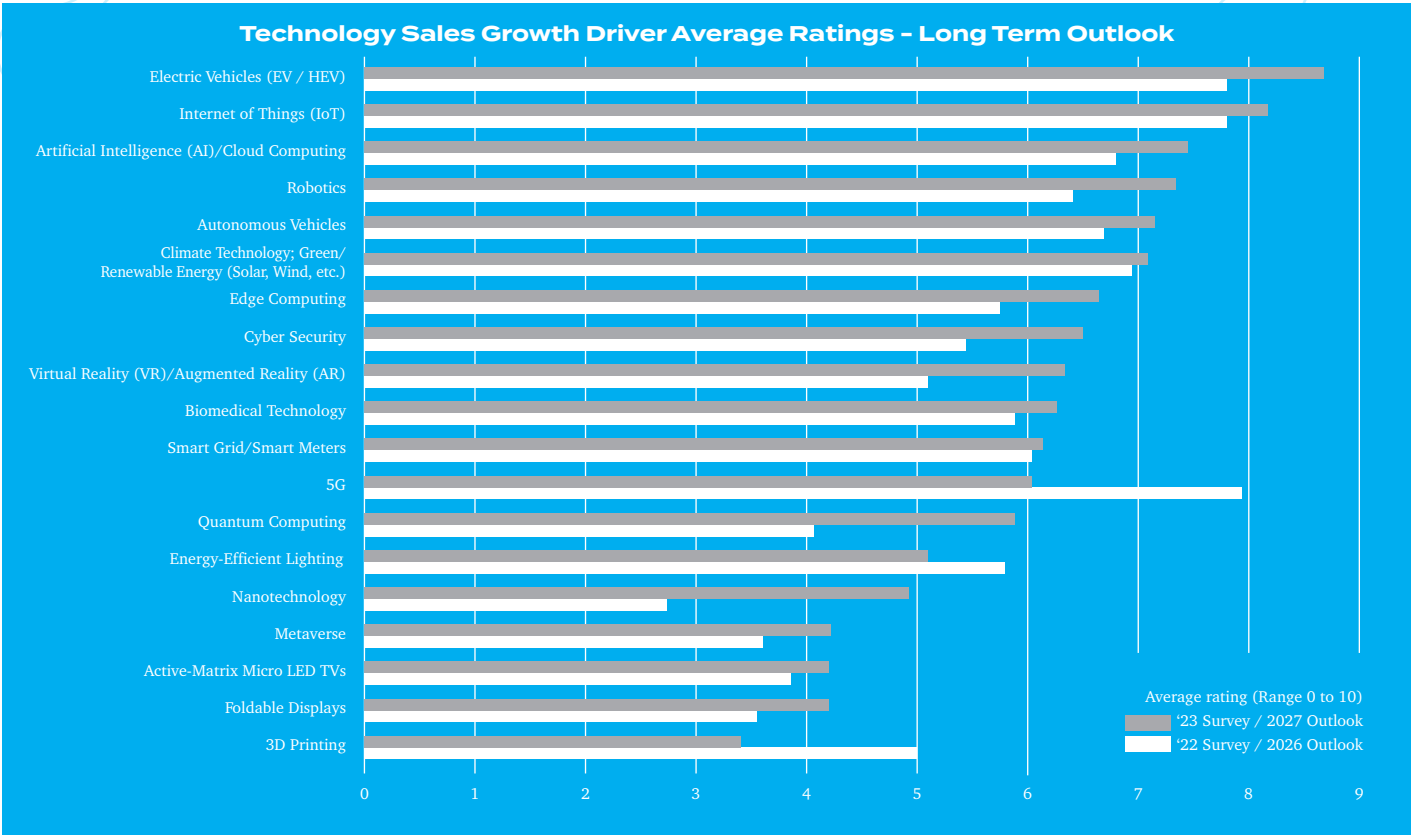
For more than 20 years, Symmetry Electronics has been a driving force in helping engineers bring innovative technologies to market. Offering a broad portfolio of industry-leading electronic components and a customer-focused technical sales team—Symmetry Electronics is dedicated to helping engineers accelerate development time, reduce costs, and ensure long-term interoperability.

866.506.8829 (U.S. Only) | 310.536.6190 | [www.symmetryelectronics.com](http://www.symmetryelectronics.com)

Symmetry is part of the Exponential Technology Group (XTG), within the TTI, Inc. Family of Specialists.







have more frequent sales and support calls with customers and can much more easily engage subject matter experts in those meetings without having to fly across the country. Decisions are being made much quicker and much more economically.”

Turning to a topic that is not necessarily related to the pandemic, Wadsworth looks at the challenge of, “attracting younger people into our industry. Despite the aspirational effort, we continue to see only slight increases in the younger generations in our companies today. This is a significant opportunity for many people early in their careers. This is also a risk to our companies as much of the knowledge base and experience will retire over the next decade. Companies that win the war on talent will win the competitive war in the marketplace. Our industry is at a crossroads as many of our team members age out toward retirement. This will also advance a more digital workplace and

customer interface that many companies are excelling in today.”

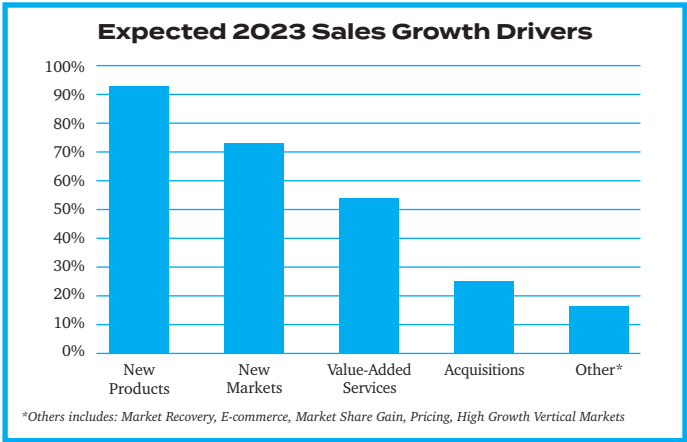
Wadsworth shares the highly valuable role ECIA and its partners are playing in addressing the challenge of recruiting young talent to the industry. “I believe the industry is trying new approaches; however, the improvement is a slow but steady effort. SPARK has been a successful effort that ECIA through our EDS organization is helping develop and educate our up-and-coming employees early in their career on the broader opportunities in our ecosystem with reps, distributors, and manufacturers. Another important effort has been in the ECIA partnership with FIRST promoting STEM in our schools all around the country. We need the next level of engineers and technology coming into our industry for both our customers but also for our industry to replace the aging work force and continue to lead the world in innovation and cutting-edge technologies

and stay on top of the world. ECIA has also sponsored the PACE set of training modules to help new employees in our industry come up to speed in understanding how the entire network operates and improve their learning curve and add value sooner in their careers.”

Mike Slater states, “I do not think distributors are unique in the changes accelerated by the pandemic. Many people

are looking at things much differently than they were three years ago. Success relies on the chance to grow and the ability to constantly adapt to changes and opportunities. Growth and adaptivity are easiest to obtain when we have a strong connection to our peers, culture, and company. This is something we were doing long before the pandemic and put effort into

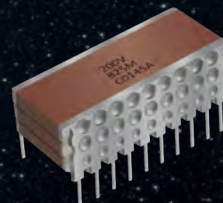
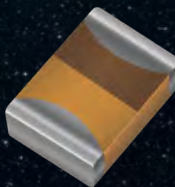
Continues on page 63







# ACCELERATING **INNOVATION** WITH AEROSPACE APPLICATIONS







**bisco industries®**

## ABOUT BISCO

Since 1973, bisco industries has been a premier distributor of Electronic Components and Fasteners used for production in the Aerospace, Communication, Computer, Fabrication, Industrial Equipment, Instrumentation, Marine, and Military Industries. 2023 marks 50 years of continued success in **connecting the supply chain with excellence.**

### A PREMIER SUPPLY CHAIN PARTNER

bisco's approach to supply chain management analyzes stock levels and usage trends to ensure strategic inventory in their 7 distribution centers, shorter lead times, and reduced costs to the entire chain. bisco's distribution centers have been tactically placed so customers have the inventory they need without the use of expedited shipping. These warehouses can be found in San Jose, CA, Anaheim, CA, Irving, TX, Chicago, IL, Atlanta, GA, Boston, MA and Toronto, Canada.



*bisco industries Headquarters: Anaheim, CA*

# COMPANY OVERVIEW

Founded in **1973**

**3.8M** Products

**350+** Sales Account Managers

**52** Global Sales Offices

**7** North American Distribution Centers

**500+** Employees

### UNSURPASSED CUSTOMER SERVICE



bisco helps their customers reduce cost and increase efficiency in their supply chain by maintaining a local sales team, providing customized services, and housing robust inventory levels across thousands of product categories.



bisco's 350+ sales representatives are located throughout 52 strategically placed offices throughout North America and internationally to best serve their local markets. While other distributors refer smaller

customers to call centers, bisco industries understands that every customer deserves personalized service. That is why every inquiry is directed to a local sales professional, specialized in an industry vertical, who will be able to quote, provide feedback, or recommend an alternative item within four hours.



When you contact bisco, you can count on speaking with a dedicated account manager who will assist you with anything from finding the right part number to tracking your shipped order. That's the bisco difference!





# bisco industries®

CONNECTING YOUR SUPPLY CHAIN WITH EXCELLENCE



**bisco industries®**  
50 Years of Excellence

Contact your local sales office or visit bisco industries online today to see how the bisco difference can take your organization to its next level of success.

**US: 800.323.1232**

**Canada: 800.258.2693**

[www.biscoind.com](http://www.biscoind.com) | [info@biscoind.com](mailto:info@biscoind.com)

Stay connected:





# DIGI-KEY ELECTRONICS: FROM HUMBLE BEGINNINGS TO GLOBAL LEADERSHIP

Headquartered in Thief River Falls, Minnesota, Digi-Key Electronics is recognized as both the leader and continuous innovator in the high service distribution of electronic components worldwide. As the original pioneer in this space, Digi-Key has been a key resource for engineers and procurement professionals for 50 years. Today, Digi-Key provides more than 14.9 million components from over 2,400 quality name-brand manufacturers with an industry-leading breadth and depth of product in stock and available for immediate shipment.

Digi-Key is a \$5 billion company and employs more than 5,000 people in Northwest Minnesota and beyond, delivering over 27,000 packages per day to customers in 180+ countries around the world. With a strong heritage of serving as a critical partner for companies around the

world, Digi-Key had humble beginnings in 1972 as a small mail-order company selling leftover parts to a digital electronic keyer kit (the Digi-Keyer). Today, Digi-Key is a leading global e-commerce company. Last year, the company opened the doors to its brand-new, 2.2 million square foot Product Distribution Center expansion, which will allow the organization to meet and exceed customers' expectations more efficiently.

Digi-Key is proud to be widely recognized as the leader for:

- Availability of products
- On-time delivery
- Overall performance
- Engineer-friendly website
- Customer service

From prototype to production, Digi-Key fuels innovation all over the world. Beyond the products that drive technology innovation, Digi-Key also supports design engineers and procurement professionals with a wealth of

digital solutions and tools to make their jobs more efficient.

To maintain a high level of customer and supplier satisfaction, Digi-Key continues finding creative ways to enhance its offerings and services. For example, Digi-Key has invested in more robust and predictive web search functionality, higher inventory levels and increased automation in its warehouse, which all benefit customers by providing an easy and efficient research, shopping and delivery experience.

Digi-Key has also invested in innovations, including cut tape printing, delivering more products and services within the ecosystem to provide customers around the world with even more reasons to make Digi-Key their first stop in the design process.

Digi-Key is a single source for all aspects of technology innovation, including bare

PCB boards, automation and control, test and measurement, IoT solutions and virtually all things related and adjacent to technology innovation, all through a single shopping experience with the Digi-Key Marketplace.

Digi-Key is always developing new ways to make it easier for customers to digitally engage, including localizing their experience in markets around the world with local language, currency and support, as well as fast shipping times, in order to remove barriers for global customers.

Digi-Key is looking forward to the innovation of its customers that will come in 2023 and is excited to enable the world's ideas.



[www.digikey.com](http://www.digikey.com)



## ECIA TOP 50 Americas Authorized Distributors Report 2023

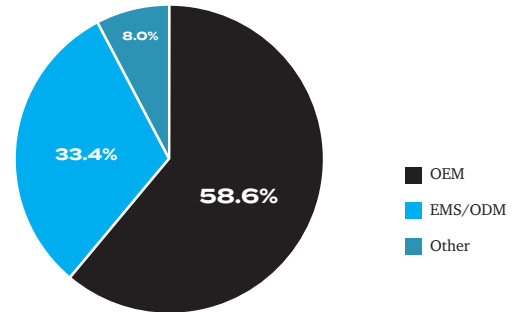
every day.” Badhorn provides a specific example of building on a strong company culture. “At Avnet we were a hybrid work force before the pandemic happened. We are back to that now. Simply put, we care about our people, our culture and our company’s performance. It is critical that we continue to deliver superior customer service, and giving employees access to the leadership, resources, and collaborative office environment is essential to this goal. Having people in the office helps with culture and collaboration. We see our customers coming back to work as well allowing us to engage with them as we had in the past. There have been some layoffs in the tech sector – the competitiveness for talent in the market has come down some with this phenomenon. We have not made a large amount

of change in how we recruit. We want to be transparent to our hires and they must want to be part of our culture. We have a strong Employee Value Proposition, and we continue to enhance it in many ways.”

### Defining Resilience

Major challenges help identify both strengths and weaknesses. Reflecting on the most recent history of the electronics component distribution industry gives us the opportunity to see what has been learned. In discussing the strengths that have been revealed, many executives gravitated to the defining word “Resilience.” John Drabik emphasized that, “we are a very resilient industry. There’s nothing we can’t really overcome. Look at all the things that were thrown at this industry, and it came out not only doing well, it came

### Americas Customer Revenue Share - 2022



Total Revenue = \$32.4 B

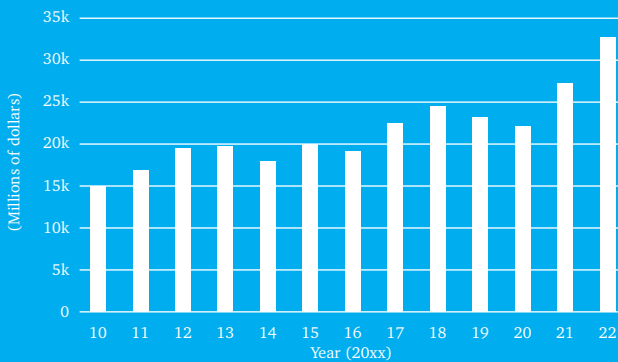
out doing extremely well. I think we’ve learned that the highs are still really good. The lows feel really bad. But we can get through both sides of the cycle, right? I wish I could tell you that we are going to stop these cycles. I don’t believe that’s the case. My fear is the amplitude gets higher and the frequency increases.” Chris Wadsworth echoes this sentiment. “The resilience of our people and the ability to learn to manage through change. Supply chain issues changed how both our sales and operations team focused on keeping our customers up and running. Change was at an all-time high and our people were able to adapt and work on the process changes necessary to meet both company and customer demands. I was very proud of how our teams across our industry stepped up and improved

during the course of these many challenges and helping our customers survive and excel.” To drive the point home once more, Schilling stated, “The resilience of the US worker, the creativity of management, and the IT infrastructure all passed the apocalypse test.”

Chris Beeson expressed his view that, “I think the last couple of years have been an indication of our speed of execution, flexibility of an organization, and how quickly one can pivot into a new environment. I believe some companies were really comfortable with that and there were other companies where maybe their methodology was somewhat narrow in scope. As a result, they had greater struggles in adapting to a new environment.

Continues on page 64

### Total Americas Top 50 Authorized Distributor Revenue



**Classic Designs Are Timeless®**

Just like the legendary Ford Built GT500 Mustang classic design...

Lansdale Semiconductor still manufactures some of the most popular... and timeless commercial wireless, telecommunications, military and aerospace integrated circuits (ICs) classic designs.

As a global pioneer in IC products life cycle management, Lansdale manufactures over 3,000 classic design ICs in the original package, exactly as they were created and produced by AMD, Farchild, Freescale Semiconductor, Harris, Intel, Motorola, National, Philips (formerly Signetics), and Raytheon.

Our exclusive life cycle management program assures you of a dependable, continuous, cost effective, and high quality source of classic designed ICs today... and tomorrow!

This means Lansdale eliminates the need to go to the time or expense of designing in a replacement part or even doing a complete product redesign – not when we still make ‘em... exactly like they used to.

Log on to our Web site at [www.lansdale.com](http://www.lansdale.com) to review our up-to-date product listings and data sheets.

Contact AmyC@Lansdale.com today.  
5245 South 39th Street • Phoenix, AZ 85040-9008  
Phone: 602.438.0123 • Fax: 602.438.0138

**LANSDALE**  
Semiconductor, Inc.



We all hear conversations about digital and the voice of the customer and how they want to be served. I think all those topics have been accelerated.”

Mike Slater recognized both the strengths and areas needed for improvement in the industry. “The electronics industry continues to be a cyclical industry. In some areas as an industry, we have made improvements to help smooth out these cycles, but in other areas we still have work to do. As an industry, we need to work together to continue to look at digital, data driven ways to have the full visibility needed to make quick adjustments and decisions. The long-term outlook for our industry is very strong with many people forecasting above average growth for the next 10 years. This makes for a very exciting industry, but also will bring challenges with supply that will need to be addressed.”

Executives had additional areas of concern that they expressed. Loftus looked to the need for improved partnerships. “Certainly, I think that there needs to be much closer partnerships between all major industries and our industry to be able to project growth and plan ahead for major CapEx. We need to make sure our manufacturing facilities keep up. At the same time, when you take the safety mechanisms out of the supply chain, namely in the way of distribution and holding more of your own in internal inventory, then you’re going to end up paying the price in these inflection points, especially as we are going forward with new bleeding edge fabs costing in excess of \$10 billion, sometimes up to \$20 billion and more, for these new super fabs. Semiconductor companies and foundries are going to be even more careful about when they are ready to put up that kind of cash for the next major investment in expanding production.” Schilling also discussed the need to strengthen partnerships. “Supplier-distributor-customer partnerships were strained over contract changes and pricing models. The US has always been

and operated at the highest contractual standards. Our word is our bond, needs to be reaffirmed.”

Chris Wadsworth identified product sourcing and manufacturing capacity management as areas for improvement. “Single source products, many of which were older technology or legacy products, and the supply chain issues exposed the fragility of the supply chain as many of those products caused major disruptions and many long-lasting shutdowns of very critical industries. These disruptions cascaded through the commercial economy and had a lasting effect on companies and people inside and outside our industry. Capacity was also exposed on many critical commodity products that to this day have still not caught up to demand levels needed to support key technologies. We have leaned out much of the excess capacity and bringing on new capacity took much longer than experts expected, and capital equipment lead times went out exponentially as well during these last few years.”

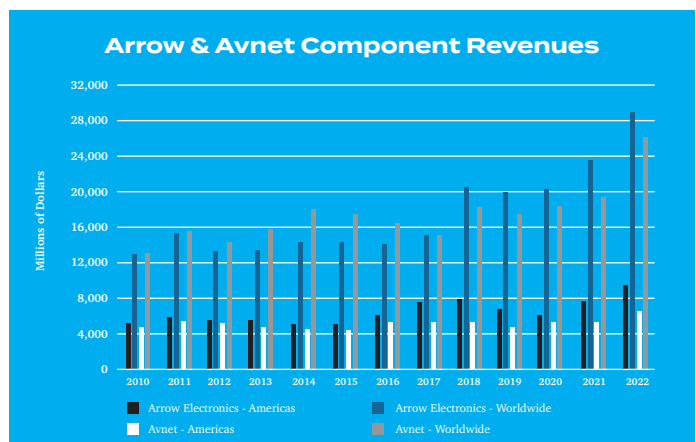
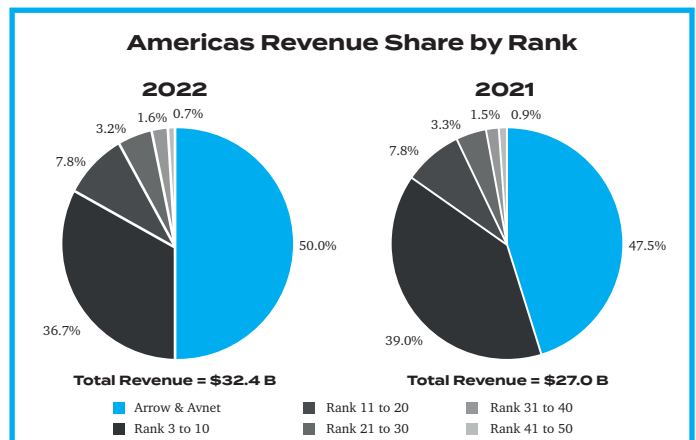
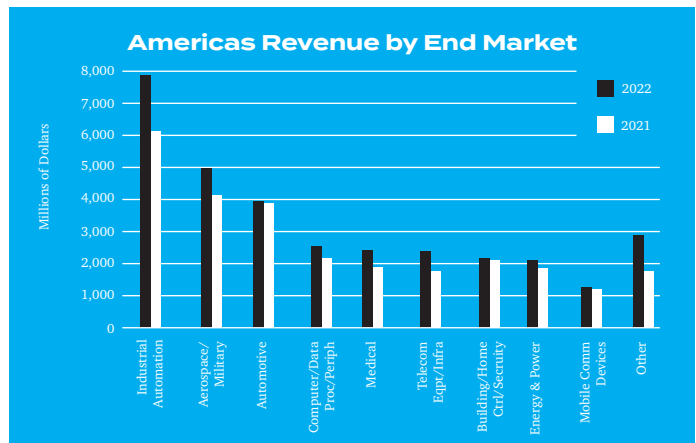
## Issues Looking Forward

Finally, these interviews presented an opportunity for executives to share what they believe will be the most important issues the electronics component industry will face this year. Chris Wadsworth turned his attention to “financial headwinds.” “The looming recession and inflation will affect growth and investment by our customers in the next twelve months. Interest rates continue to increase and at some point, will put more of a headwind on our industrial and electronics community. We have not had this level of inflation or interest rate environment and we must mitigate. The fact that SVB (Silicon Valley Bank) just went bankrupt, I feel will shoot challenges in many high-tech startups viability which exasperates the tech slow down and layoffs we have been seeing over the last quarter. This part of our industry ecosystem could experience additional headwinds as a result. We are seeing fewer

positive outlooks for a number of growth verticals over the last 3 months. Time will tell.”

In a final optimistic note Mike Slater expresses his view that, “getting balance into the industry in 2023 will be key. When I speak about balance, that is in many areas of the business. The increase

in business in many areas brought about changes in the ways people worked. Customers were reacting to the increased demand and shortage of many materials and that caused people in various positions to focus on different things than they may have been hired for or wanted to do. It is similar for manufacturers and distributors I believe. With



# ECIA TOP 50 Americas Authorized Distributors Report 2023

demand and inventory becoming more stable in 2023, we can focus on more of a regular rhythm of work. This still may look and feel different than it was three years ago, but we can chart out a more normal path now with what it will look like for the next 5-10 years.”

## The Top 50 Americas Authorized Distributor Survey Results

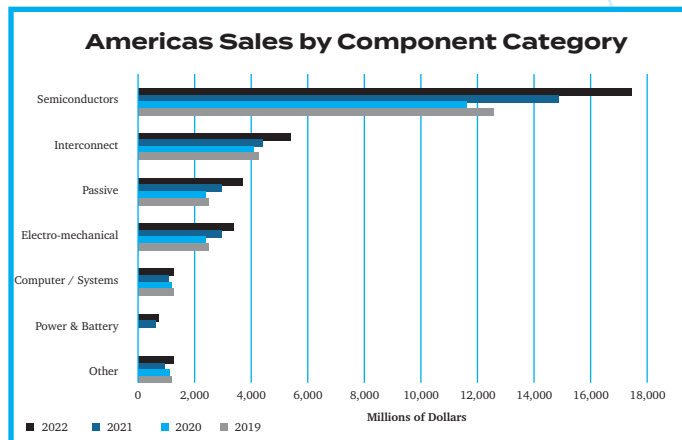
Before presenting the results for 2022 it is important to highlight key areas of methodology followed in preparing this report.

1. Only “Authorized Distributors” are included in the research and rankings. This is consistent with ECIA’s mission to support the Authorized Channel. As a result, brokers and others are no longer included and they have been replaced by authorized distributors in the Top 50 rankings.
2. The revenues reported for Arrow Electronics are limited to include only their revenues associated with electronic component distribution. For Arrow Electronics this corresponds to their “Electronic Components” division.
3. In some cases, companies have not provided inputs in all areas of the survey. Where companies did not provide inputs for worldwide or Americas total revenues, estimates have been developed based on inputs from various sources including D&B. Where splits for revenues by component category or end market were not provided,

estimates were developed based on various inputs and models. The market share is an ongoing work in process as feedback enables refined estimates.

Total Americas revenue for the Top 50 authorized distributors in 2022 grew by 20% to \$32.4 B from \$27.0 B. This same group of Top 50 companies grew their combined worldwide revenue by only 3.3% from \$129.4 B to \$133.6B between 2021 and 2022, a growth of 3.3%. Worldwide revenues were depressed by a 6.3% decline in Asia sales. EMEA revenue growth almost matched the Americas growth as they increased by 19.9%. As a result, the Americas share of revenues jumped to 24.3% in 2022 and EMEA grew to 18.0% of worldwide revenues.

Americas revenues for the Top 50 distributors grew for every component category in 2022. Interestingly, the strongest revenue growth came in the Computer/ Systems and Other categories. The relatively small size of these categories makes higher growth possible. Beyond these segments Passive Components achieved the highest growth in 2022 at 22.1% followed closely by Electro-Mechanical at 21.3% growth. The largest component category, semiconductors, saw its share of the total Americas market slip from 55.0% to 53.5%. Over the five-year period from 2017 to 2022 total Americas distribution revenue grew by 8.0% Compound Annual Growth Rate (CAGR)

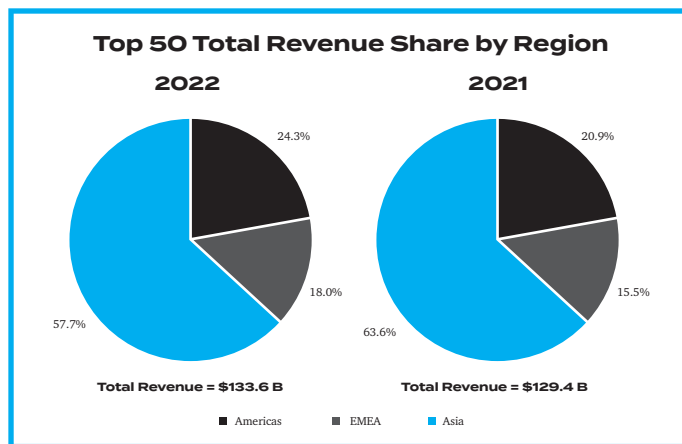
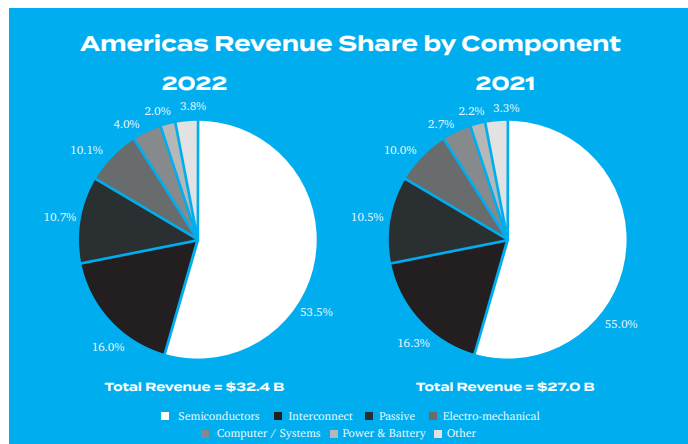


with Passive components leading the way followed by Electro-Mechanical components at 9.4% and 8.6% CAGR, respectively. Semiconductors grew by 7.4% CAGR and Interconnect components achieved 6.8% CAGR growth. Power & Battery was added as a separate category for the first time in 2021.

The top two North America Distributors, Arrow Electronics and Avnet, both saw a large boost in their Americas revenues in 2022. Arrow Electronics sales grew by 22.5% while Avnet’s growth came in at 31.9%. Avnet’s strong growth placed them in the Top 10 by sales growth in 2022. Avnet saw sales grow significantly higher than Arrow on the global stage. Avnet grew their worldwide revenue by 22.1% and Arrow Electronics by 9.2%. The Top 10 companies in 2022 with revenues of \$28.1 B and a combined revenue share of 86.6% saw their revenues grow by 20.2%. By comparison, companies

ranked between 11 and 50 with combined revenues of \$4.30 B and combined market share of 13.4% saw their revenues grow by 18.3%. Average 2022 revenue for the Top 10 companies was \$2.8 B while average revenue for companies ranked 11 through 50 was \$108 M.

Once again, the largest end-market segments for Americas distributors in 2022 were Industrial Automation, Aerospace/Military, and Automotive, accounting for 21.0%, 14.0%, and 13.2% of the market, respectively. However, the market is fairly diversified with even the smallest segment, Mobile Communications, driving \$1.3 B in revenues in 2022. OEMs continued to be the largest customers of distributors with 58.6% of total Americas revenue.





# The top 50 Americas authorized distributors

The final tables of this report present the complete list of Top 50 Americas Authorized Distributors for 2022 along with Top 10 rankings for individual component categories, top sales growth, and top revenue per employee

| Rank 2022    | Rank 2021 | Company                                       | 2022 Americas Sales (\$ Thousands) | Growth 2022/2021 (%) | Share of Top 50 Total Sales (%) | Americas Share of Worldwide Sales (%) | Type* | Sales Breakdown by Percent |                   |                    |              |                   |                 |       |        | Total Americas Employees | Sales per Employee (\$ Millions) |
|--------------|-----------|---|------------------------------------|----------------------|---------------------------------|---------------------------------------|-------|----------------------------|-------------------|--------------------|--------------|-------------------|-----------------|-------|--------|--------------------------|----------------------------------|
|              |           |   |                                    |                      |                                 |                                       |       | Semiconductor (Active)     | Passive Component | Electro-Mechanical | Interconnect | Computer/ Systems | Power & Battery | Other |        |                          |                                  |
| 1            | 1         | Arrow Electronics (2)                         | 9,592,547                          | 22.5                 | 29.59                           | 33.3                                  | 1     | 74.0                       | 6.4               | 4.5                | 4.6          | 7.0               | -               | 3.5   | 6,500  | 1.48                     |                                  |
| 2            | 2         | Avnet (Includes Farnell) (2)                  | 6,605,700                          | 32.0                 | 20.38                           | 25.1                                  | 1     | 76.0                       | 6.1               | 4.0                | 7.9          | 3.0               | -               | 3.0   | 4,500  | 1.47                     |                                  |
| 3            | 3         | Digi-Key Electronics (2)                      | 2,820,300                          | 9.1                  | 8.70                            | 55.3                                  | 3     | 39.0                       | 19.5              | 12.0               | 20.0         | 3.9               | 4.4             | 1.2   | 4,500  | 0.63                     |                                  |
| 4            | 4         | Future Electronics (1)                        | 2,535,000                          | 2.2                  | 7.82                            | 39.0                                  | 1     | 68.0                       | 11.0              | 8.5                | 8.5          | 0.8               | 3.2             | -     | 1,875  | 1.35                     |                                  |
| 5            | 5         | TTI   | 2,000,000                          | 13.6                 | 6.17                            | 54.8                                  | 2     | -                          | 46.0              | 8.0                | 46.0         | -                 | -               | -     | 2,200  | 0.91                     |                                  |
| 6            | 6         | Mouser Electronics                            | 1,731,900                          | 25.3                 | 5.34                            | 42.4                                  | 3     | 38.0                       | 17.0              | 12.0               | 21.0         | 6.0               | 4.0             | 2.0   | 2,359  | 0.73                     |                                  |
| 7            | 7         | DAC / Heilind                                 | 1,033,427                          | 8.9                  | 3.19                            | 79.5                                  | 2     | -                          | -                 | 19.9               | 80.1         | -                 | -               | -     | 740    | 1.40                     |                                  |
| 8            | 8         | RS  | 866,000                            | 39.0                 | 2.67                            | 28.1                                  | 3     | 1.4                        | 1.6               | 29.7               | 16.0         | 9.7               | 9.6             | 32.0  | 1,200  | 0.72                     |                                  |
| 9            | 9         | Sager Electronics                             | 459,000                            | 20.5                 | 1.42                            | 100.0                                 | 2     | -                          | -                 | 35.0               | 24.0         | -                 | 33.0            | 8.0   | 407    | 1.13                     |                                  |
| 10           | 10        | Master Electronics (2)                        | 439,600                            | 19.5                 | 1.36                            | 70.0                                  | 1     | 10.0                       | 17.3              | 25.9               | 38.8         | 5.0               | -               | 3.0   | 500    | 0.88                     |                                  |
| 11           | 12        | Carlton-Bates (WESCO)                         | 346,850                            | 10.6                 | 1.07                            | 100.0                                 | 1     | -                          | -                 | 85.0               | 5.0          | -                 | 5.0             | 5.0   | 500    | 0.69                     |                                  |
| 12           | 13        | WPG Americas                                  | 320,000                            | 10.3                 | 0.99                            | 1.4                                   | 2     | 75.0                       | -                 | -                  | -            | 5.0               | 20.0            | -     | 100    | 3.20                     |                                  |
| 13           | 11        | Nexty Electronics (Toyota Tsusho +Tomen) (1)  | 318,165                            | -1.2                 | 0.98                            | 6.3                                   | 1     | 85.0                       | 4.0               | 3.0                | 5.0          | 1.0               | -               | 2.0   | 130    | 2.45                     |                                  |
| 14           | 16        | Supreme Electronics (1)                       | 306,226                            | 82.9                 | 0.94                            | 5.2                                   | 1     | 95.8                       | 1.3               | 2.9                | -            | -                 | -               | -     | 175    | 1.75                     |                                  |
| 15           | 14        | Bisco Industries                              | 272,330                            | 21.6                 | 0.84                            | 89.0                                  | 1     | 1.0                        | 20.0              | 40.0               | 20.0         | 1.0               | 2.0             | 16.0  | 530    | 0.51                     |                                  |
| 16           | 15        | Powell Electronics                            | 244,579                            | 19.1                 | 0.75                            | 91.6                                  | 1     | -                          | -                 | 11.0               | 89.0         | -                 | -               | -     | 260    | 0.94                     |                                  |
| 17           | 19        | Galco   | 200,000                            | 37.0                 | 0.62                            | 96.2                                  | 1     | 6.0                        | 8.0               | 10.0               | 7.0          | 19.0              | -               | 50.0  | 220    | 0.91                     |                                  |
| 18           | 17        | PEI-Genesis (3)                               | 192,150                            | 20.1                 | 0.59                            | 63.0                                  | 1     | -                          | -                 | -                  | 100.0        | -                 | -               | -     | 330    | 0.58                     |                                  |
| 19           | 18        | RFMW  | 189,000                            | 22.7                 | 0.58                            | 63.6                                  | 2     | 50.0                       | 40.0              | -                  | 10.0         | -                 | -               | -     | 86     | 2.20                     |                                  |
| 20           | 21        | Electro Enterprises, Inc.                     | 150,440                            | 22.4                 | 0.46                            | 75.7                                  | 1     | -                          | -                 | 24.4               | 75.6         | -                 | -               | -     | 315    | 0.48                     |                                  |
| 21           | 20        | Macnica                                       | 141,105                            | 14.3                 | 0.44                            | 2.1                                   | 1     | 81.0                       | -                 | 7.0                | -            | -                 | 8.0             | 4.0   | 92     | 1.53                     |                                  |
| 22           | 25        | Richardson Electronics Ltd                    | 129,048                            | 32.3                 | 0.40                            | 51.5                                  | 2     | 66.0                       | 14.0              | 1.0                | 4.0          | -                 | 5.0             | 10.0  | 350    | 0.37                     |                                  |
| 23           | 22        | BJG Electronics Group                         | 121,000                            | 10.6                 | 0.37                            | 91.0                                  | 2     | -                          | -                 | 15.0               | 80.0         | -                 | -               | 5.0   | 340    | 0.36                     |                                  |
| 24           | 23        | Hughes Peters                                 | 117,000                            | 18.1                 | 0.36                            | 100.0                                 | 1     | 3.0                        | 30.0              | 40.0               | 25.0         | -                 | -               | 2.0   | 160    | 0.73                     |                                  |
| 25           | 24        | Steven Engineering                            | 108,415                            | 11.2                 | 0.33                            | 89.2                                  | 2     | -                          | -                 | 35.0               | 35.0         | 7.0               | 2.0             | 21.0  | 131    | 0.83                     |                                  |
| 26           | 28        | Symmetry Electronics                          | 105,000                            | 40.0                 | 0.32                            | 84.0                                  | 2     | 98.0                       | -                 | -                  | -            | 2.0               | -               | -     | 80     | 1.31                     |                                  |
| 27           | 26        | Flame Enterprises                             | 88,000                             | 15.3                 | 0.27                            | 91.1                                  | 2     | -                          | -                 | 95.0               | 5.0          | -                 | -               | -     | 59     | 1.49                     |                                  |
| 28           | 35        | Flip Electronics                              | 82,800                             | 97.6                 | 0.26                            | 53.4                                  | 2     | 100.0                      | -                 | -                  | -            | -                 | -               | -     | 85     | 0.97                     |                                  |
| 29           | 27        | SIIX (1)                                      | 79,000                             | 5.3                  | 0.24                            | 9.6                                   | 1     | 95.0                       | -                 | -                  | -            | -                 | -               | 5.0   | 60     | 1.32                     |                                  |
| 30           | 29        | Marsh Electronics                             | 76,316                             | 3.7                  | 0.24                            | 100.0                                 | 1     | 6.4                        | 21.6              | 30.5               | 6.8          | 0.4               | 4.1             | 30.2  | 137    | 0.56                     |                                  |
| 31           | 31        | Peerless Electronics (1)                      | 74,750                             | 8.0                  | 0.23                            | 100.0                                 | 1     | 4.0                        | 4.0               | 75.0               | 8.0          | -                 | -               | 9.0   | 105    | 0.71                     |                                  |
| 32           | 32        | Area51 Electronics                            | 62,360                             | 32.1                 | 0.19                            | 95.4                                  | 1     | 31.3                       | 26.1              | 17.4               | 3.7          | 1.3               | 2.6             | 17.6  | 73     | 0.85                     |                                  |
| 33           | 34        | Brevan Electronics                            | 57,200                             | 29.4                 | 0.18                            | 100.0                                 | 1     | 50.0                       | 25.0              | 15.0               | 3.0          | 1.0               | 1.0             | 5.0   | 52     | 1.10                     |                                  |
| 34           | 33        | All Tech Electronics                          | 56,000                             | 21.7                 | 0.17                            | 100.0                                 | 2     | 80.0                       | 5.0               | 10.0               | 5.0          | -                 | -               | -     | 36     | 1.56                     |                                  |
| 35           | 30        | EDOM Technology                               | 49,337                             | -29.1                | 0.15                            | 1.2                                   | 1     | 100.0                      | -                 | -                  | -            | -                 | -               | -     | 20     | 2.47                     |                                  |
| 36           | 40        | Diverse Electronics                           | 48,500                             | 43.1                 | 0.15                            | 83.6                                  | 1     | 16.0                       | 15.0              | 20.0               | 26.0         | 7.0               | 13.0            | 3.0   | 53     | 0.92                     |                                  |
| 37           | 39        | Edge Electronics, Inc.                        | 43,500                             | 26.5                 | 0.13                            | 86.6                                  | 1     | 52.4                       | 1.8               | 1.0                | 1.8          | 21.0              | 3.0             | 19.0  | 35     | 1.24                     |                                  |
| 38           | 38        | Beyond Components (1)                         | 42,850                             | 24.2                 | 0.13                            | 100.0                                 | 1     | 4.0                        | 4.0               | 75.0               | 7.0          | -                 | -               | 10.0  | 70     | 0.61                     |                                  |
| 39           | 42        | NASCO Aerospace & Electronics                 | 38,016                             | 26.0                 | 0.12                            | 100.0                                 | 1     | 25.0                       | 5.0               | 25.0               | 25.0         | 10.0              | 5.0             | 5.0   | 29     | 1.31                     |                                  |
| 40           | 36        | Falcon Electronics                            | 38,000                             | -5.0                 | 0.12                            | 98.2                                  | 2     | 100.0                      | -                 | -                  | -            | -                 | -               | -     | 18     | 2.11                     |                                  |
| 41           | 41        | CDM Electronics (1)                           | 35,700                             | 13.3                 | 0.11                            | 93.0                                  | 1     | -                          | -                 | 6.0                | 94.0         | -                 | -               | -     | 120    | 0.30                     |                                  |
| 42           | 43        | Ryoden (1)                                    | 29,675                             | 2.3                  | 0.09                            | 2.2                                   | 1     | 87.6                       | 12.4              | -                  | -            | -                 | -               | -     | 10     | 2.97                     |                                  |
| 43           | 44        | NEP Electronics (1)                           | 27,100                             | 16.3                 | 0.08                            | 100.0                                 | 1     | 10.0                       | 10.0              | 60.0               | 10.0         | -                 | -               | 10.0  | 125    | 0.22                     |                                  |
| 44           | 46        | World Micro Components / MIT Distributors (1) | 23,000                             | 10.2                 | 0.07                            | 90.9                                  | 2     | 50.0                       | 14.0              | 8.0                | 11.0         | -                 | 10.0            | 7.0   | 45     | 0.51                     |                                  |
| 45           | 45        | Bluff City Electronics                        | 22,826                             | 5.7                  | 0.07                            | 100.0                                 | 1     | 10.0                       | 10.0              | 65.0               | -            | 5.0               | -               | 10.0  | 37     | 0.62                     |                                  |
| 46           | 47        | Microwave Components LLC                      | 20,100                             | 0.5                  | 0.06                            | 97.5                                  | 2     | -                          | -                 | 12.0               | 88.0         | -                 | -               | -     | 25     | 0.80                     |                                  |
| 47           | 49        | Projections Unlimited, Inc. (PUI)             | 19,901                             | 5.6                  | 0.06                            | 89.7                                  | 1     | 15.0                       | 24.0              | 48.0               | 12.0         | -                 | 1.0             | -     | 30     | 0.66                     |                                  |
| 48           | 50        | Sherburn Electronics (1)                      | 19,000                             | 9.2                  | 0.06                            | 100.0                                 | 2     | 15.0                       | 10.0              | 25.0               | 25.0         | 15.0              | 10.0            | -     | 11     | 1.73                     |                                  |
| 49           | 48        | Kensington Electronics                        | 18,500                             | -2.1                 | 0.06                            | 92.1                                  | 1     | -                          | 95.0              | -                  | 4.0          | -                 | -               | 1.0   | 29     | 0.64                     |                                  |
| 50           | 37        | S.A.S. Dragon (1)                             | 17,595                             | -51.9                | 0.05                            | 0.6                                   | 1     | 86.0                       | 6.0               | 7.6                | -            | -                 | -               | 0.4   | 10     | 1.76                     |                                  |
| TOTAL TOP 50 |           |   | 32,414,808                         | 20.0                 | 100.00                          | 24.3                                  |       | 53.5                       | 10.7              | 10.1               | 16.0         | 4.0               | 2.0             | 3.8   | 29,854 | 1.09                     |                                  |

\*Type of Distributor: 1 = Broadline; 2 = Specialized; 3 = High Service/E-Catalog Notes: (1) ECIA Estimate for Total North America Sales and Sales Breakdown (2) ECIA Estimate for Sales Breakdown (3) ECIA Estimate for Total North America Sales

# ECIA TOP 50 Americas Authorized Distributors Report 2023

## Top 10 semiconductor (active) sales

| Rank 2022    | Company                                      | 2022 Americas Sales (\$ Millions) | Share of Top 50 Total Sales (Percent) |
|--------------|--|-----------------------------------|---------------------------------------|
| 1            | Arrow Electronics (1)                        | 7,098.5                           | 40.97                                 |
| 2            | Avnet (Includes Farnell) (1)                 | 5,020.3                           | 28.97                                 |
| 3            | Future Electronics (1)                       | 1,723.8                           | 9.95                                  |
| 4            | Digi-Key Electronics (1)                     | 1,099.9                           | 6.35                                  |
| 5            | Mouser Electronics                           | 658.1                             | 3.80                                  |
| 6            | Supreme Electronics (1)                      | 293.4                             | 1.69                                  |
| 7            | Nexty Electronics (Toyota Tsusho +Tomen) (1) | 270.4                             | 1.56                                  |
| 8            | WPG Americas                                 | 240.0                             | 1.39                                  |
| 9            | Macnica                                      | 114.3                             | 0.66                                  |
| 10           | Symmetry Electronics                         | 102.9                             | 0.59                                  |
|              | Others                                       | 705.2                             | 4.07                                  |
| TOTAL TOP 50 |  | 17,326.9                          | 100.00                                |

## Top 10 passive component sales

| Rank 2022    | Company                      | 2022 Americas Sales (\$ Millions) | Share of Top 50 Total Sales (Percent) |
|--------------|------------------------------|-----------------------------------|---------------------------------------|
| 1            | TTI                          | 920.0                             | 26.53                                 |
| 2            | Arrow Electronics (1)        | 613.9                             | 17.70                                 |
| 3            | Digi-Key Electronics (1)     | 550.0                             | 15.86                                 |
| 4            | Avnet (Includes Farnell) (1) | 402.9                             | 11.62                                 |
| 5            | Mouser Electronics           | 294.4                             | 8.49                                  |
| 6            | Future Electronics (1)       | 278.9                             | 8.04                                  |
| 7            | Master Electronics (1)       | 76.1                              | 2.19                                  |
| 8            | RFMW                         | 75.6                              | 2.18                                  |
| 9            | Bisco Industries             | 54.5                              | 1.57                                  |
| 10           | Hughes Peters                | 35.1                              | 1.01                                  |
|              | Others                       | 166.4                             | 4.80                                  |
| TOTAL TOP 50 |                              | 3,467.7                           | 100.00                                |

## Top 10 electro-mechanical sales

| Rank 2022    | Company                      | 2022 Americas Sales (\$ Millions) | Share of Top 50 Total Sales (Percent) |
|--------------|------------------------------|-----------------------------------|---------------------------------------|
| 1            | Arrow Electronics (1)        | 431.7                             | 13.21                                 |
| 2            | Digi-Key Electronics (1)     | 338.4                             | 10.36                                 |
| 3            | Carlton-Bates (WESCO)        | 294.8                             | 9.02                                  |
| 4            | Avnet (Includes Farnell) (1) | 264.2                             | 8.09                                  |
| 5            | RS                           | 257.2                             | 7.87                                  |
| 6            | Future Electronics (1)       | 215.5                             | 6.59                                  |
| 7            | Mouser Electronics           | 207.8                             | 6.36                                  |
| 8            | DAC / Heilind                | 205.7                             | 6.29                                  |
| 9            | Sager Electronics            | 160.7                             | 4.92                                  |
| 10           | TTI                          | 160.0                             | 4.90                                  |
|              | Others                       | 731.7                             | 22.39                                 |
| TOTAL TOP 50 |                              | 3,267.7                           | 100.00                                |

## Top 10 interconnect sales

| Rank 2022    | Company                      | 2022 Americas Sales (\$ Millions) | Share of Top 50 Total Sales (Percent) |
|--------------|------------------------------|-----------------------------------|---------------------------------------|
| 1            | TTI                          | 920.0                             | 17.69                                 |
| 2            | DAC / Heilind                | 827.8                             | 15.92                                 |
| 3            | Digi-Key Electronics (1)     | 564.1                             | 10.85                                 |
| 4            | Avnet (Includes Farnell) (1) | 521.9                             | 10.04                                 |
| 5            | Arrow Electronics (1)        | 441.3                             | 8.49                                  |
| 6            | Mouser Electronics           | 363.7                             | 6.99                                  |
| 7            | Powell Electronics           | 217.7                             | 4.19                                  |
| 8            | Future Electronics (1)       | 215.5                             | 4.14                                  |
| 9            | PEI-Genesis (1)              | 192.2                             | 3.70                                  |
| 10           | Master Electronics (1)       | 170.6                             | 3.28                                  |
|              | Others                       | 764.9                             | 14.71                                 |
| TOTAL TOP 50 |                              | 5,199.4                           | 100.00                                |

## Top 10 computer/system product sales

| Rank 2022    | Company                      | 2022 Americas Sales (\$ Millions) | Share of Top 50 Total Sales (Percent) |
|--------------|------------------------------|-----------------------------------|---------------------------------------|
| 1            | Arrow Electronics (1)        | 671.5                             | 51.60                                 |
| 2            | Avnet (Includes Farnell) (1) | 198.2                             | 15.23                                 |
| 3            | Digi-Key Electronics (1)     | 110.0                             | 8.45                                  |
| 4            | Mouser Electronics           | 103.9                             | 7.98                                  |
| 5            | RS                           | 84.0                              | 6.45                                  |
| 6            | Galco                        | 38.0                              | 2.92                                  |
| 7            | Master Electronics (1)       | 22.0                              | 1.69                                  |
| 8            | Future Electronics (1)       | 20.3                              | 1.56                                  |
| 9            | WPG Americas                 | 16.0                              | 1.23                                  |
| 10           | Edge Electronics, Inc.       | 9.1                               | 0.70                                  |
|              | Others                       | 28.5                              | 2.19                                  |
| TOTAL TOP 50 |                              | 1,301.4                           | 100.00                                |

## Top 10 power & battery sales

| Rank 2022    | Company                    | 2022 Americas Sales (\$ Millions) | Share of Top 50 Total Sales (Percent) |
|--------------|----------------------------|-----------------------------------|---------------------------------------|
| 1            | Sager Electronics          | 151.5                             | 23.85                                 |
| 2            | Digi-Key Electronics (1)   | 124.1                             | 19.54                                 |
| 3            | RS                         | 83.1                              | 13.09                                 |
| 4            | Future Electronics (1)     | 81.1                              | 12.77                                 |
| 5            | Mouser Electronics         | 69.3                              | 10.91                                 |
| 6            | WPG Americas               | 64.0                              | 10.08                                 |
| 7            | Carlton-Bates (WESCO)      | 17.3                              | 2.73                                  |
| 8            | Macnica                    | 11.3                              | 1.78                                  |
| 9            | Richardson Electronics Ltd | 6.5                               | 1.02                                  |
| 10           | Diverse Electronics        | 6.3                               | 0.99                                  |
|              | Others                     | 20.5                              | 3.23                                  |
| TOTAL TOP 50 |                            | 635.0                             | 100.00                                |

## Top 10 distributors by sales growth

| Rank 2022    | Company                    | Sales Growth 2022/2021 (Percentage) | 2022 Americas Sales (\$ Millions) | 2021 Americas Sales (\$ Millions) |
|--------------|----------------------------|-------------------------------------|-----------------------------------|-----------------------------------|
| 1            | Flip Electronics           | 97.6                                | 82.8                              | 41.9                              |
| 2            | Supreme Electronics        | 82.9                                | 306.2                             | 167.4                             |
| 3            | Diverse Electronics        | 43.1                                | 48.5                              | 33.9                              |
| 4            | Symmetry Electronics       | 40.0                                | 105.0                             | 75.0                              |
| 5            | RS                         | 39.0                                | 866.0                             | 623.0                             |
| 6            | Galco                      | 37.0                                | 200.0                             | 146.0                             |
| 7            | Richardson Electronics Ltd | 32.3                                | 129.0                             | 97.5                              |
| 8            | Area51 Electronics         | 32.1                                | 62.4                              | 47.2                              |
| 9            | Avnet (Includes Farnell)   | 32.0                                | 6,605.7                           | 5,005.7                           |
| 10           | Brevan Electronics         | 29.4                                | 57.2                              | 44.2                              |
|              | Others                     | 15.5                                | 23,952.0                          | 20,741.7                          |
| TOTAL TOP 50 |                            | 20.0                                | 32,414.8                          | 27,023.5                          |

## Top 10 sales per americas employees

| Rank 2022    | Company                                      | 2022 Americas Sales (\$ Millions) | Americas Employees | Sales per Employee (\$ Millions) |
|--------------|--|-----------------------------------|--------------------|----------------------------------|
| 1            | WPG Americas                                 | 320.0                             | 100                | 3.20                             |
| 2            | Ryoden (1)                                   | 29.7                              | 10                 | 2.97                             |
| 3            | EDOM Technology                              | 49.3                              | 20                 | 2.47                             |
| 4            | Nexty Electronics (Toyota Tsusho +Tomen) (1) | 318.2                             | 130                | 2.45                             |
| 5            | RFMW   | 189.0                             | 86                 | 2.20                             |
| 6            | Falcon Electronics                           | 38.0                              | 18                 | 2.11                             |
| 7            | S.A.S. Dragon (1)                            | 17.6                              | 10                 | 1.76                             |
| 8            | Supreme Electronics                          | 306.2                             | 175                | 1.75                             |
| 9            | Sherburn Electronics (1)                     | 19.0                              | 11                 | 1.73                             |
| 10           | All Tech Electronics                         | 56.0                              | 36                 | 1.56                             |
|              | Others                                       | 31,071.8                          | 29,258.0           | 1.06                             |
| TOTAL TOP 50 |  | 32,414.8                          | 29,854             | 1.09                             |

Note = (1) ECIA Estimate



ELECTRONICS

# sourcing

MAY 2023

## TOP 10 AMERICAS INDEPENDENT DISTRIBUTORS REPORT 2023

 **CML** INNOVATIVE TECHNOLOGIES  
WHERE INNOVATION COMES TO LIGHT  
formerly Chicago Miniature Lamp and SLI Miniature Lighting

ASK ABOUT OUR STAINLESS STEEL RANGE, NEW FOR 2023



**Fast supply chain &  
global distribution**  
[www.cml-it.com](http://www.cml-it.com)

For details of your local distributor  
or to discuss your requirements  
further contact: [ussales@cml-it.com](mailto:ussales@cml-it.com)

# Capacity challenges persist

Thomas Smart discovers the biggest challenges facing independent distributors are inflation, lead times and component shortages

**C**ontinued financial instability has been a major challenge recently faced by the electronic component industry. The pandemic-induced global economic downturn has resulted in supply chain disruptions and reduced supply, plus inflation which increased significantly late 2022 and early 2023. Inflationary pressures have created additional challenges for independent distributors, as they work to maintain profitability while dealing with increased operating and inventory costs. Raw materials prices, transportation costs and other expenses have increased significantly, further exacerbating the situation. Despite these challenges, the industry remains optimistic, with many distributors focusing on building stronger relationships

with customers and suppliers to weather the storm.

American Sun Components explained how it shields customers from inflation: “We have a just-in-time inventory model wherein we secure the stock in order to ship it to the customer immediately. We also have legal devices/contracts in place which keep the prices stable for us and therefore our customers.”

Utilizing excess stock can also reduce the impact as Perfect Parts explained: “Perfect Parts helps to mitigate the risk of rising inflation and its direct effect on customers by utilizing our client’s excess inventory to offset costs both on and off the board.”

Another concern for independent distributors is manufacturer production capacity limitations which

directly affect component lead times and the likelihood of shortages. Component manufacturers’ production capacity has been hit by a range of factors including supply chain disruptions, factory shutdowns and a lack of investment in new production facilities.

The pandemic had a significant impact, with many manufacturers forced to shut their production facilities to comply with lockdown regulations. It also resulted in supply chain disruptions, leading to delays in the delivery of raw materials.

Smith’s president—Americas, Todd Burke, explained: “Production capacity has started to stabilize but is still below pre-pandemic levels. Production capacity at foundries and IDMs has returned to normal and, in some cases, has been



**Thomas Smart**  
Data Analyst,  
Electronics Sourcing

reduced to levels lower than what they were before the pandemic. That said, however, many of the backlogs that were created during the capacity decreases still exist. Specifically, automotive and industrial chips will continue to have supply constraints throughout 2023 and into 2024 while awaiting capacity expansions to come online.”

Perfect Parts concluded: “Although capacity is increasing it is nowhere near normal levels and part shortages will continue posing a challenge for manufacturing in the foreseeable future.”

[Continues on page 82>](#)

## The Top 10 North America Independent Distributors

| Rank 2022 | Company                                  | 2022 North America (\$ Millions) | Share of Top 10 Total Sales (%) | North America Sales Share of Worldwide (%) | 2022 Global Revenues (\$ Millions) | Type* | Total Employees | Sales per Employee (\$ Millions) |
|-----------|--|----------------------------------|---------------------------------|--|------------------------------------|-------|-----------------|----------------------------------|
| 1         | Smith                                    | 2,112                            | 32.6                            | 44 <sup>3</sup>                            | 4,800                              | 1     | 800             | 6                                |
| 2         | NewPower Worldwide                       | 1,440                            | 22.2                            | 67   | 2,140                              | 1     | 145             | 14.8                             |
| 3         | Fusion Worldwide                         | 1,250                            | 19.3                            | 42   | 3,000                              | 1     | 600             | 5                                |
| 4         | A2 Global Electronics                    | 1,030.5                          | 15.9                            | 90   | 1,145                              | 1     | -               | -                                |
| 5         | Classic Components                       | 224                              | 3.7                             | 55   | 408                                | 1     | 130             | 3.1                              |
| 6         | 4 Star Electronics, Inc                  | 134                              | 2                               | 100  | 134                                | 1     | 45              | 3                                |
| 7         | Quiksol International Components Pte Ltd | 112                              | 1.8                             | 27   | 412                                | 1     | 227             | 1.8                              |
| 8         | ASC American Sun Components Inc.         | 95                               | 1.5                             | 38   | 250                                | 2     | -               | -                                |
| 9         | Perfect Parts Corporation                | 38                               | 0.5                             | 46   | 83                                 | 1     | 45              | 1.8                              |
| 10        | Chip Stock                               | 35                               | 0.5                             | 71 <sup>3</sup>                            | 49                                 | 1     | 15              | 6                                |

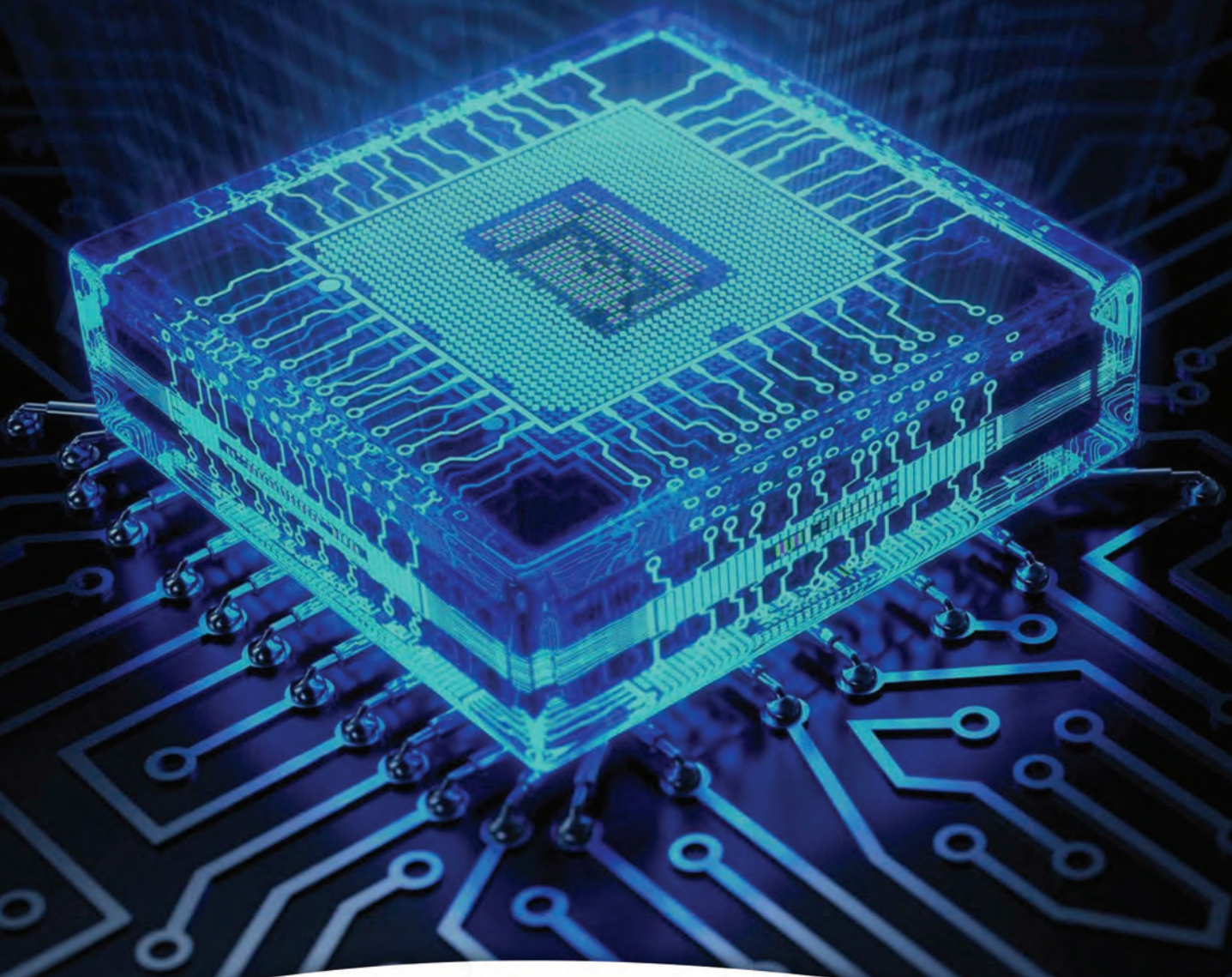
\*Type of Distributor:  
1 = Broadline  
2 = Specialized

<sup>3</sup> Electronics Sourcing estimate





Call Classic for the components you need







**+1 310-539-5500**

*An Industry Leader Since 1985,  
Classic has the Global Resources to  
Supply the Components You Need.*

## **SERVICES & SOLUTIONS**

- ✓ *Obsolete / Hard-To-Find Components*
- ✓ *Shortage Mitigation*
- ✓ *Vendor Managed Inventory*
- ✓ *Excess Inventory Solutions*
- ✓ *Strategic Cost Savings*
- ✓ *Custom Solutions*



**info@class-ic.com**



**class-ic.com**



# SMITH'S PEOPLE MAKE THE DIFFERENCE

## DIVERSE CULTURE AND TALENT BASE

Since our founding in 1984, Smith's people have been the driving force shaping our identity and our success supporting customers around the world. Our global team is made up of a diverse range of employees who have brought their unique experiences, viewpoints, and talents to build a dynamic company culture that has driven Smith from the start and continues to today.

## NURTURING AMBITION

Smith's employees benefit from an entrepreneurial environment that encourages and supports ambition, allowing them to pitch ideas and initiatives and chase success across traditional and experimental channels. Over the years, many employees at Smith have actively charted new career paths and brought new ideas and business models to Smith at the same time. We benefit as a company from a team that brings drive and creativity to their work each day.

### ABOUT SMITH

- A global leader in independent distribution - seamlessly connecting businesses to the electronic components they need
- Founded in 1984
- 18 locations worldwide
- 900+ employees

### BENEFITS

- Freedom to chart your own path in an entrepreneurial culture
- Vibrant, international environment
- Top-tier medical coverage
- Generous 401(k) contributions
- Flexible paid time off
- Healthy work-life balance
- Opportunities to give back to local and global communities

## A PLACE – AND SUPPORT – TO GROW

Whether tenured or recent hires, Smith's employees are given space and opportunities to grow and build careers that often span decades. We prioritize the advancement of the Smith team by promoting from within whenever we can, facilitating teams, collaboration, and mentorship, and providing resources for continual growth and advancement.

## SUPPORTING AND ADVANCING EXCELLENCE

One of the key resources we offer our global team is access to our learning and development curriculum through our award-winning e-learning platform, Smith University. This enables employees to develop new skills, broaden their knowledge, and stay at the forefront of the swiftly evolving electronic-component marketplace. Our management training program also plays a key role in advancing a new generation of Smith's leaders. Our skilled and knowledgeable teams support Smith's excellence in all we do.

## PEOPLE SHAPE SMITH

In a constantly evolving world and tech sphere, there's no room to stand still. The people of Smith keep us continually moving by contributing their unique talents and perspectives and seizing the opportunities Smith offers to affect change, make a mark, and shape the company in ways that strengthen our services and benefit our partners around the world.

**LEARN MORE ABOUT OPEN  
POSITIONS AT SMITH:**







# LEADING SUPPLY CHAIN SERVICES SINCE 1984



Tailored support to sell or purchase excess electronic components



State-of-the-art operational facilities and storage solutions on three continents



Shortage sourcing for a full product range — motherboards, CPUs, HDDs, SSDs, ICs, memory, and more



Dedicated IT asset management team to provide end-to-end support



Tenured professionals and commodity experts to help guide decision making



Data-driven market intelligence information supported by Smith's global network of trusted partners

**EXPERT SERVICES THAT CONNECT BUSINESSES TO THE ELECTRONIC COMPONENTS THEY NEED**

**CONTACT US TO LEARN MORE**



[smithweb.com](http://smithweb.com)





F ★ R ★ E ★ E ★ D ★ O ★ M



Global Component Distribution



11225 Challenger Ave. Odessa, FL 33556 | 800.260.8830

# The Eagle *—continues to* **SOAR & DOMINATE**

**after Another Year of  
Unprecedented Growth**

**Freedom partnerships solve problems.** Our principles are customer centric: when you call, we answer – with flexible and nimble inventory programs that match your product lifecycle, and distribution services that protect your supply chain from disruption.

That's **Global Distribution, the Freedom way.**

**freedomUSA.com**

## **NOW HIRING**

Visit our website or call now to learn more about joining our talented team.







# The Critical Link in Your Supply Chain

---

Fusion is your best source for quality electronic components.



Scan to learn more.  
[fusionww.com](https://fusionww.com)





# WHO WE ARE

For over 20 years Fusion Worldwide has been connecting buyers to trusted suppliers of electronic components in the open market. Headquartered in Portsmouth, NH, Fusion Worldwide has grown into a 3B global organization with over 600 employees in 19 offices throughout the Americas, Europe and Asia. As a leading independent distributor, Fusion offers comprehensive supply chain solutions for small, medium and large enterprises, including Fortune 500s across numerous verticals.

By partnering with Fusion Worldwide, businesses gain access to trusted suppliers and customized services that meet their ever-changing needs. Fusion continuously invests in sales and service hubs, supplier relations, quality services and technology infrastructure to enable fast, turnkey solutions.

To learn more about how Fusion Worldwide can support your business, visit [fusionww.com](http://fusionww.com) and follow Fusion on LinkedIn.

## Our Services

- Shortage Sourcing
- Cost Savings
- Inventory Management
- Obsolescence Sourcing
- Supplier Consolidation
- Quality Testing



## Industries We Serve

- Data Center + Enterprise Computing
- Automotive + Transportation
- Industrial Automation
- Telecommunications + Networking
- Gaming + PC
- Medical
- Audio/Visual
- Aerospace + Defense
- Energy
- Consumer Electronics





## Align with acceleration

**Trust your supply chain with us.**

Our reputation for reliability, flexibility, value, and transparency will accelerate your business to a new velocity.



In a time of unprecedented market challenges, do not risk your supply chain by settling with a broker offering the lowest price.

Your company depends on reliability, value, and trusted industry knowledge. Avoid counterfeit components, experience continuity in supply, and benefit from excellent customer service with Velocity Electronics.



### TRUSTED SOLUTIONS FOR:

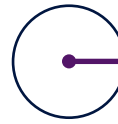
- Shortages
- PPV
- Bonded Programs
- Obsolete
- EOL/LTB

Partner with us and experience a  
**change in velocity**

[velocityelectronics.com](http://velocityelectronics.com)



# Don't let your component shortage needs slow you down.



## We've got answers



Strategically located in the Americas, APAC, and EMEA.  
**We are where you need us to be.**



**27** Offices  
**16** Countries



### INVENTORY SOLUTIONS

Our collaborative approach and commitment to building long-term partnerships include every aspect of our innovative supply chain services.

Velocity reduces the cost of procurement while keeping your **production lines running** through:

- In-stock and bonded inventory
- Global sourcing resources
- Integrated solutions
- Streamlined processes

### QUALITY YOU CAN COUNT ON

Partnering for us means quality every step of the way; this is proven through:

- Real-time vendor rating system
- Order accuracy guarantee
- Three global Inspection and Distribution Centers

Velocity is certified to more standards in more regions than any other distributor:

- **AS6081, AS9120, ISO 9001, ANSI/ESD S20.20:** certified in Austin, Amsterdam, and Singapore.
- Velocity's inspection protocol is accredited to **ISO/IEC 17020:2012.**



### AUTHENTIC VALUES

We adhere to a set of internal core values and a code of business conduct emphasizing honesty and integrity in everything we do.

We prioritize building **relationships with our partners** to optimize their supply chain and exceed their needs.





# CHIP 1 EXCHANGE

## DELIVERING READINESS, REDUCING COSTS.

**C**hip 1 Exchange is an industry-leading, global, hybrid, Franchise/ Full-Service

Distributor of Electronic Components and peripherals. Being a hybrid distributor, we have a broad offering of Franchise lines. Still, we are also one of the largest top-quality open market FACTORY ORIGINAL suppliers of Electronic Components and Peripherals worldwide. We have been supply chain partners for more than two decades. Our service excellence and high-level expertise have been the backbone of our brand as a trusted and reliable partner in providing solutions for our customers. Here's what we can do for you:

### Procurement

Our worldwide network includes relationships with manufacturers, franchised distributors and independent distributors. Whether difficult to find, obsolete or end of life product, Chip 1 has the contacts and sourcing to find and deliver the correct parts to our customers in a timely manner all at competitive prices.

Our successful concept is based on the following items:

- Constant tracking of components and we only purchase from reliable suppliers.
- Delivery over night or just in time.
- The purchasing department has relationships established with most of our suppliers whether domestically or internationally, this enables the best possible prices for each component.
- Due to our central location in

Europe we are able to deliver any parcel within hours, even to the remotest cities in Europe, this is also true with North America and our Asia offices.

- Own stock with a constant market value of millions of Euros.
- We offer competitive terms as well as volume purchase agreements for our customers.

### Excess Management

Chip 1 Exchange offers a number of standard solutions for inventory management and reduction.

Below are four of our most popular programs, however, we are always open to designing a custom solution that better meets the requirements of your business.

### Lot Buy:

This solution is for customers that would like to sell their entire excess inventory at once and remove the product from their books, warehouse etc.

### Consignment inventory:

You would send us a list of the product you would like to remove from your inventory. We would then market the product worldwide through our vast network of customers and Internet based sites.

We presently have tens of thousands of customers in our database and we will market the product to this extensive list of customers. This is a slower approach than the first solution; however, in some cases it may yield a better return for you.

### Line buy:

In this option you would send us a

number of items that you would like to remove from your inventory. We would then bid on each line item separately.

### Customer in-house-consignment:

In this solution you would keep the inventory in your warehouse and we would market the product as we would in in option number two above.

### Design and Engineering

Chip 1 Exchange guides customers through technology's most challenging issues, providing a real world solution to today's most complex and challenging designs. Additionally, Chip 1 Exchange employs many Electrical Engineers that are thoroughly trained by our manufactures to ensure they are equipped with the latest knowledge and services to assist the customer through the most difficult designs.

Services offered:

- Technical Support
- Engineering assistance
- Unbiased design guidance
- Training
- In-house technical seminars
- Local seminars
- Development tools
- Samples
- Thermal evaluation

### Shortage Management

Whether you're in quest of reducing extended lead times or to locate allocated, obsolete, and/or end-of-life electronic components, semiconductors, and other difficult-to-locate electronic components like murata multilayer ceramic capacitors, Chip 1 has the supply-chain expertise

to resolve your material shortages. An increase in production or supply delay by another supplier may lead to shortage issues and possibly the risk of a line down situation. With Chip 1's rapid response times, unmatched sourcing and experience in global logistics, we can eliminate the stress of shortage situations and deliver the solutions you require, thus removing disruption to your production lines.

Chip 1 understands the importance of shortage elimination and our team of highly qualified sales people are ready and capable to quickly source electronic components from around the world.

From the first point of contact each customer is assigned a dedicated account manager who will handle component sourcing and logistics to ensure that your production lines remain in full production mode.

We employ the identical practice for obsolete parts and End-of-Life material, therefore, providing our customers with the best solution for all of your supply chain requirements.

Services:

- Worldwide search
- Swift fulfillment
- Meticulous quality inspection process
- Competitive pricing
- Broad product offering
- Shortage solutions
- EOL/Obsolete solutions
- Extensive inventory



# DELIVERING READINESS. REDUCING COSTS.



AUTOMOTIVE



MEDICAL



CONSUMER



INDUSTRIAL



AEROSPACE



IOT



DEFENSE

## YOUR TRUSTED SUPPLY CHAIN PARTNER FOR ELECTRONIC COMPONENTS.



FRANCHISE  
LINE CARD



### LEADING GLOBAL FULL SERVICE DISTRIBUTOR OF ELECTRONIC COMPONENTS

Chip 1 Exchange is an industry leading, global, hybrid, Franchise/Full Service Distributor of Electronic Components and peripherals. Being a hybrid distributor, not only do we have a broad offering of Franchise lines, but we are also one of the largest top-quality open market FACTORY ORIGINAL suppliers of Electronic Components and Peripherals in the world.

#### CONTACT US



[www.chip1.com](http://www.chip1.com)



[@chip1exchange](https://www.facebook.com/chip1exchange)



[Chip 1 Exchange](https://www.linkedin.com/company/chip1exchange)



[info@chip1.com](mailto:info@chip1.com)



[@chip1exchange](https://www.instagram.com/chip1exchange)



[@chip1exchange](https://twitter.com/chip1exchange)

#### CERTIFICATIONS





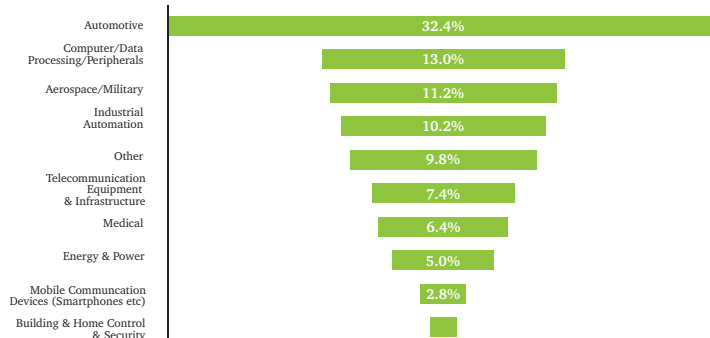
# Automotive components dominate independent NA revenue share

In 2022 the independent North American electronic component industry was dominated by automotive related components comprising of nearly a third of market share at 32.4 per cent, followed by computer/data processing/peripherals at 13 per cent, aerospace/military at 11.2 per cent and industrial automation rounding out the top four with 10.2 per cent.

Distributors have highlighted the key factors behind the high demand for automotive components as a large

increase in the number of manufactured electric vehicles (EVs) and hybrid electric vehicles (HEVs), including charging points and accessories, plus an increase in smart technology within traditional internal combustion vehicles such as multimedia displays, inbuilt GPS, lane detection sensors and surround cameras.

North America revenue share by end market 2022



## Automotive key independent sales driver for next five years

Automotive related components are expected to remain a key sales growth driver for the next five years for independent distributors. The automotive industry has been rapidly evolving with the integration of electronic components in vehicles, with this trend expected to continue. Use of electronic components in vehicles has increased significantly, creating new opportunities for independent distributors.

Moreover, increasing demand for electric vehicles is driving growth in the automotive industry. Electric vehicles require significant amounts of electronic components, including batteries, semiconductors and charging infrastructure. This increases demand for independent distributors to supply these components to electric vehicle manufacturers.

Growing demand for AI is another sales growth driver

for the next five years. Significant investment in research and development is expected to push demand for components including processors, sensors and memory devices that are designed to handle the amounts of data AI applications generate. Thus, OEMs and contract manufacturers are increasingly sourcing these types of electronic components.

Another driver is IoT which has enabled the development of smart homes, industrial automation systems, wearable health devices and intelligent transportation systems. In smart homes, IoT devices let homeowners control various household appliances and systems remotely.

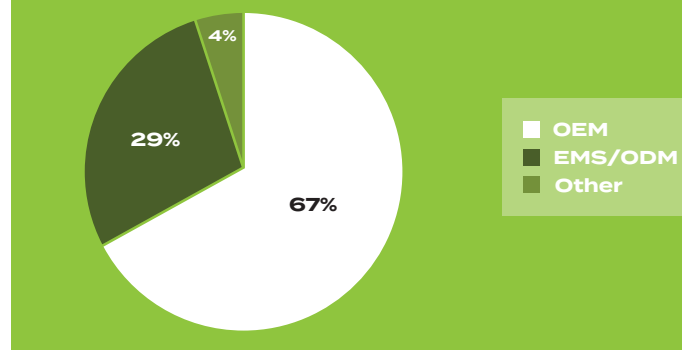
Industrial automation systems use IoT technology to optimize processes and increase efficiency. Wearable

health devices, such as fitness trackers, monitor various health metrics, including heart rate and sleep patterns. Intelligent transportation systems utilize IoT technology to improve traffic flow and safety. All these applications are driving component demand, especially for sensors.

### Top 15 expected sales for the next 5 years

1. Electric Vehicles (EV / HEV)
2. Autonomous Vehicles
3. Artificial Intelligence (AI)
4. Internet of Things (IoT)
5. Climate Technology
6. Smart Grid / Smart Meters
7. Robotics
8. Cyber Security
9. Energy-Efficient Lighting
10. Nanotechnology
11. Edge Computing
12. Biomedical Technology
13. 5G
14. Metaverse
15. Virtual Reality (VR) / Augmented Reality (AR)

North America customer revenue share 2022





# DON'T RISK IT ALONE

CHOOSE YOUR SUPPLY CHAIN PARTNER WISELY



[www.4starelectronics.com](http://www.4starelectronics.com)

Toll Free: 877.240.8595 - Ph. 949.276.5225

930 Calle Negocio, Suite C, San Clemente, CA 92673





# Empowering Supply Chain<sup>®</sup>

## Financial Strength

- \$325M Committed Credit Facility
- Net 30+ Terms for All Customers
- \$75M Insurance Coverage
- RSM Audited Financials  
(2017, 2018, 2019, 2020, 2021, 2022)

## Quality Commitment

- Audited & Certified
- Fully Traceable
- DFARs Compliant
- Complete Transparency
- Come Audit Us!

## Services & Solutions

- Global Distribution Facilities
- Inventory Management Solutions
- Excess & Vendor Managed Inventory
- Custom Solutions

## Total Control & Flexibility

- EMPOWER<sup>™</sup> Proprietary  
Cloud-Based Sourcing Platform
- Global Inventory Visibility
- 100% Supply Assurance
- Customized Reporting

## Certifications & Memberships

- AS6081 • AS9120 • ISO 9001 • ESD S20.20 • ISO 45001 • ISO 14001
- C-TPAT • ITAR • ERAI • GIDEP • IDEA



[info@newpowerww.com](mailto:info@newpowerww.com) | 800-985-9279

USA | MEXICO | NETHERLANDS | HUNGARY | SINGAPORE | HONG KONG | TAIWAN | INDIA

# NEWPOWER



## Immediate Access to Allocated Parts.

At NewPower, Parts Don't Sleep™. We are industry experts in the sourcing, procurement, and redistribution of electronic components, computer products, and peripherals. From shortages to cost-saving opportunities to exclusive market insights - we are your go-to independent electronic components distributor.

### Testing & Validation

- Results in 24-48 hours -

At NewPower, we ensure every product is guaranteed to meet form, fit and function through rigorous testing, including:

Physical Verification  
DECAP/DELID | X-ray | XRF  
Electrical | SEM | SAM  
HCT | Temp Cycle  
Solderability | Upscreening  
Coplanarity  
Failure Analysis | Leakage Test  
Die Shear Testing

### NewPower Difference



2022 Revenue  
**\$2.14B**



Credit Facility  
**\$325M**



Fully Insured  
**\$75M**



Cloud Technology  
**EMPOWER™**



Global Locations  
**14**



Employees  
**145**

With a \$325M committed credit facility and \$75M insurance coverage, we provide peace of mind in a volatile market, allowing organizations to plan and forecast years in advance and setting financial standards for the distribution industry.



### Quality Commitment

Our decades of experience, disciplined audit procedures, and industry certifications ensure product authenticity and functionality. Our uniformed global processes make us a worldwide leader in counterfeit avoidance, ensuring each part meets form, fit, and function.



Empowering Supply Chain®  
newpowerww.com  
800.985.9279



# Technology never stops evolving. Neither should your supply chain.

**Finally, an electronic component distributor and supply chain solutions partner that makes sense.**

Sensible Micro stocks, sources, and distributes electronic components to manufacturers across numerous industries. We're proud to be your partner, not just your provider, and our team-based approach has helped us to become one of the Inc. 500's Fastest Growing Tech Companies.



Leverage our fully vetted, hybrid line card of authorized, independent, and factory-direct suppliers to consolidate all of your sourcing efforts into a single relationship.



**RAPID RESPONSE**



We house one of the most technologically advanced component inspection and anti-counterfeit lab capabilities in the industry. Our AS6081 certification means your product is guaranteed to meet the highest level of quality, risk management and compliance standards.

**AS6081 CERTIFIED**

**Sensible**  
MICRO CORPORATION

# Why Sensible?

AS6081  
Certified

## Sourcing, Inspection, and Testing — All in One Place

Sensible Micro houses one of the most technologically advanced electronic component testing labs in the industry. We handle everything from solderability testing to full counterfeit avoidance inspections with a multi-certified team of inspectors.

## Unparalleled Customer Service

Our customers count on fast and reliable support from a designated account manager as well as real-time online access to order tracking, inspection reports, spec sheets, and more.

## Versatile Sourcing Solutions

Leverage a network of leading authorized, independent, and factory direct suppliers. We vet and monitor all vendors with a robust rating system to ensure top quality. If we don't already stock the part you need, our experienced team will find it.

## Certified Excellence

Sensible Micro brings recognized expertise to quality sourcing and inspection. Our certifications, industry memberships, and leading inspection procedures signify our commitment to consistent quality.




**Sensible**  
MICRO CORPORATION


**It's Time to  
Get Sensible.**


We're ready to solve  
your most complex  
electronic component  
and technology needs.

## Contact Us

 Tampa, FL

 [sensiblemicro.com](http://sensiblemicro.com)

 (877) 992-1930

 @SensibleMicroCorp

 Sensible Micro Corporation





# THE PERFECT SOURCE

**T**oday'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.

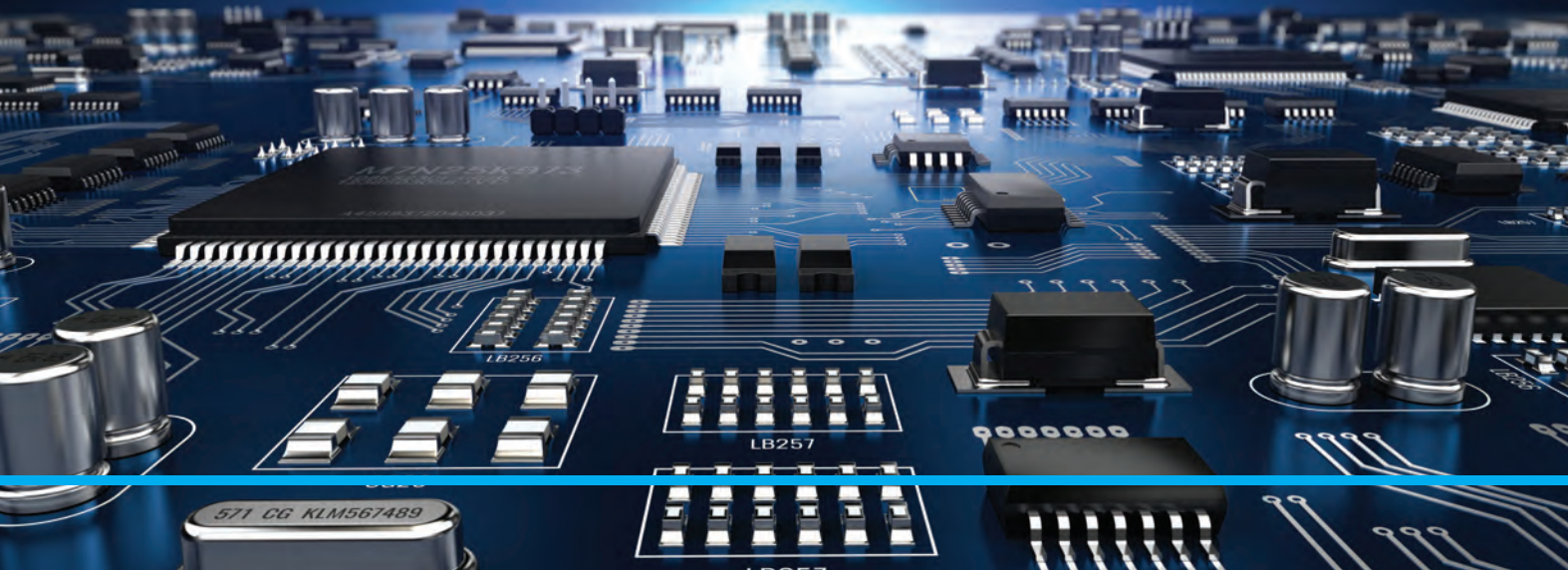
Sourcing from the open market can be daunting with counterfeit parts and sub-standard materials posing as a constant threat to your supply chain. Material procured from the open market that is improperly tested can cause loss of relationships, increased liability,

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.

With an eight-year streak of zero RMAs due to sub-standard materials, Perfect Parts is the only USA distributor that can boast zero RMAs due to a counterfeit or substandard part deliveries. When you work with Perfect Parts you can expect a level of quality that is unrivaled in the electronic component industry. Perfect Parts is a global online distributor of electronic components

that specializes in testing requirements, sourcing, and distribution. With access to over 30 million unique inventory lots from our global network of manufacturers, OEMs, contract manufacturers, authorized channels, and other vetted suppliers you will find everything you need for your builds. With a focus on providing value-added services and advanced web tools, Perfect Parts will change the way you design and procure components for your organization.

[www.perfectelectronicparts.com](http://www.perfectelectronicparts.com)







**Perfect Parts**  
CORPORATION

**SUPPLY CHAIN SOLUTIONS PARTNER**

**[WWW.PERFECTELECTRONICPARTS.COM](http://WWW.PERFECTELECTRONICPARTS.COM)**





SINCE 1980

**40+**  
YEARS



# DISCOVER ENDLESS POSSIBILITIES

## REDUCING SUPPLY CHAIN COMPLEXITY



## THE WIDEST

selection of alternative  
semiconductors and  
electronic component  
brands for your AVL.

### STAY UP TO DATE

Join email list at  
[www.ibselectronics.com](http://www.ibselectronics.com)



# IBS ELECTRONICS GROUP

was established in 1980 in Southern California as an ISO 9001:2015, AS9120B and AS6081 certified authorized franchise distributor & a global leader in the delivery of innovative electronic components and logistics solutions.

IBS operates a highly effective global sourcing network with offices in Asia, Europe, and the Americas, providing a broad range of integrated sourcing solutions to leading original equipment manufacturers (OEMs) and contract manufacturers (CMs) across a wide range of industries.

IBS Electronics' expertise in quality assurance, technology, and supply chain management, together with our leadership in the global deployment of Lean and Six Sigma, enables us to provide a competitive advantage to our customers by improving time-to-market, scalability, efficiency, and supply chain management.



IBS Electronics creates an integrated supply chain with our customers and suppliers by becoming a seamless extension of their operations worldwide. IBS delivers "Best in Class" processes, information, technology, tools and people.

**100+** Authorized Franchise Lines  
**1 Million+** Part Numbers  
**Seamless** Global Network



IBS Electronics' operates a Global Procurement Network that enables us to provide our services and products seamlessly worldwide. This network consists of a robust set of systems, skills, and tools that we use to efficiently manage production and services, regardless of geography, cost point, technology, or end-market demand.

IBS supports a network of global customers with turnkey value-added services designed to reduce response times, increase flexibility in the supply chain, reduce order delivery costs & inventory investment, and help customers to optimize their total cost of ownership.



**Discover Bespoke  
Supply Chain Management**  
Customized Solution For Your Requirement

Find The Parts You Need

**[www.ibselectronics.com](http://www.ibselectronics.com)**



A2 GLOBAL ELECTRONICS + SOLUTIONS

# ELECTRONICS SUPPLY CHAIN OUTLOOK

For over 40 years, A2 Global Electronics + Solutions has set the quality standard offering easy, fair, and uncomplicated electronic component distribution and supply chain solutions. From End of Life, to last time buys and full production support, our customers consider us their go-to resource for end-to-end electronics services. Our local offices and distribution centers across the Americas, EMEA, and APAC regions give us a full picture of the complex, ever-changing electronics supply chain. With that in mind, here's our take on the market outlook for this year.

Following a booming 2022, things are beginning to feel different in the electronics supply chain. We are now entering a period of slower growth and are beginning to see a rebalancing of inventory across the market, though recovery is uneven across industries, component types, and geographic regions.

We are returning to a more normalized marketplace. As

supply chains correct, demand will continue downward. Consumer and consumer-related areas will account for the most significant drops in demand. In contrast, rapid technological advances and newly approved government funding for domestic fab construction and defense industries will help the following industries weather the softening market:

- Industrial Sector
- Semiconductor Fabrication
- Automotive/EV
- Energy/Energy Storage
- 5G
- Internet of Things (IoT)
- Data Centers
- Defense/Aerospace Sectors

Open market pricing will soften by as much as 30%. As supply chain conditions normalize, thereby reducing the acuity of shortages, pricing is expected to drop. The anticipated decrease, however, follows an all-time high of Quarter 2 of 2022, so some end users will still experience elevated pricing relative to before the shortage market.

The complete picture of supply availability will remain murky. Supply availability will be uneven and forecasting lead times will be tough. Certain high-profile segments, such as automotive/EV and semiconductor manufacturing, will see some relief from recent supply constraints. Lower-profile customer segments and product classes will still struggle to find parts. Regardless of tier, the general landscape of product availability will look different than the historical linear distribution model, who gains access to available supply will be multivariate, dependent on a number of factors, including need, leverage, location, supplier relationships, and price.

Customers increasingly value supply chain diversity. A new matrix is emerging wherein customers are taking more control over their supply chain. Historically, they have outsourced supply chain management to electronic manufacturing service (EMS) companies or

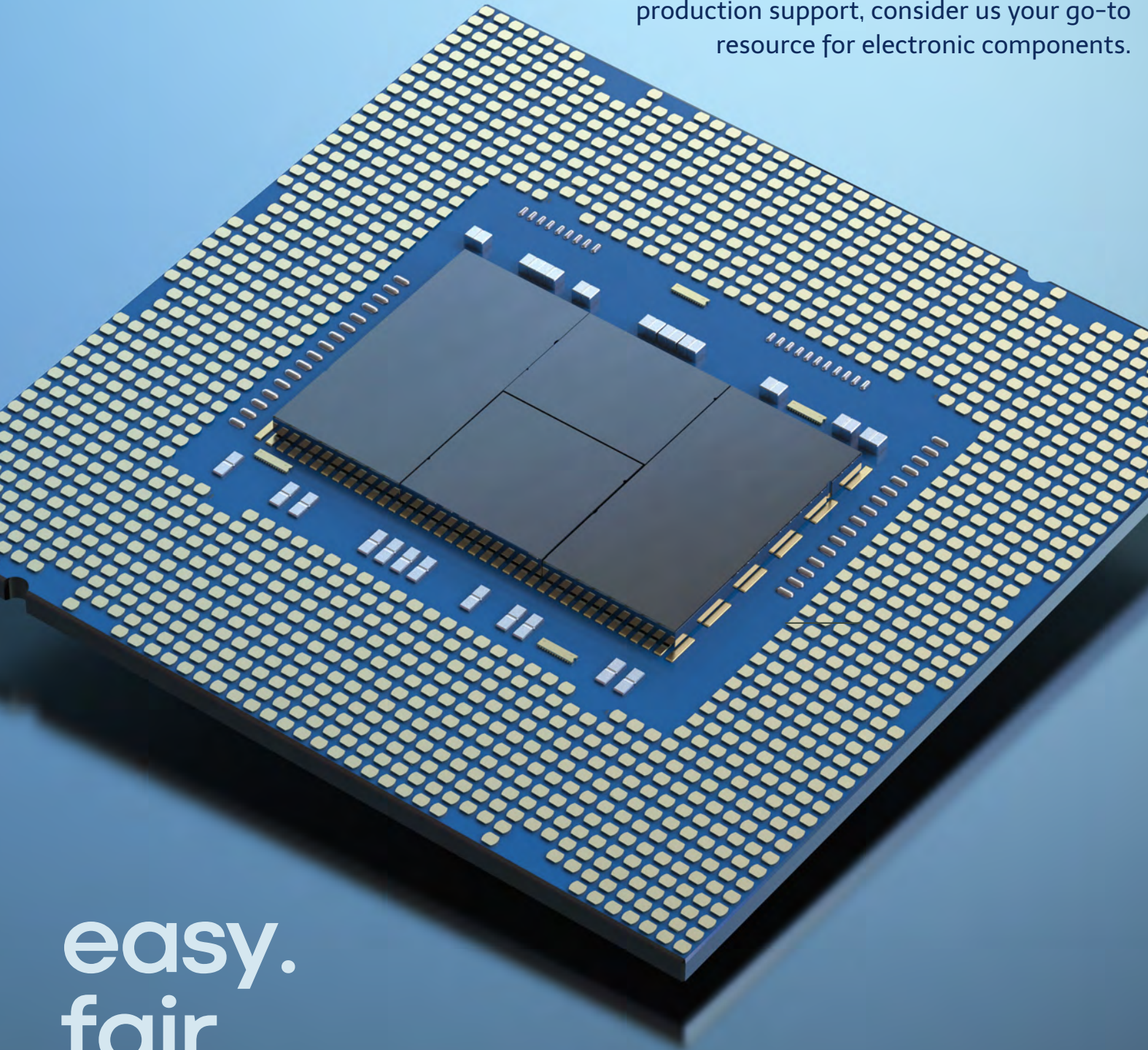
contract manufacturers. In doing so, they have become disconnected from their direct supply chain. Going forward, it seems that they will favor a hybrid approach to supply management and procurement. It is likely they will utilize supply chain models that combine direct, legacy distribution, as well as open market distributors.

Indeed, we are settling into a new "normal". The ongoing impacts of inflation, a global labor shortage, geopolitical conflicts, and a limited supply of raw production materials could all put downward pressure on an already delicate market. However, new funding sources for expanded production give us reason to believe the outlook for the industry will be solid this year.

[www.a2globalelectronics.com](http://www.a2globalelectronics.com)



From End of Life, to last time buys and full  
production support, consider us your go-to  
resource for electronic components.



easy.  
fair.  
uncomplicated.

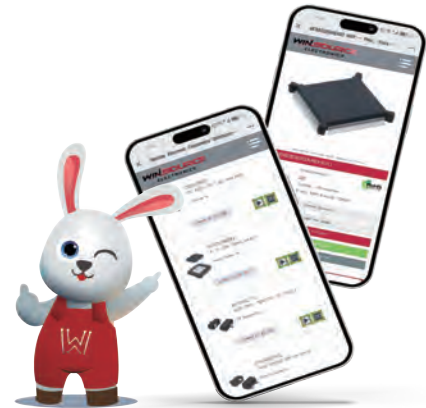




WIN-SOURCE.NET

**WINSOURCE**  
ELECTRONICS

## THE LARGEST ELECTRONIC COMPONENTS ONLINE STORE FROM ASIA



**24 Hours**  
Delivery



**365 Days**  
Warranty



**23 Years**  
Supply Chain  
Experience

**1 MILLION+ COMPONENTS**

**OBSOLETE**

**EOL**

**SHORTAGE**

**Find Obsolete Reduce Cost**

# eBOM.com

The **GAME CHANGING** site for  
the electronics industry

powered by  
 **TrustedParts.com**

## DISCOVER | SOURCE | COMPARE | BUY

| Manufacturer               | Distributor        | Telephone       | Website                        | Franchised Distributor (Y/N/M) | 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 | Pack and Hold |
|----------------------------|--------------------|-----------------|--------------------------------|--------------------------------|----------------------------|---------------------------|---------------------|---------------------------------|--------------------------------|--------------------|---------------|
| <b>CABLE &amp; WIRING</b>  |                    |                 |                                |                                |                            |                           |                     |                                 |                                |                    |               |
| 3M                         | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | 23,235                     | N/A                       | \$0                 | 0.46                            | 50                             | 1,000+             | Y             |
| Alpha Wire                 | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | 8,106                      | N/A                       | \$0                 | 93%                             | 50                             | 1,000+             | Y             |
| Belden Wire & Cable        | Mouser Electronics | 800-346-6874    | www.mouser.com                 | Y                              | 5,863                      | N/A                       | \$0                 | 97%                             | 50                             | 1,000+             | Y             |
| Molex                      | ECCO               | 773-767-2200    | www.eccoconnectors.com         | Y                              | N/A                        | N/A                       | N/A                 | N/A                             | N/A                            | N/A                | N/A           |
| Molex                      | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| TE Connectivity            | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| <b>CIRCUIT PROTECTION</b>  |                    |                 |                                |                                |                            |                           |                     |                                 |                                |                    |               |
| Bel Fuse                   |                    | +1 201 432 0463 | belfuse.com/circuit-protection | N/A                            | N/A                        | N/A                       | N/A                 | N/A                             | N/A                            | N/A                | N/A           |
| Bourns                     | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | 4,462                      | N/A                       | \$0                 | 68%                             | 50                             | 1,000+             | Y             |
| Eaton                      | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| EPCOS                      | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | 3,487                      | N/A                       | \$0                 | 100%                            | 50                             | 1,000+             | Y             |
| KYOCERA AVX                | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50+                            | 1,000+             | Y             |
| KYOCERA AVX                | Digi-Key           | 800-344-4539    | www.digikey.com                | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50+                            | 1,000+             | Y             |
| Littelfuse                 | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | 28,790                     | N/A                       | \$0                 | 67%                             | 50                             | 1,000+             | Y             |
| Schurter                   | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Vishay                     | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | 31,445                     | N/A                       | \$0                 | 68%                             | 50                             | 1,000+             | Y             |
| <b>DISPLAYS &amp; LEDs</b> |                    |                 |                                |                                |                            |                           |                     |                                 |                                |                    |               |
| BIVAR                      | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Broadcom                   | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Cree LED                   | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | 12,390                     | N/A                       | \$0                 | 99%                             | 50                             | 1,000+             | Y             |
| Dialight                   | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | 6,179                      | N/A                       | \$0                 | 84%                             | 50                             | 1,000+             | Y             |
| Displaytech                | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Hantronics                 | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Kingbright Company, LLC    | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | 301                        | N/A                       | \$0                 | 100%                            | 50                             | 1,000+             | Y             |
| Lumileds                   | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Luminus                    | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Newhaven Display           | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| ams OSRAM                  | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | 1,690                      | N/A                       | \$0                 | 100%                            | 50                             | 1,000+             | Y             |
| Tianma                     | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| <b>ELECTROMECHANICAL</b>   |                    |                 |                                |                                |                            |                           |                     |                                 |                                |                    |               |
| ALPS                       | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Apem, Inc.                 | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | 4,326                      | N/A                       | \$0                 | 83%                             | 50                             | 1,000+             | Y             |
| E-Switch                   | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Grayhill                   | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Honeywell                  | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Keystone Electronics       | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Littelfuse                 | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Nidec                      | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| NKK Switches               | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | 13,976                     | N/A                       | \$0                 | 86%                             | 50                             | 1,000+             | Y             |
| Omron                      | Mouser Electronics | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |

## Advert Index

| Advert                            | Page       | Advert                     | Page                       |
|-----------------------------------|------------|----------------------------|----------------------------|
| 4 Star Electronics Inc.           | 83         | Lansdale                   | 63                         |
| A2 Global Electronics & Solutions | 92 & 93    | Marsh Electronics Inc.     | 50 & 51                    |
| Avnet                             | 21 & 36    | Master                     | 29                         |
| All Tech Electronics              | 26 & 27    | Mouser Electronics         | 10,11,16,17,23,24,54 & IBC |
| AVX Corporation                   | 39         | Newark                     | 38 & 39                    |
| Bisco Industries                  | 60 & 61    | NewPower Worldwide         | 84 & 85                    |
| Brevan                            | 41         | NTE Electronics Inc        | 44                         |
| Carlisle Interconnect Technology  | 18         | ROLEC Enclosures, Inc      | 53                         |
| Chip 1 Exchange                   | 80 & 81    | Perfect Parts              | 88 & 89                    |
| Chip Stock                        | 19         | Rochester                  | 30 & 31                    |
| Classic Components                | 70 & 71    | RS                         | 49                         |
| CML Innovative Technologies ltd   | 68         | Rutronik                   | 52 & BC                    |
| Coilcraft                         | 08         | Sager Electronics          | 05 & 56                    |
| Digi-Key                          | IFC & 62   | Sensible Micro Corporation | 86 & 87                    |
| eBOM.com                          | 94         | Sigmatron                  | 13                         |
| ECCO (Electronic Connector Co.)   | 40         | Smith                      | 72 & 73                    |
| ECS Inc International             | 18         | Solid State Disks          | 22                         |
| Electro Enterprises               | 42 & 43    | Sourceability              | 34 & 35                    |
| Flip Electronics                  | 33         | Symentry Electronics       | 57                         |
| Freedom Electronics               | 74 & 75    | Trusted Parts (ECTIA)      | 15                         |
| Fusion Worldwide                  | 09,76 & 77 | TTI Inc                    | 07 & 28                    |
| Galco                             | 46 & 47    | Velocity Electronics       | 78 & 79                    |
| IBS Electronics Group             | 90 & 91    | Winsource Electronics      | 94                         |



| Manufacturer                   | Distributor          | Telephone       | Website                        | Franchised Distributor (Y/N/M) | 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 | Pack and Hold |
|--------------------------------|----------------------|-----------------|--------------------------------|--------------------------------|----------------------------|---------------------------|---------------------|---------------------------------|--------------------------------|--------------------|---------------|
| Panasonic                      | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Phoenix Contact                | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| PUI Audio                      | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Schneider Electric             | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Sensata                        | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| TE Connectivity                | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Teledyne Relays                | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| ENCLOSURES                     |                      |                 |                                |                                |                            |                           |                     |                                 |                                |                    |               |
| Bud                            | ECCO                 | 773-767-2200    | www.eccoconnectors.com         | Y                              | N/A                        | N/A                       | N/A                 | N/A                             | N/A                            | N/A                | N/A           |
| Bud Industries                 | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | 1,325                      | N/A                       | \$0                 | 80%                             | 50                             | 1,000+             | Y             |
| Hammond Manufacturing          | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | 2,839                      | N/A                       | \$0                 | 82%                             | 50                             | 1,000+             | Y             |
| METCASE Enclosures             | OKW Enclosures, Inc. | (800) 965-9872  | www.metcaseusa.com             |                                | 322                        | N/A                       | \$0                 | N/A                             | 10                             | 20                 | Y             |
| New Age Enclosures             | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| OKW Gehäusesysteme GmbH        | OKW Enclosures, Inc. | (800) 965-9872  | www.okwenclosures.com          |                                | 2,450                      | N/A                       | \$0                 | N/A                             | 10                             | 20                 | Y             |
| ROLEC Gehäuse-Systeme GmbH     | ROLEC Enclosures Inc | (888) 658-5774  | www.rolec-usa.com              |                                | 1,960                      | N/A                       | \$0                 | N/A                             | 4                              | 6                  | Y             |
| FREQUENCY MANAGEMENT           |                      |                 |                                |                                |                            |                           |                     |                                 |                                |                    |               |
| Abrakon Corporation            | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | 1,780                      | N/A                       | \$0                 | 100%                            | 50                             | 1,000+             | Y             |
| CTS Electronic Components      | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | 3,889                      | N/A                       | \$0                 | 100%                            | 50                             | 1,000+             | Y             |
| ECS Inc                        | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | 2,070                      | N/A                       | \$0                 | 100%                            | 50                             | 1,000+             | Y             |
| Epson Toyocom                  | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | 178                        | N/A                       | \$0                 | 100%                            | 50                             | 1,000+             | Y             |
| IQD Frequency Products         | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| KYOCERA AVX                    | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50+                            | 1,000+             | Y             |
| KYOCERA AVX                    | Digi-Key             | 800-344-4539    | www.digikey.com                | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50+                            | 1,000+             | Y             |
| SiTime                         | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| ICs & SEMICONDUCTORS           |                      |                 |                                |                                |                            |                           |                     |                                 |                                |                    |               |
| Analog Devices, Inc            | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | 18,749                     | N/A                       | \$0                 | 95%                             | 50                             | 1,000+             | Y             |
| Broadcom Limited               | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Central Semiconductor          | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Central Semiconductor Corp.    | Future Electronics   | (800) 675-1619  | www.futureelectronics.com      | Y                              | N/A                        | N/A                       | N/A                 | N/A                             | N/A                            | N/A                | Y             |
| Digi International             | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Diodes Incorporated            | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| FTDI Chip                      | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | 94                         | N/A                       | \$0                 | 100%                            | 50                             | 1,000+             | Y             |
| Infineon                       | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | 1,580                      | N/A                       | \$0                 | 63%                             | 50                             | 1,000+             | Y             |
| Intel                          | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| ISSI                           | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Lattice                        | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Littelfuse                     | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| MACOM                          | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Maxim Integrated               | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Microchip                      | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | 5,800                      | N/A                       | \$0                 | 100%                            | 50                             | 1,000+             | Y             |
| Monolithic Power Systems (MPS) | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Nexperia                       | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| NXP                            | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | 7,205                      | N/A                       | \$0                 | 100%                            | 50                             | 1,000+             | Y             |
| onsemi                         | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | 7,486                      | N/A                       | \$0                 | 96%                             | 50                             | 1,000+             | Y             |
| Power Integrations             | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Qorvo                          | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Renesas Electronics            | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| ROHM Semiconductor             | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Silicon Laboratories Inc       | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | 1,141                      | N/A                       | \$0                 | 100%                            | 50                             | 1,000+             | Y             |
| Skyworks                       | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| ST Microelectronics            | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | 8,145                      | N/A                       | \$0                 | 96%                             | 50                             | 1,000+             | Y             |
| Swissbit                       | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Texas Instruments              | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | 29,676                     | N/A                       | \$0                 | 94%                             | 50                             | 1,000+             | Y             |
| Toshiba                        | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | 800                        | N/A                       | N/A                 | N/A                             | N/A                            | N/A                | Y             |
| Vishay                         | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | 53,781                     | N/A                       | \$0                 | 77%                             | 50                             | 1,000+             | Y             |
| Wolfspeed                      | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | 53,781                     | N/A                       | \$0                 | 77%                             | 50                             | 1,000+             | Y             |
| INTERCONNECTION                |                      |                 |                                |                                |                            |                           |                     |                                 |                                |                    |               |
| Bel                            |                      | +1 858 676 9650 | belfuse.com/magnetic-solutions | N/A                            | N/A                        | N/A                       | N/A                 | N/A                             | N/A                            | N/A                | N/A           |
| 3M                             | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | 23,235                     | N/A                       | \$0                 | 46%                             | 50                             | 1,000+             | Y             |
| Aero Conesys                   | ECCO                 | 773-767-2200    | www.eccoconnectors.com         | Y                              | N/A                        | N/A                       | N/A                 | N/A                             | N/A                            | N/A                | N/A           |
| Amphenol                       | ECCO                 | 773-767-2200    | www.eccoconnectors.com         | Y                              | N/A                        | N/A                       | N/A                 | N/A                             | N/A                            | N/A                | N/A           |
| Amphenol                       | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | 165,853                    | N/A                       | \$0                 | 31%                             | 50                             | 1,000+             | Y             |
| Anderson Power Products        | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Active (Delphi)                | Mouser Electronics   | 800-346-6873    | www.mouser.com                 | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Bel Magnetic Solutions         |                      | +1 858 676 9650 | belfuse.com/magnetic-solutions | N/A                            | N/A                        | N/A                       | N/A                 | N/A                             | N/A                            | N/A                | N/A           |

| Manufacturer                 | Distributor        | Telephone        | Website                       | Franchised Distributor (Y/N/M) | 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 | Pack and Hold |
|------------------------------|--------------------|------------------|-------------------------------|--------------------------------|----------------------------|---------------------------|---------------------|---------------------------------|--------------------------------|--------------------|---------------|
| Cinch                        | ECCO               | 773-767-2200     | www.eccoconnectors.com        | Y                              | N/A                        | N/A                       | N/A                 | N/A                             | N/A                            | N/A                | N/A           |
| Cinch Connectivity/Bel       | Mouser Electronics | 800-346-6873     | www.mouser.com                | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Cinch Connectivity Solutions |                    | +1 507 833 8822  | belfuse.com/cinch             | N/A                            | N/A                        | N/A                       | N/A                 | N/A                             | N/A                            | N/A                | N/A           |
| Eaton                        | Mouser Electronics | 800-346-6873     | www.mouser.com                | Y                              | 10,744                     | N/A                       | \$0                 | 27%                             | 50                             | 1,000+             | Y             |
| ERNI Electronics             | Mouser Electronics | 800-346-6873     | www.mouser.com                | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Glenair                      | Mouser Electronics | 800-346-6873     | www.mouser.com                | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Harting                      | Mouser Electronics | 800-346-6873     | www.mouser.com                | Y                              | 2,160                      | N/A                       | \$0                 | 51%                             | 50                             | 1,000+             | Y             |
| Harwin                       | Mouser Electronics | 800-346-6873     | www.mouser.com                | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Hirose Electric              | Mouser Electronics | 800-346-6873     | www.mouser.com                | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| ITT Cannon                   | ECCO               | 773-767-2200     | www.eccoconnectors.com        | Y                              | N/A                        | N/A                       | N/A                 | N/A                             | N/A                            | N/A                | N/A           |
| ITT Cannon                   | Mouser Electronics | 800-346-6873     | www.mouser.com                | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| JAE Electronics              | Mouser Electronics | 800-346-6873     | www.mouser.com                | Y                              | 6,02                       | N/A                       | \$0                 | 100%                            | N/A                            | N/A                | Y             |
| JST                          | Mouser Electronics | 800-346-6873     | www.mouser.com                | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| KYOCERA AVX                  | Mouser Electronics | 800-346-6873     | www.mouser.com                | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50+                            | 1,000+             | Y             |
| KYOCERA AVX                  | Digi-Key           | 800-344-4539     | www.digikey.com               | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50+                            | 1,000+             | Y             |
| LEMO                         | Mouser Electronics | 800-346-6873     | www.mouser.com                | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Mill-Max                     | Mouser Electronics | 800-346-6873     | www.mouser.com                | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Molex                        | Mouser Electronics | 800-346-6873     | www.mouser.com                | Y                              | 85,634                     | N/A                       | \$0                 | 89%                             | 50                             | 1,000+             | Y             |
| Neutrik                      | Mouser Electronics | 800-346-6873     | www.mouser.com                | Y                              | 1,563                      | N/A                       | \$0                 | 100%                            | 50                             | 1,000+             | Y             |
| NorComp                      | Mouser Electronics | 800-346-6873     | www.mouser.com                | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Phoenix Contact              | Mouser Electronics | 800-346-6873     | www.mouser.com                | Y                              | 30,044                     | N/A                       | \$0                 | 77%                             | 50                             | 1,000+             | Y             |
| Radiall                      | Mouser Electronics | 800-346-6873     | www.mouser.com                | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Samtec                       | Mouser Electronics | 800-346-6873     | www.mouser.com                | Y                              | 123,613                    | N/A                       | \$0                 | 69%                             | 50                             | 1,000+             | Y             |
| Stewart Connector            |                    | + 1 717 235 7512 | belfuse.com/stewart-connector | N/A                            | N/A                        | N/A                       | N/A                 | N/A                             | N/A                            | N/A                | N/A           |
| Switchcraft Corporation      | Mouser Electronics | 800-346-6873     | www.mouser.com                | Y                              | 300                        | N/A                       | \$0                 | 55%                             | 50                             | 1,000+             | Y             |
| TE Connectivity              | Mouser Electronics | 800-346-6873     | www.mouser.com                | Y                              | 123,613                    | N/A                       | \$0                 | 69%                             | 50                             | 1,000+             | Y             |

## OBSOLESCENCE / HARD TO FIND

|  |                       |              |                    |   |         |       |       |        |    |      |   |
|--|-----------------------|--------------|--------------------|---|---------|-------|-------|--------|----|------|---|
|  | Lansdale              | 602-438-0123 | lansdale.com       | Y |         |       |       |        |    |      |   |
|  | Lantek Corp.          | 973-579-8100 | www.lantekcorp.com | M | 186,000 | \$22M | \$0   | 75.00% | 5  | 62   | Y |
|  | Rochester Electronics | 978-462-9332 | www.rocelec.com    | Y |         | N/A   | \$250 |        | 10 | 400+ | Y |

## OPTO ELECTRONICS

|                    |                    |              |                |   |       |     |     |     |    |        |   |
|--------------------|--------------------|--------------|----------------|---|-------|-----|-----|-----|----|--------|---|
| Broadcom           | Mouser Electronics | 800-346-6873 | www.mouser.com | Y | N/A   | N/A | \$0 | N/A | 50 | 1,000+ | Y |
| Cree LED           | Mouser Electronics | 800-346-6873 | www.mouser.com | Y | 582   | N/A | \$0 | 99% | 50 | 1,000+ | Y |
| Finisar            | Mouser Electronics | 800-346-6873 | www.mouser.com | Y | N/A   | N/A | \$0 | N/A | 50 | 1,000+ | Y |
| ams OSRAM          | Mouser Electronics | 800-346-6873 | www.mouser.com | Y | 1,927 | N/A | \$0 | 99% | 50 | 1,000+ | Y |
| ROHM Semiconductor | Mouser Electronics | 800-346-6873 | www.mouser.com | Y | N/A   | N/A | \$0 | N/A | 50 | 1,000+ | Y |
| Vishay             | Mouser Electronics | 800-346-6873 | www.mouser.com | Y | N/A   | N/A | \$0 | N/A | 50 | 1,000+ | Y |

## PASSIVES

|                                 |                    |                 |                    |     |         |     |     |      |     |        |     |
|---------------------------------|--------------------|-----------------|--------------------|-----|---------|-----|-----|------|-----|--------|-----|
| ABRACON                         | Mouser Electronics | 800-346-6873    | www.mouser.com     | Y   | N/A     | N/A | \$0 | N/A  | 50  | 1,000+ | Y   |
| Bourns                          | Mouser Electronics | 800-346-6873    | www.mouser.com     | Y   | 38      | N/A | \$0 | 78%  | 50  | 1,000+ | Y   |
| Cornell Dubilier                | Mouser Electronics | 800-346-6873    | www.mouser.com     | Y   | 24,145  | N/A | \$0 | 71%  | 50  | 1,000+ | Y   |
| Coilcraft                       | Mouser Electronics | 800-346-6873    | www.mouser.com     | Y   | N/A     | N/A | \$0 | N/A  | 50  | 1,000+ | Y   |
| EPCOS                           | Mouser Electronics | 800-346-6873    | www.mouser.com     | Y   | 26,533  | N/A | \$0 | 98%  | 50  | 1,000+ | Y   |
| Fair-Rite                       | Mouser Electronics | 800-346-6873    | www.mouser.com     | Y   | N/A     | N/A | \$0 | N/A  | 50  | 1,000+ | Y   |
| KEMET                           | Mouser Electronics | 800-346-6873    | www.mouser.com     | Y   | 77,568  | N/A | \$0 | 66%  | 50  | 1,000+ | Y   |
| KOA Speer                       | Mouser Electronics | 800-346-6873    | www.mouser.com     | Y   | 34,078  | N/A | \$0 | 58%  | 50  | 1,000+ | Y   |
| KYOCERA AVX                     | Mouser Electronics | 800-346-6873    | www.mouser.com     | Y   | N/A     | N/A | \$0 | N/A  | 50+ | 1,000+ | Y   |
| KYOCERA AVX                     | Digi-Key           | 800-344-4539    | www.digikey.com    | Y   | N/A     | N/A | \$0 | N/A  | 50+ | 1,000+ | Y   |
| Murata                          | Mouser Electronics | 800-346-6873    | www.mouser.com     | Y   | 33,780  | N/A | \$0 | 99%  | 50  | 1,000+ | Y   |
| Nichicon                        | Mouser Electronics | 800-346-6873    | www.mouser.com     | Y   | 20,389  | N/A | \$0 | 84%  | 50  | 1,000+ | Y   |
| Ohmite                          | Mouser Electronics | 800-346-6873    | www.mouser.com     | Y   | 14,293  | N/A | \$0 | 55%  | 50  | 1,000+ | Y   |
| Panasonic Electronic Components | Mouser Electronics | 800-346-6873    | www.mouser.com     | Y   | 14,948  | N/A | \$0 | 100% | 50  | 1,000+ | Y   |
| Signal Transformer              |                    | +1 516 239 5777 | belfuse.com/signal | N/A | N/A     | N/A | N/A | N/A  | N/A | N/A    | N/A |
| Taiyo Yuden                     | Mouser Electronics | 800-346-6873    | www.mouser.com     | Y   | 4,620   | N/A | \$0 | 98%  | 50  | 1,000+ | Y   |
| TE Connectivity                 | Mouser Electronics | 800-346-6873    | www.mouser.com     | Y   | 6,663   | N/A | \$0 | 100% | 50  | 1,000+ | Y   |
| TDK                             | Mouser Electronics | 800-346-6873    | www.mouser.com     | Y   | 6,663   | N/A | \$0 | 100% | 50  | 1,000+ | Y   |
| TT Electronics                  | Mouser Electronics | 800-346-6873    | www.mouser.com     | Y   | N/A     | N/A | \$0 | N/A  | 50  | 1,000+ | Y   |
| United Chemi-Con (UCC)          | Mouser Electronics | 800-346-6873    | www.mouser.com     | Y   | N/A     | N/A | \$0 | N/A  | 50  | 1,000+ | Y   |
| Vishay                          | Mouser Electronics | 800-346-6873    | www.mouser.com     | Y   | 102,917 | N/A | \$0 | 64%  | 50  | 1,000+ | Y   |
| Würth                           | Mouser Electronics | 800-346-6873    | www.mouser.com     | Y   | 934     | N/A | \$0 | 99%  | 50  | 1,000+ | Y   |
| Yageo Corporation               | Mouser Electronics | 800-346-6873    | www.mouser.com     | Y   | 18,246  | N/A | \$0 | 100% | 50  | 1,000+ | Y   |

## POWER & BATTERIES

|                               |                    |                 |                             |     |     |     |     |     |     |        |     |
|-------------------------------|--------------------|-----------------|-----------------------------|-----|-----|-----|-----|-----|-----|--------|-----|
| Artesyn Embedded Technologies | Mouser Electronics | 800-346-6873    | www.mouser.com              | Y   | N/A | N/A | \$0 | N/A | 50  | 1,000+ | Y   |
| B&K Precision                 | Mouser Electronics | 800-346-6873    | www.mouser.com              | Y   | N/A | N/A | \$0 | N/A | 50  | 1,000+ | Y   |
| Bel Power Solutions           |                    | +1 866 513 2839 | belfuse.com/power-solutions | N/A | N/A | N/A | N/A | N/A | N/A | N/A    | N/A |



# Buyers' Guide

| Manufacturer      | Distributor        | Telephone    | Website        | Franchised Distributor (Y/N/M) | 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 | Pack and Hold |
|-------------------|--------------------|--------------|----------------|--------------------------------|----------------------------|---------------------------|---------------------|---------------------------------|--------------------------------|--------------------|---------------|
| Cincon            | Mouser Electronics | 800-346-6873 | www.mouser.com | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Cosel             | Mouser Electronics | 800-346-6873 | www.mouser.com | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| CUI Inc.          | Mouser Electronics | 800-346-6873 | www.mouser.com | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Delta Electronics | Mouser Electronics | 800-346-6873 | www.mouser.com | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| MEAN WELL         | Mouser Electronics | 800-346-6873 | www.mouser.com | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Murata            | Mouser Electronics | 800-346-6873 | www.mouser.com | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Phihong           | Mouser Electronics | 800-346-6873 | www.mouser.com | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Phoenix Contact   | Mouser Electronics | 800-346-6873 | www.mouser.com | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| RECOM             | Mouser Electronics | 800-346-6873 | www.mouser.com | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Schaffner         | Mouser Electronics | 800-346-6873 | www.mouser.com | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| SL Power          | Mouser Electronics | 800-346-6873 | www.mouser.com | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Texas Instruments | Mouser Electronics | 800-346-6873 | www.mouser.com | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| TDK Lambda        | Mouser Electronics | 800-346-6873 | www.mouser.com | Y                              | 405                        | N/A                       | \$0                 | 80%                             | N/A                            | N/A                | Y             |
| TRACO Power       | Mouser Electronics | 800-346-6873 | www.mouser.com | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| Vicor             | Mouser Electronics | 800-346-6873 | www.mouser.com | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |
| XP Power          | Mouser Electronics | 800-346-6873 | www.mouser.com | Y                              | N/A                        | N/A                       | \$0                 | N/A                             | 50                             | 1,000+             | Y             |

| SENSORS             |                    |              |                 |   |        |     |     |     |     |        |   |
|---------------------|--------------------|--------------|-----------------|---|--------|-----|-----|-----|-----|--------|---|
| ams OSRAM           | Mouser Electronics | 800-346-6873 | www.mouser.com  | Y | N/A    | N/A | \$0 | N/A | 50  | 1,000+ | Y |
| Amphenol            | Mouser Electronics | 800-346-6873 | www.mouser.com  | Y | N/A    | N/A | \$0 | N/A | 50  | 1,000+ | Y |
| Analog Devices Inc. | Mouser Electronics | 800-346-6873 | www.mouser.com  | Y | N/A    | N/A | \$0 | N/A | 50  | 1,000+ | Y |
| Bosch               | Mouser Electronics | 800-346-6873 | www.mouser.com  | Y | N/A    | N/A | \$0 | N/A | 50  | 1,000+ | Y |
| Honeywell           | Mouser Electronics | 800-346-6873 | www.mouser.com  | Y | 12,059 | N/A | \$0 | 64% | 50  | 1,000+ | Y |
| KYOCERA AVX         | Mouser Electronics | 800-346-6873 | www.mouser.com  | Y | N/A    | N/A | \$0 | N/A | 50+ | 1,000+ | Y |
| KYOCERA AVX         | Digi-Key           | 800-344-4539 | www.digikey.com | Y | N/A    | N/A | \$0 | N/A | 50+ | 1,000+ | Y |
| Littelfuse          | Mouser Electronics | 800-346-6873 | www.mouser.com  | Y | N/A    | N/A | \$0 | N/A | 50  | 1,000+ | Y |
| Melexis             | Mouser Electronics | 800-346-6873 | www.mouser.com  | Y | N/A    | N/A | \$0 | N/A | 50  | 1,000+ | Y |
| Microchip           | Mouser Electronics | 800-346-6873 | www.mouser.com  | Y | N/A    | N/A | \$0 | N/A | 50  | 1,000+ | Y |
| NXP                 | Mouser Electronics | 800-346-6873 | www.mouser.com  | Y | N/A    | N/A | \$0 | N/A | 50  | 1,000+ | Y |
| onsemi              | Mouser Electronics | 800-346-6873 | www.mouser.com  | Y | N/A    | N/A | \$0 | N/A | 50  | 1,000+ | Y |
| Omron               | Mouser Electronics | 800-346-6873 | www.mouser.com  | Y | 4,915  | N/A | \$0 | 59% | 50  | 1,000+ | Y |
| Renesas             | Mouser Electronics | 800-346-6873 | www.mouser.com  | Y | 4,915  | N/A | \$0 | 59% | 50  | 1,000+ | Y |
| Sensirion           | Mouser Electronics | 800-346-6873 | www.mouser.com  | Y | N/A    | N/A | \$0 | N/A | 50  | 1,000+ | Y |
| STMicroelectronics  | Mouser Electronics | 800-346-6873 | www.mouser.com  | Y | N/A    | N/A | \$0 | N/A | 50  | 1,000+ | Y |
| TDK                 | Mouser Electronics | 800-346-6873 | www.mouser.com  | Y | N/A    | N/A | \$0 | N/A | 50  | 1,000+ | Y |
| TE Connectivity     | Mouser Electronics | 800-346-6873 | www.mouser.com  | Y | N/A    | N/A | \$0 | N/A | 50  | 1,000+ | Y |
| Texas Instruments   | Mouser Electronics | 800-346-6873 | www.mouser.com  | Y | 914    | N/A | \$0 | 65% | 50  | 1,000+ | Y |
| Vishay              | Mouser Electronics | 800-346-6873 | www.mouser.com  | Y | 914    | N/A | \$0 | 65% | 50  | 1,000+ | Y |

| SWITCHES & KEYBOARDS |      |              |                        |   |     |     |     |     |     |     |     |
|----------------------|------|--------------|------------------------|---|-----|-----|-----|-----|-----|-----|-----|
| OTTO                 | ECCO | 773-767-2200 | www.eccoconnectors.com | Y | N/A | N/A | N/A | N/A | N/A | N/A | N/A |

| TEST & MEASUREMENT |                    |              |                           |   |       |           |     |      |    |        |   |
|--------------------|--------------------|--------------|---------------------------|---|-------|-----------|-----|------|----|--------|---|
| B&K Precision      | Mouser Electronics | 800-346-6873 | www.mouser.com            | Y | N/A   | N/A       | \$0 | N/A  | 50 | 1,000+ | Y |
| Fluke              | Mouser Electronics | 800-346-6873 | www.mouser.com            | Y | 1,008 | N/A       | \$0 | 94%  | 50 | 1,000+ | Y |
| Keysight           | Mouser Electronics | 800-346-6873 | www.mouser.com            | Y | N/A   | N/A       | \$0 | N/A  | 50 | 1,000+ | Y |
| Lascar Electronics |                    | 814-835-0621 | www.lascarelectronics.com | Y | 130   | \$602,000 | \$0 | 100% | 10 | 175    | Y |
| Tektronix          | Mouser Electronics | 800-346-6873 | www.mouser.com            | Y | N/A   | N/A       | \$0 | N/A  | 50 | 1,000+ | Y |
| Teledyne LeCroy    | Mouser Electronics | 800-346-6873 | www.mouser.com            | Y | 194   | N/A       | \$0 | 96%  | 50 | 1,000+ | Y |

| THERMAL MANAGEMENT |                    |               |                           |     |     |            |     |     |    |        |   |
|--------------------|--------------------|---------------|---------------------------|-----|-----|------------|-----|-----|----|--------|---|
| Materials Direct   | Materials Direct   | 01908 222 211 | www.materials-direct.com  | N/A | N/A | £1,000,000 | £0  | N/A | 5  | 55     | Y |
| ebm-papst          | Mouser Electronics | 800-346-6873  | www.mouser.com            | Y   | 194 | N/A        | \$0 | 96% | 50 | 1,000+ | Y |
| Sanyo Denki        | Mouser Electronics | 800-346-6873  | www.mouser.com            | Y   | 194 | N/A        | \$0 | 96% | 50 | 1,000+ | Y |
| CUI Devices        | Mouser Electronics | 800-346-6873  | www.mouser.com            | Y   | 194 | N/A        | \$0 | 96% | 50 | 1,000+ | Y |
| Universal Science  | Universal Science  | 01908 222 211 | www.universal-science.com | N/A | N/A | £1,000,000 | £0  | N/A | 5  | 55     | Y |

| WIRELESS SOLUTIONS |                    |              |                 |   |     |     |     |     |     |        |   |
|--------------------|--------------------|--------------|-----------------|---|-----|-----|-----|-----|-----|--------|---|
| KYOCERA AVX        | Mouser Electronics | 800-346-6873 | www.mouser.com  | Y | N/A | N/A | \$0 | N/A | 50+ | 1,000+ | Y |
| KYOCERA AVX        | Digi-Key           | 800-344-4539 | www.digikey.com | Y | N/A | N/A | \$0 | N/A | 50+ | 1,000+ | Y |

## Contract Manufacturers Buyers' Guide

| Manufacturer                    | Telephone            | Website                    | Turnover | Location         | Employees | Number of Surface Mount Lines | Approvals                                      | BGA Capacity | Lead Free Manufacturer | Prototyping | Design Capability | Full Turnkey | Cables and Harnessing |
|---------------------------------|----------------------|----------------------------|----------|------------------|-----------|-------------------------------|--|--------------|------------------------|-------------|-------------------|--------------|-----------------------|
| Alan Anderson Manufacturing Ltd | +44 (0) 333 322 7222 | www.aa-manufacturing.co.uk | £21m     | Hertfordshire UK | 40        | 2                             | ISO9001:2015, IPC-A-610                        | Y            | Y                      | Y           | Y                 | Y            | Y                     |
| Pektron                         | 1-248-677-4838       | www.pektron.com            | \$66m    | Michigan & UK    | 350       | 8                             | ISO9001, ISO14001, TS16949, BEAB, VCA, TUV, UL | Y            | Y                      | Y           | Y                 | Y            | Y                     |

# We're single-minded about your satisfaction

Join our growing list of customers

환상적인 고객  
서비스. 정말  
감사합니다!

感谢Mouser—  
以来专业热心  
服务与支持！



Excellent  
service client  
à chaque  
fois.  
Merci  
beaucoup

Jedes Mal ein  
hervorragend  
Kundenservice  
Vielen Dank!

毎回素晴らしい  
カスタマーサービス。  
どうもありがとう。

Fantastic customer  
service every time.  
Many thanks!

Optimizing your purchasing experience across the globe.  
Visit [mouser.com/customer-resource-center](https://www.mouser.com/customer-resource-center)







COMMITTED TO CELEBRATE

## CELEBRATING 50 YEARS OF CONTINUOUS COMMITMENT TO EXCELLENCE IN THE ELECTRONICS INDUSTRY

Over the last 5 decades Rutronik has developed from a "one-man-company" into one of the worldwide leading broadline distributors for electronic components. Thanks to our loyal customers, Rutronik can look back on a successful company history of 50 years.