

State of the Industry Report



Electronic Component Market Overview



From Undersupply to Oversupply: Recovering from the Global Chip Shortage

Late 2020 through 2022 was an infamous era in the electronic component industry, with long-lasting effects. The echoes of extreme shortages, record-high lead times, and significant pricing fluctuations were still salient as 2023 drew to a close, reminding the industry that consequences from imbalances are unavoidable — no matter how resilient your supply chain is. Even the most tenured experts in the semiconductor industry have felt the pressures from too many supply chain disruptions, too much demand, and too much uncertainty about what the next month, or year, might bring.

For customers who struggled during [the global chip shortage](#), those consequences manifested in the form of non-cancellable, non-returnable orders, leading to oversupply. With their commitments, these orders were met with lead times of up to a year.

Consequently, overbuying became a trend, resulting in massive volumes of excess inventory in various sectors of the electronic component market. According to a [2023 Kearney study](#), this is a \$250+ billion problem in the U.S. alone. This issue, along with recent economic woes — inflation, fear of a recession, and sky-high prices for both capital and commodities — led [major players to cut production](#), despite the unprecedented investment in chip manufacturing from the Inflation Reduction Act and the [CHIPS and Science Act](#)

At the beginning of 2023, this attempt to correct the landscape resulted in an overcorrection. Lead times came down from their 52-week highs, but demand lessened in many sectors. Pricing stabilized and the primary problem in the market became overstock.

As industry players learn from the lessons of the past two years, adopting more careful, deliberate procurement strategies will be crucial to avoid further disruptions and bottlenecks.

“Customers are throwing away the playbook – just doing things differently, leaner, restructured, more agile,” says Gerard Magnarelli, Sales Manager at Fusion Worldwide.

As noted by [McKinsey](#), procurement is transitioning from assuming security of supply to optimizing the portfolio in order to mitigate the risk and impact of disruptions. “Accelerating development of alternative suppliers, creating real-time data transparency, and incorporating procurement data into integrated business planning can identify and moderate the risk of shortages while limiting cost ramifications. More companies say they are taking a new approach when weighing trade-offs,” the report states.

Ursula von der Leyen, President of the European Commission, perhaps said it best when introducing the [EU Chips Act](#). Unequivocal in stressing the importance of strategies that include diversification, collaboration, and contingencies, she said, “It should be clear that no country — and even no continent — can be entirely self-sufficient.”

Artificial Intelligence Evolves, Chipmakers Adjust

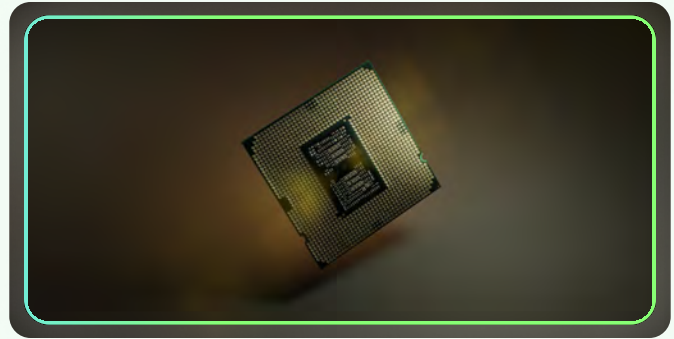
[Artificial intelligence](#) (AI) continues to advance at a rapid rate. As it evolves, so does the technology that makes up its building blocks — including advanced chips and hardware. This technology — which is expected to reach \$1.3 trillion in growth by 2032 — is a major driver in electronic component market activity.

AI began to have a ripple effect on the market as early as March, when demand for GPUs signaled an impending change. The advent of generative AI programs like ChatGPT, DALL-E, and Bard fueled a surge in demand throughout 2023. Recent market research from McKinsey also found that enterprises have embraced generative AI and largely expect more widespread adoption of the technology in the coming years.

At the end of 2023, AI remains one of the biggest electronic component market drivers. It is outpacing established industries like consumer electronics and gaming. Prices, lead times, and shortages of components necessary for AI applications show no signs of abating.

According to Fusion’s Vice-President of Global Purchasing, Dylan Chew, this includes large cloud server providers that are hungry for this evolving technology.

“We’ve seen a jump in demand from the big server builders,” says Chew.

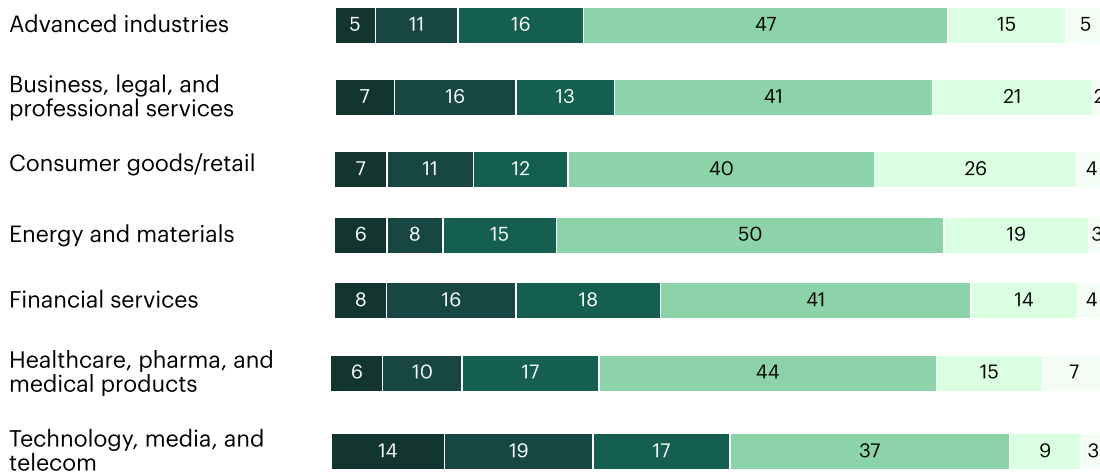


For server builds, the AI hardware that supports the technology stacks expands beyond GPUs and FPGAs to memory parts, interconnects, packing, and systems.

Respondents across regions, industries, and seniority levels say they are already using generative AI tools.

Reported exposure to generative AI tools, % of correspondents

- Regularly use for work
- Regularly use for work and outside of work
- Regularly use outside of work
- Have tried at least once
- No exposure
- Don't know



Source: McKinsey Global Survey on AI, 1,684 participants at all levels of the organization, April 11–21, 2023

Note: Figures may not sum to 100%, because of rounding. In Asia-Pacific, n = 164; in Europe, n = 515; in North America, n = 392; in Greater China (includes Hong Kong and Taiwan), n = 337; and in developing markets (includes India, Latin America, and Middle East and North Africa), n = 276. For advanced industries (includes automotive and assembly, aerospace and defense, and advanced electronics), n = 96; for business, legal, and professional services, n = 215; for consumer goods and retail, n = 128; for energy and materials, n = 96; for financial services, n = 248; for healthcare, pharma, and medical products, n = 130; and for technology, media, and telecom, n = 244. For C-suite respondents, n = 541; for senior managers, n = 437; and for middle managers, n = 339. For respondents born in 1964 or earlier, n = 143; for respondents born between 1965 and 1980, n = 268; and for respondents born between 1981 and 1996, n = 80. Age details were not available for all respondents. For respondents identifying as men, n = 1,025; for respondents identifying as women, n = 156. The survey sample also included respondents who identified as “nonbinary” or “other” but not a large enough number to be statistically meaningful.

The Complications of U.S.-China Relations

The supply chain has long been stressed by the ongoing U.S.-China trade war. The palpable uneasiness about where things go from here is undeniable as conflicts extend from the initial tariffs that impacted chipmaking and trade, dating back to 2018. Since then, we've witnessed a back-and-forth of who will restrict whom and determining what comes next.

This has become even more of a challenge as the U.S. continues to limit trade to China, restricting the country's resources to advance technologies it deems a risk to national security. Where major chipmaker Nvidia supplied 90% of the country's AI chips, the latest U.S. measures limit this, prompting China to double down on making its own chips and technology.

This is only one example of the implications of tensions between the U.S. and China, but the impacts of the longstanding trade war are constantly felt throughout the electronic component supply chain. The effort companies must expend to adhere to and stay ahead of changing export rules has become difficult to maintain, but manufacturers are proving it's not impossible. They've had no choice but to persevere; the allure and opportunity of the Chinese market are too great to ignore. Most raw materials are still being sourced from China, and the Chinese consumer market isn't going anywhere. Neither is their technology or R&D.

Further complicating relations is the backdrop of a potential recession in China, which the country wants to avoid at all costs. U.S. attempts to limit China's access to semiconductor technology, complicates the eastern power's efforts to do so but will spur China to become more self-reliant. In the long run, this is likely to hurt U.S. chipmaker interests.



Vulnerability and Instability Arising from Regional Conflicts

If we've learned anything during the past few years, it's that supply chains are fragile. The ongoing conflicts in Israel and Eastern Europe pose many threats to the electronic component industry.

Whether it's semiconductors, memory modules, or CPUs, all the components of an electronic device require manufacturing, machinery and expertise. These are sourced from all around the world, and conflict threatens these transactions as well as investment and consumer confidence. EY's CEO Outlook Pulse Survey found that as many as 40% of CEOs have reportedly reconfigured their semiconductor supply chains to address geopolitical challenges.

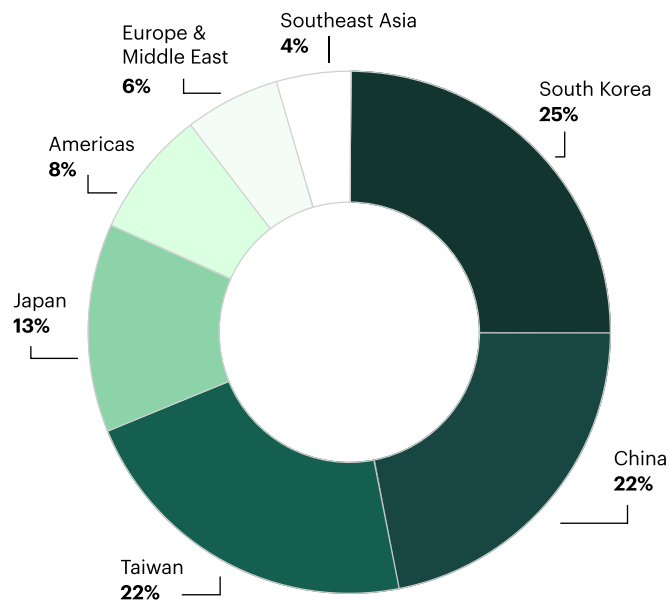
Due to the war in Ukraine, the availability of palladium and neon are at risk. The U.S. sources 35% of its palladium (a key component for sensors and memory modules) from Russia, while Ukraine is responsible for nearly 70% of the world's neon gas capacity (necessary for semiconductor lithography). Argon, krypton, and xenon are also at risk of shortages and therefore price fluctuations.

Israel is also an important part of the global semiconductor supply chain — Intel and NVIDIA both have a presence there. It is one of the few places outside Asia where advanced chip manufacturing occurs. At the moment, Israeli manufacturers face logistical as well as existential hurdles – flights have been canceled, distributors have suspended operations, and work may not be a priority or even possible for local workers affected by the conflict.



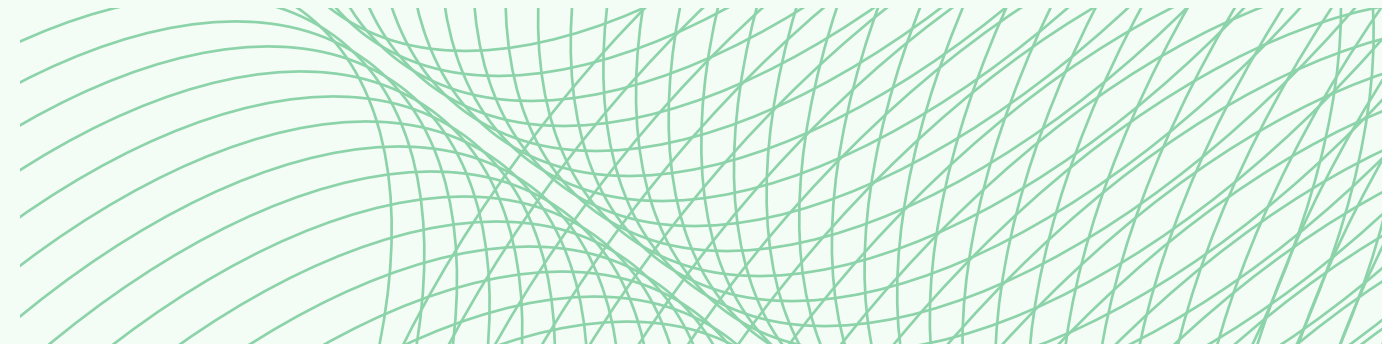
Where Are Most Chips Manufactured?

Distribution of global semiconductor fabricating capacity in 2022, by location *

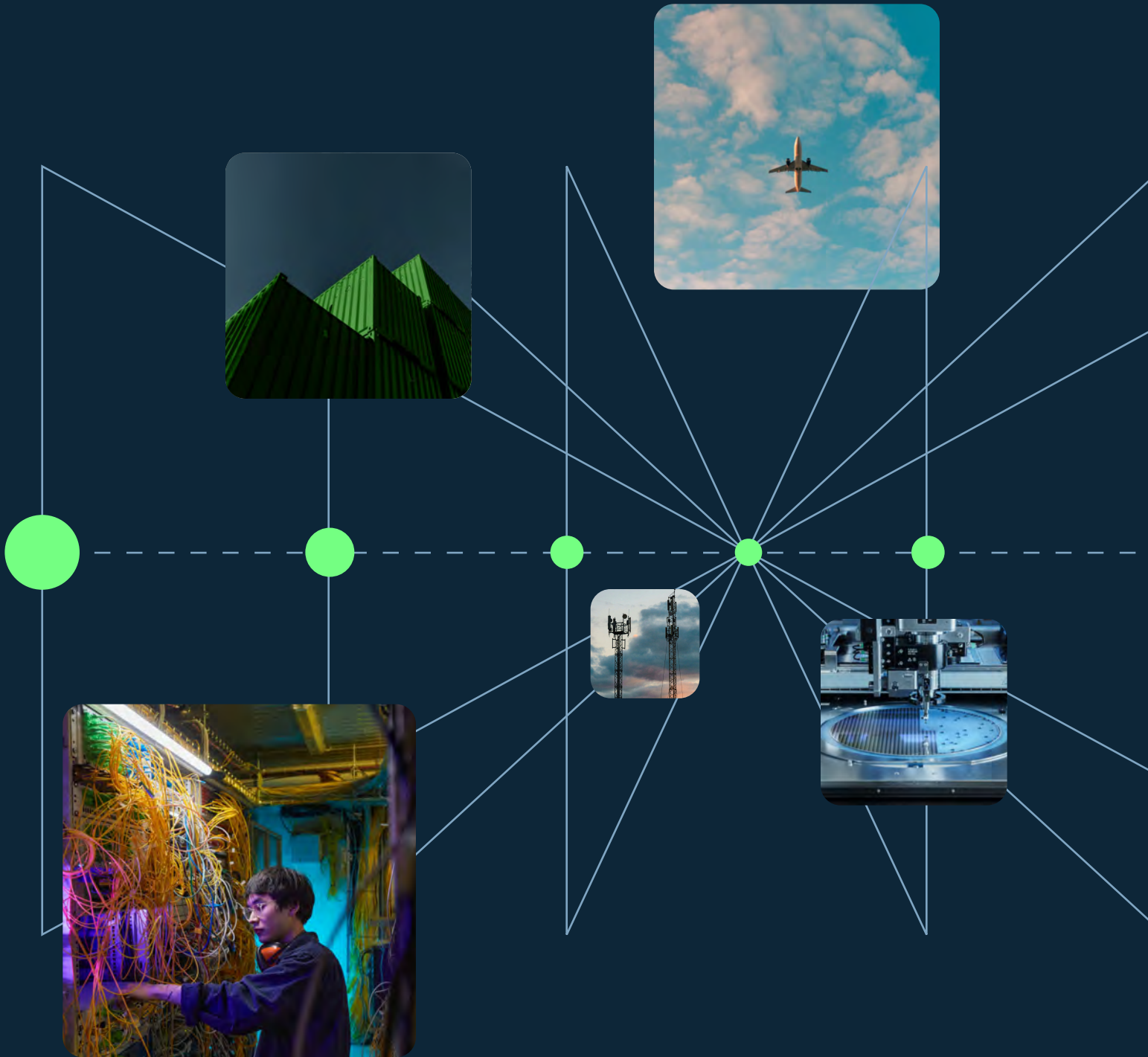


*300mm fabs

Source: SEMI 300mm Fab Outlook to 2026



Industries to Watch





Aerospace & Defense

Demand is as strong as ever for the aerospace and defense industries, as we see a constant funnel for components needed to support the technical makeup of both aerospace and defense builds. Commercial airplanes, for example, are developing exponentially in terms of electrical complexity, which means a reliable supply source for parts is crucial.

These required parts not only make up seat configurations, fire detection, airflow management, and in-flight entertainment, but the safety, navigation, radar detection, and control systems of every plane. These aren't components that can simply be manufactured and supplied by any source, though. They require an aggressive qualification process to confirm that components follow industry compliance standards. These standards are upheld beyond the commercial space, as industry-specific electronic component testing methods are required all customers in the aerospace and defense industries. This makes the approval process highly tedious for suppliers.

This process enhances the existing reputation of the two industries, which are known for their conservative tendencies when it comes to acquiring parts for builds. This conservative nature was feasible pre-2022 shortages, but when demand outpaced supply and even the most reliable manufacturers could not fill orders, the aerospace and defense industries wavered and began relying heavily on the open market.

Recent geopolitical events are also impacting the demand in the defense sector which, to its credit, has persevered in the face of mounting tensions and foreign policy commitments. The U.S. Government and its contractors cannot risk national security

objectives, so industry giants have begun working with non-franchised distributors to build supply chain resiliency and fulfill their quotas.

Bottom Line: Mordor Intelligence anticipates the U.S. Air Force will lead the charge among defense sectors through 2028 – “dominating” other branches, while multiple analysts predict that aerospace will continue to grow over the next decade. Massive modernization is on deck for this sector, which looks ahead to sustainability goals, advancements in AI, and digitization.

Diversifying supplier base for critical supplies is top priority for survey respondents of A&D companies to build and manage supply chain resiliency

36%

Diversifying the supplier base for critical suppliers

20%

Improving visibility into risks and performance in lower supply chain tiers

18%

Localizing the supply chain and promoting friendshoring

(shifting manufacturing to countries with trade agreements)

Survey question: In your view, what is the top priority for your organization to build and manage supply chain resiliency over the next year?

Source: Deloitte outlook survey



Automotive

Automotive struggled along with everyone to keep up with the global chip shortage, but it's now back in the driver's seat and looking forward with a generally favorable outlook (with a few speedbumps along the way). As mentioned in the September 2023 edition of Fusion Worldwide's quarterly earnings report, *From the Source's Mouth*, pricing volatility has impacted automotive components. Constrained supply caused lead times to stretch for MOSFETs, IGBTs, and SiC components. In its most recent earnings call, Teradyne reported signs of demand weakness in the automotive test market. United Microcontroller Corporation reported higher-than-expected inventory buildup for automotive and a decline in revenue in Q4 2023.

PwC forecasts that U.S. electric powertrains and batteries alone are expected to hit \$128 billion by 2035, up from 2021's haul of \$10 billion.

Fusion Worldwide's revenue from automotive has quintupled since 2021, and that portends much of what is to come. Due to the advent of a new era in automotive technologies marked by the rise of both electric vehicles and autonomous vehicles, as well as other innovative crafts, demand for electrical components is likely to fly through the roof.

This bullishness extends beyond cars to public transportation; 32% of respondents to an Accenture industry survey believe autonomous vehicles could be mainstream for mass transportation by 2024.

Beyond that, advancements continue to create opportunity elsewhere, as mentioned in the Accenture report: "Traditional modes of transportation are being upended by drone delivery and air taxis as airspace becomes the next frontier."



Bottom Line: Chips will be needed to enable enhancements across the board – for everything from sensors to security to sustainability. Therefore, automotive buyers are likely to see their clout increase as they position themselves among the likes of HP and Apple in the pecking order for chip allocation.

Automotive learned some hard lessons during the global chip shortage, and we must now hope those lessons will lead to increased resiliency for the industry as they navigate short-term softness.



Contract Manufacturers

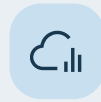
Contract manufacturers (CM) are essential in the infrastructure of the supply chain. They offer reliability stemming from a vetted network, speed to meet demand, and partnership to help cut costs and streamline sourcing. Adaptability has also been key to that staying power; in recent years, contract manufacturers have been instrumental in the global distribution of PPE, ventilators, and other medical equipment.

In other words, this sector will always hold a necessary role in the electronic component supply chain. While the CMs' success is largely dependent on the success of their clients, their strategic approach of diversifying clientele allows them to navigate multiple sectors at once. Fusion sources have recently reported that many CMs have partnered more closely than ever with their customers, taking on more and more supply chain functions to help customers cut costs and streamline sourcing.



CMs will continue to be a mainstay of the industry conversation through 2029, according to [Data Bridge Market Research](#). They cite an increase in offshoring - especially in emerging countries - and positive changes in the regulatory landscape as primary drivers of what they expect to be over 7% in growth for the electronic manufacturing service industry.

Manufacturer Spotlight: Jabil saw stronger than expected results in its diversified manufacturing services (DMS) in recent months, with success driven by automotive and healthcare business demand. They plan to continue investing in electric vehicles and autonomous driving, AI cloud solutions, renewable energy, and healthcare due to robust demand projections.



Enterprise Computing & Servers

Enterprise computing has been a beating heart for the electronic component industry for many years. Not surprisingly, it's at the forefront of our most exciting opportunities, including AI. The ever-growing need for data and compute across multiple industries will rely almost entirely on this sector to reach their full potential, so it's uniquely positioned to dictate the terms of the wave of innovations in AI, IoT, graphics, multimedia, telecommunications, and beyond.

Expect huge growth from the hyperscalers, who will be taking advantage of opportunistic pricing for the first time in a few years as well as continuous advances in connectivity. However, data center builders, owners, and operators must continue to address [multiple skills shortages](#) in order to build and operate the infrastructure their clients want, as well as adhere to the [growing sustainability requirements](#) that their investors - and local governments - expect.

Intel has long led the industry when it comes to processors and storage, but with success capitalizing on the era of AI, NVIDIA has cornered the market across multiple product categories - GPUs, servers, and SSDs. However, NVIDIA's position faces fierce competition with many tech giants looking for greater market share. [Microsoft may not stand by idly in wait](#), and [neither will AMD or Dell](#). Tesla is even getting in on the action, hoping GONK can compete with AWS in the server space.





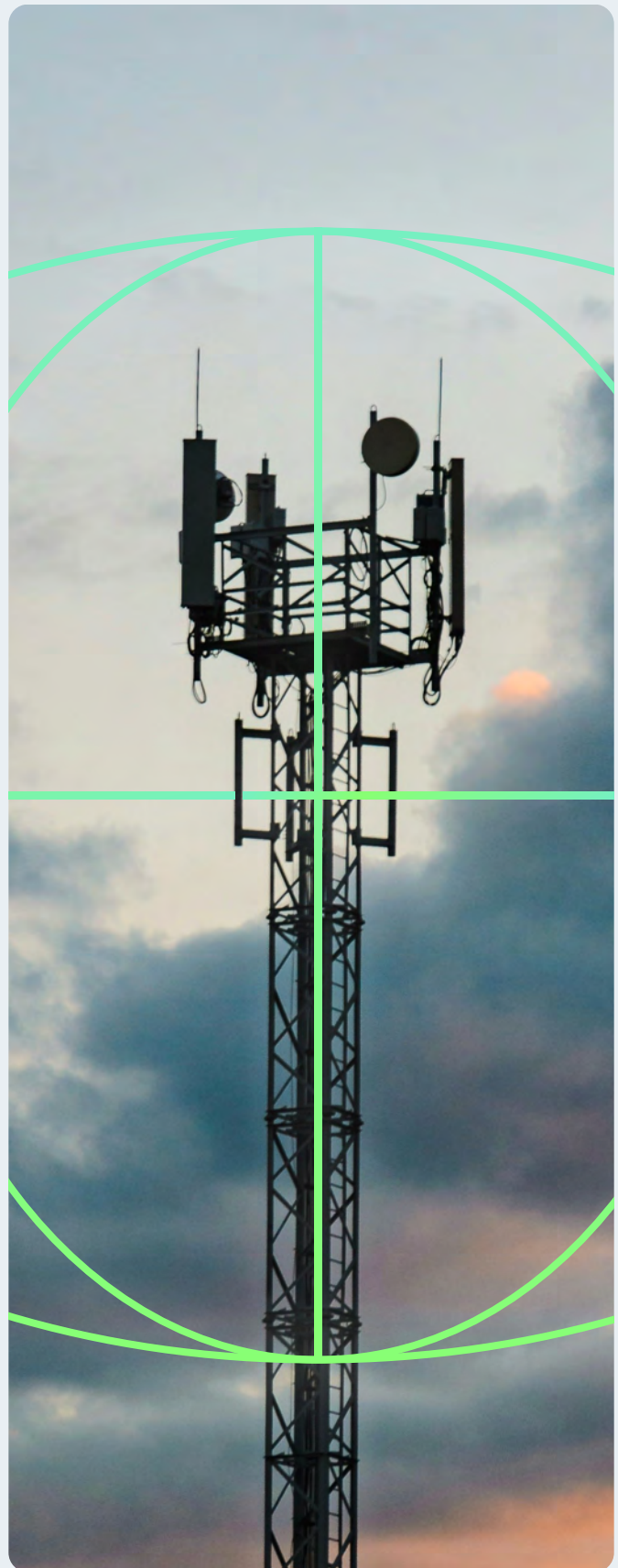
Telecom & Networking

If enterprise computing is the beating heart of AI and IoT, then telecom and networking may become the arteries and nerves. AI, IoT, and Edge computing are, naturally, significant demand drivers for this sector. None of these paradigm shifts are possible without telecom and networking.

While these opportunities have long runways (especially considering the push for broadband access in rural communities across the U.S.), the disappointment of the 5G “revolution” has cast a long shadow over the forecasts of its biggest players, who were expecting better results. Many manufacturers have simply stopped buying electronic components for 5G because their sales have stalled.

Fusion’s September 2023 Greensheet however, takes a positive spin on current state of this industry, noting, “The AI effect has spread to the networking product market, increasing demand for NICs, fiber optic cables, optical transceivers, and high-speed switches.” As of early Q4, customers were focused on higher-end parts, causing lead times to extend as production struggles to match mounting demand.

At least one industry player concurs and is consequently bullish on the outlook. In a recent earnings call, MaxLinear asserted its outlook for its broadband business is solid, as enterprises transition from legacy DSL and other older technologies to 10-gigabit PON fiber access.



Additional Industries on Our Radar





Consumer Electronics

In 2020, consumers purchased personal devices and wearables, audio and visual entertainment equipment, and smart home devices at a high clip. This was followed by the consumer electronic sector plateauing, inflation shrinking spending power, and gizmos and gadgets falling off shopping lists. Additionally, rising materials and labor costs intensified the squeeze.

Not surprisingly, players in the consumer electronics space are undercutting each other and settling for smaller profit margins. As a result, substantial growth is likely not on the horizon. This sector wrapped up 2023 sitting on modest growth of about 4%. One spot of strength in this space is white goods – appliances like fridges and washing machines. These perennially “need-to-have” items performed well from 2020-2022 and were still in demand as we turned the page to 2024.



Gaming

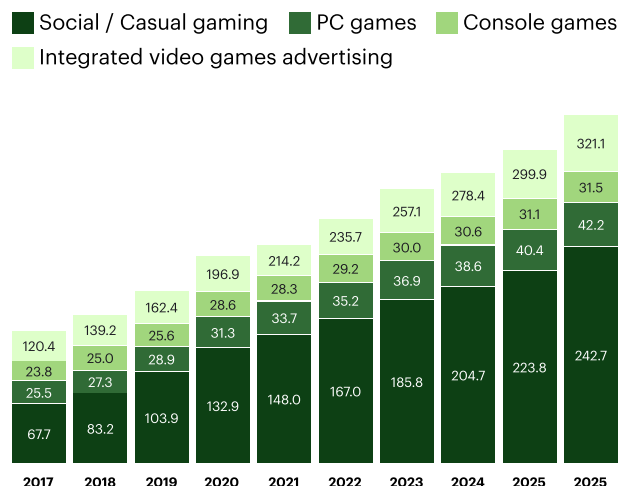
Gaming experienced boom times during COVID, serving upward of 2 billion players at its peak, by one estimate. Remote work hasn’t yet lent itself well to game development, so the sector experienced obstacles in 2020 and 2021; many high-profile games shipped late while gamers had to go to storied lengths to secure a PlayStation 5. Now, things are largely back on track for the industry, and a healthy share of those customers have stuck

around, despite prices rising significantly during a time when most households have cut back on discretionary expenses. The World Economic Forum, for one, is exceptionally bullish on gaming all the way through 2026.

A priority commodity for gaming has always been graphics, which are heavy on embedded GPU. With games changing — and the use of virtual reality, augmented reality, and artificial intelligence increasingly — data is needed. This means the gaming industry’s fortunes will rely on data center growth. Alongside AI, the gaming sector should help fill the vacuum left behind in the wake of crypto’s decline. PwC estimates a sector-wide value of \$260 billion USD by 2026, as gaming eats up 10.9% of global spending in the entertainment and media sector.

Dark Horse Alert: Industrial equipment tends to require a lot of non-volatile, quick-programming memory to execute sequential functions. MICRON may be making serious waves in the industrial space to take advantage of a gap in the memory market, especially as we are likely to enter shortages for both DRAM and NAND Flash.

Total global video games revenue, by segment (US\$bn)



Note: 2021 is the latest available data. 2022-2026 values are forecasts.
Source: PwC’s Global Entertainment & Media Outlook 2022-2026, Omdia



Healthcare

Roughly 50% of all medical devices require a semiconductor. The medical field is a conservative one by nature, and its purchasing habits reflect this. Few healthcare centers can or want to buy new equipment every year; they traditionally invest heavily in service and repair rather than replace a sunk cost. And when it's time to replace, they want a modest number of units. That unique behavior is unlikely to change anytime soon.

However, disruptive technology holds great implications for the field. Will new applications change the paradigm? AI, for example, has huge potential, as does the increasing use of remote patient monitoring devices and the digitization of diagnostic equipment.

By 2024, AI adoption in medical and healthcare will have increased by 45% in just one year.



Personal Computing

The last major spike in mobile and laptop sales was in 2020. Even though demand for desktop workstations has long been stale, everyone wanted a new device (or a few) when they had to transition to working and learning from home. Demand normalized in 2021, 2022 and 2023; the rising costs of commodities combined with cash-crunched consumers didn't help the bottom line.



In general, the outlook for 2024 isn't much better. Personal Computing is likely to continue to trend down. While laptops and tablets have long been in demand, demand for desktop workstations has been flat for years. But we believe a lot of the devices which hungry consumers procured in 2020 are approaching the end of their useable lives, so a bump in sales — and therefore a subtle increase in demand for their components — is expected. Whether that bump occurs in 2024 or 2025, however, is to be determined. Until then, this sector can't fall much further from its current position.

Conclusion: 2024 Outlook



Conclusion

The electronic component industry finds itself at an inflection point as we enter the next calendar year. We're still in the midst of a recovery brought on by inescapable geopolitical conditions that impacted every industry, but we have learned important lessons and recalibrated accordingly. By that overarching barometer, the electronic component industry is positioned for growth and is certainly more resilient than it was this time last year.

Furthermore, optimism and long runways across many sectors bode well for continual growth. It's also fair to say that government investment and breakthrough technologies are providing strong headwinds for many domestic sectors under our purview, even if unintended consequences may arise from protectionist policies. Still, multiple red flags – new global developments, stubborn consumer behavior, and some persistent supply chain issues – cannot be ignored.

Neither can the open-endedness of the biggest questions facing our industry. Will AI be the boon we all are hoping, planning, and investing for? Or will it face a rockier road to its potential, with a similar fate to 5G and crypto? Will the U.S.-China tensions persist, or might pressing global crises thaw things a bit? Very recent and equally subtle developments out of Beijing portend positivity.

In many ways, navigating 2024 and beyond will be a balancing act – especially when it comes to achieving resiliency. Deloitte, for example, acknowledges that while self-sufficiency is the goal for many countries, the global supply chain is far too complex for it to be truly attainable for the United States or Europe. They write that “the goal for both chipmakers and policymakers is likely to make their domestic industrial capacity appropriately more self-sufficient while recognizing that self-sufficiency may be unattainable.”

New challenges and geopolitical trends will undoubtedly arise in 2024 and beyond. Fusion Worldwide will be at your side with the market intelligence to help you navigate the open market, proactively plan for whatever comes next, and make better business decisions.



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