



The European Institute for the PCB Community

EIPC SPEeDNEWS

The Weekly On-Line Newsletter

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ARTIFICIAL INTELLIGENCE NEWS

From Factories to Film Sets, AI Has a Simple Goal

Making things quicker, more efficiently, and for less money is the name of the game.

Making movie magic in a Hollywood film studio has more in common with churning out cars at a Bavarian factory than most of us would like to admit. We see cinema as some creative symphony of sight and sound compared to the mechanical coldness of automobiles. Yet there's a reason why both industries use the same word: production.

Artificial intelligence is seeping into these businesses for largely the same goal: to boost efficiency and increase productivity. The current actors' strike in the US has shone a light on the reality of a profession which is at the same time glamorous and brutal. Among the biggest fears is the notion that performers will be replaced by their own avatars — digital twins — which preserve all that is human while rendering the actual person entirely redundant. It's a valid concern, but likely overblown.

To examine how the use of AI may actually play out in Hollywood we can look at the car industry. BMW AG assembles more than 40 models at 31 factories around the world. With dozens of customizable options, there are at least 2,100 possible configurations of an automobile that bears the German giant's logo. Some of those changes are easy, such as swapping out the paint color. Others require tweaks to the assembly line that have ripple effects on the entire process, including on those workers tasked with getting a car out the door as quickly as possible.

Customization is the enemy of productivity. A factory manager wants to minimize downtime between changes to tooling while ensuring each factory setup is as efficient as possible. That's where artificial intelligence comes in and, unsurprisingly, Nvidia Corp. is a major player.

The US chip designer has become synonymous with the AI boom. It not only sells the hardware used to crunch numbers and spit out text, photos and videos, but it's developed a broad suite of software that helps companies run more smoothly. Its Omniverse platform, for example, is used by BMW to create digital twins of a car plant, allowing management to manipulate 3D models of an assembly line in real time and optimize productivity.

Industrial giants Honeywell International Inc. and General Electric Co. are also keen to roll out their own digital-twin products for the oil and gas, power-generation and mining industries as a way to predict equipment failure, maximize uptime and lower maintenance costs. GE claims AI can boost reliability by more than 93% within two years. BMW says this technology makes the factory-planning process 30% more efficient.

Offer the line producer of a Hollywood movie a one-third boost in efficiency on a film set and they'll likely jump for joy. It's that person's job to go through each line item of a film's budget to maximize return on investment — hence the name. And it's not just about saving money. Beyond counting pennies, they need to ensure working hours are adhered to and a minimum number of crew are employed on set.

Unions have very strict rules on everything from working hours to job roles. And they also define wages according to the budget of a movie. A higher-value production must pay its staff more, which means if costs go over by even one dollar, pay scales could jump into the next tier and blow out costs. A first assistant camera operator, for example, gets 65% more if the budget spills over the tier-one cap of \$7.5 million.

Even modest Hollywood productions costs at least \$100,000 per day of filming. While there's great benefit to digitally replicating background actors to cut costs, their day rate, at around 17% of a feature actor's wage, is less a factor than making efficient use of the film's stars. If a producer could squeeze out more from a lead actor's day, or get the same amount of scenes shot from fewer days of filming, then the financial benefits are exponential. It would also reduce time on set, which means reduced cast

and crew costs, completion of an equivalent production within a lower budget tier, and smaller wage rates.

That's where AI and digital twins enter the picture, and dozens of companies including Nvidia and Walt Disney Co. are building this future. The risk isn't just stealing an actor's likeness — you can be sure the unions will prevent that — but to cut their time on set, which is the yardstick for most performers' wages. Rather than replacing a human for the entirety of a film, we could see increased use of footage from one scene being used as a template for other scenes while preserving the imperceptible human quirks which distinguish live-action from animation.

In fact, it's already happening. Actors have told me of incidents they where they appeared on screen in parts of a production they weren't even aware of. Others have been asked, and refused, to have their faces scanned by high-resolution sensors including lasers. Future deals between producers and performers could include rights to digital copies limited for use only in that production, with commensurate premiums to the base rate of pay. It may not be romantic, but digital twins are here to stay. Movies, like cars, are a product — but they also reflect the progress humans make over time. And one of those changes is the never-ending pursuit of technology and productivity

July 25, 2023

By Tim Culpan

Bloomberg

Amazon, Anthropic, Google, Inflection, Meta, Microsoft, and OpenAI agree to safeguards in the US

Seven leading companies in artificial intelligence have committed to managing risks posed by the tech, the White House has said.

July 24, 2023

Global SMT & Packaging

This will include testing the security of AI, and making the results of those tests public. Representatives from Amazon, Anthropic, Google, Inflection, Meta, Microsoft, and OpenAI joined US President Joe Biden to make the announcement. It follows a number of warnings about the capabilities of the technology. The pace at which the companies have been developing

their tools have prompted fears over the spread of disinformation, especially in the run up to the 2024 US presidential election.

“We must be clear-eyed and vigilant about the threats emerging from emerging technologies that can pose – don’t have to but can pose – to our democracy and our values,” President Joe Biden said during remarks on Friday.

On Wednesday, Meta, Facebook’s parent company, announced its own AI tool called Llama 2.

Sir Nick Clegg, president of global affairs at Meta, told the BBC the “hype has somewhat run ahead of the technology”.

As part of the agreement signed on Friday, the companies agreed to:

- Security testing of their AI systems by internal and external experts before their release.
- Ensuring that people are able to spot AI by implementing watermarks.
- Publicly reporting AI capabilities and limitations on a regular basis.
- Researching the risks such as bias, discrimination and the invasion of privacy.

The goal is for it to be easy for people to tell when online content is created by AI, the White House added.

“This is a serious responsibility, we have to get it right,” Mr Biden said. “And there’s enormous, enormous potential upside as well.”

Watermarks for AI-generated content were among topics EU commissioner Thierry Breton discussed with OpenAI chief executive Sam Altman during a June visit to San Francisco.

“Looking forward to pursuing our discussions – notably on watermarking,” Breton wrote in a tweet that included a video snippet of him and Mr Altman.

<https://emp.bbc.co.uk/emp/SMPj/2.49.3/iframe.html#Media> caption,

In the video clip Mr Altman said he “would love to show” what OpenAI was doing with watermarks “very soon.”

The voluntary safeguards signed on Friday are a step towards more robust regulation around AI in the US.

The administration is also working on an executive order, it said in a statement.

The White House said it would also work with allies to establish an international framework to govern the development and use of AI.

Warnings about the technology include that it could be used to generate misinformation and destabilise society, and even that it could pose an

existential risk to humanity – although some ground-breaking computer scientists have said apocalyptic warnings are overblown.

1) Intel Accelerates AI Development with Reference Kits

Artificial Intelligence

Optimized AI reference kits help developers and data scientists innovate faster.

July 24, 2023

Intel

What's New: Intel now offers a set of 34 open source AI reference kits to the community, the result of a yearlong collaboration with Accenture, enabling developers and data scientists to deploy artificial intelligence (AI) faster and more easily. Each kit includes model code, training data, instructions for the machine learning pipeline, libraries and oneAPI components to optimize AI and make it accessible to organizations in multiarchitecture on-premises, cloud and edge environments.

“Intel AI reference kits give millions of developers and data scientists an easy, high performance and cost-effective way to build and scale their AI applications in health and life sciences, financial services, manufacturing, retail and many other domains. Intel is committed to enabling an AI everywhere future through not just our portfolio of AI-accelerated processors and systems but also our contributions to an open AI software ecosystem. The reference kits are built using components of Intel's AI software portfolio and on the foundation of the open, standards-based, oneAPI multiarchitecture programming model.”

- Wei Li, Ph.D., Intel vice president and general manager of AI and Analytics

Why It Matters: Built on the oneAPI open, standards-based, heterogeneous programming model and components of Intel's end-to-end AI software portfolio, such as Intel® AI Analytics Toolkit and the Intel® Distribution of OpenVINO™ toolkit, the reference kits enable AI developers to streamline the process of introducing AI into their applications, enhancing existing intelligent solutions and accelerating deployment. The result is proven performance improvements with a shorter, more productive workflow versus a traditional model development workflow.

The preconfigured kits simplify AI development for solutions across industries including consumer products, energy and utilities, financial services, health and life sciences, manufacturing, retail and telecommunications. Here is a sample of some of the benefits across industries:

Using the AI reference kit designed to set up interactions with an enterprise conversational AI chatbot, users can experience inferencing in batch mode up to 45% faster with oneAPI optimizations.¹

The AI reference kit designed to automate visual quality control inspections for life sciences demonstrated training up to 20% faster and inferencing 55% faster for visual defect detection with oneAPI optimizations.²

To enable developers to predict utility asset health and deliver higher service reliability, there is an AI reference kit that provides up to a 25% increase in prediction accuracy.³

AI reference kits can reduce the time to solution from weeks to days, helping data scientists and developers train models faster and at a lower cost by overcoming the limitations of proprietary environments. AI tools and optimizations powered by oneAPI maximize portability for open accelerated computing applications.

“Collaborating with Intel to build AI reference kits for the open source community has led to more productive AI workloads for our clients,” said John Giubileo, managing director, Accenture. “The kits, built on oneAPI, are designed to offer developers a portable and efficient solution for AI projects, which reduces project complexity and the time to deployment across industries.”

What’s Next: Through community feedback, along with contributions, select kits will continue to be updated. Specific kits include visual quality inspection, enterprise conversational AI chatbot setup, predictive asset health analytics, medical imaging diagnostics, document automation, AI-structured data generation and others.

Apple Working On A ChatGPT Rival Dubbed “Apple GPT”

According to a new Bloomberg report, Apple is currently testing a ChatGPT-like large language model to rival OpenAI’s ChatGPT and Google’s Bard.

While Apple halted the chatbot rollout due to growing security concerns regarding generative AI, the tech giant is making it available to an increasing number of employees.

Initially dubbed as “Apple GPT” by some engineers, the chatbot works on Apple’s own large language model framework Ajax.

While Apple is yet to devise a strategy to release its new AI technology to its users, reports suggest that the tech giant aims to make a significant announcement next year.

What Do We Know About “Apple GPT” So Far?

Apple’s new chatbot is quite similar to ChatGPT, Bing AI, and Bard in the sense that it doesn’t come with any additional features that the existing AI chatbots don’t offer already.

However, Apple is supposedly focusing on addressing AI-related privacy concerns, which have caused ChatGPT and other AI products to face growing resistance from data regulators.

Apple CEO Tim Cook assured that while the company will be adding AI technology to more of its products, it will do so on a “very thoughtful basis.”

As of now, Apple GPT is capable of summarizing text and answering questions based on data it has been trained with.

Codenamed Ajax, the large language model that would be powering “Apple GPT”, runs on Google Cloud. Additionally, it was also built on Google’s machine learning framework, Google JAX.

This is certainly interesting considering that Apple’s new chatbot will rival [Google’s Bard](#). According to people familiar with Apple’s AI efforts, the company created Ajax last year with the goal of unifying machine learning development at Apple.

A growing number of Apple employees are being allowed to use the tech giant’s new chatbot. But, they aren’t allowed to develop any consumer-bound features using the chatbot and are currently using it for product prototyping purposes.

Apple’s Growing Efforts To Keep Up With The AI Race

Though Apple has been integrating its products with AI features for years, the tech giant is struggling to keep up with the rapidly growing market

for [generative AI tools](#). The tech giant's biggest AI product, the voice assistant Siri, has become a bit stagnant.

Apple's devices generated revenue of almost \$320 billion in the last fiscal year.

However, Apple did make some notable headway with AI in other areas, deploying AI-related improvements in Siri, maps, photos, and the search function on its systems. A smarter version of autocorrecting is in the works, too, and is expected to be rolled out later this year.

Slacking behind in the AI revolution has indeed become a troubling concern for [Apple](#). The company is worried about missing a potentially drastic change in how devices operate.

Unless the tech giant manages to keep up with the AI advancements and integrate its products with generative AI technologies, it could be facing heavy losses in the future.

Expressing his concern over the vast range of AI services inundating the market, Tim Cook said that there are a "number of issues that need to be sorted".

Whether Apple will manage to catch up with Google, OpenAI, and other rivals in the race for generating AI development remains a matter of speculation.

Generative AI puts high-wage jobs at risk

Generative AI systems such as ChatGPT or DALL-E present society with fascinating and, at the same time, alarming challenges, as jobs long thought to be secure find themselves targeted for the first time by automation.

Generative artificial intelligence (GenAI) speeds up changes in the working world. It automates work steps, relieves employees of routine work, and thus creates new freedom for creative working and innovations. Furthermore, the generative offshoot of artificial intelligence has the potential to breathe new life into the slowed down productivity growth of the past decades.

A current [McKinsey study](#) expects annual productivity growth of 2.6 to 4.4 trillion US dollars thanks to GenAI technologies.

The future of knowledge work

That is ensured, among other things, by productivity leaps in professions that have so far been affected very little or not at all by automation. The biggest upheaval lies ahead in the fields of communication, monitoring, documentation, or human interaction in general. In other words, knowledge work, especially in the context of decision-making and collaboration.

GenAI generates around 75% of the estimated value in the areas of customer service, marketing and sales, software development, and research and development. That includes supporting interactions with customers, creating content, and independently generating software codes based on natural voice instructions.

However, generative AI for production and supply chain functions offers far less benefit than “conventional” discriminative AI applications. That’s because the aim of the latter is to differentiate and classify input, while GenAI, based on historical data, creates something new that is indistinguishable from human output.

According to the McKinsey study, there is especially high potential, alongside teaching professions (38%), in IT professions (31%), followed by creative professions (24%). At the level of individual tasks, opportunities arise for management activities, and applying specialist knowledge to decision-making, planning, and creative tasks.

A [study](#) by OpenAI, Open Research and the University of Pennsylvania likewise primarily sees the jobs of workers with higher education and higher pay affected. Accordingly, accountants, mathematicians, programmers, interpreters, or journalists should prepare for AI taking over at least part of their previous tasks.

And [Goldman Sachs](#) expects up to 300 million full-time jobs worldwide to be replaced by AI – with a greater impact in industrialized, emerging or developing countries. In the U.S. and Europe, up to a quarter of all jobs would be up for grabs.

Highly qualified fields of work with automation potential

Unlike previous leaps in technology, generative AI is therefore not aimed at physical processes but at complex, highly qualified, and highly paid fields of work that require employees to have a Bachelor’s or Master’s degree, for

example. For this group, according to the McKinsey study, GenAI has doubled the automation potential by 2030 compared to previous estimates of 28% of all activities that can theoretically be automated to 57%. In jobs that require no university degree, the automation potential rose by a factor of just 1.2 to 63%.



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NEWS FROM FRANCE

ICAPE GROUP announces its 2023 half-year revenue AND GROSS MARGIN

Good Signs: IPC Apex Booth Traffic Suggests Busy Year Ahead

Exhibitors hope new products will keep the order books filled in 2023.

by Mike Buetow

Printed Circuit Design & Fab

The good times of 2022 carried over into January as the industry turned out for one of the larger IPC Apex Expo trade shows in some time. The San Diego Convention Center show floor was humming for the better part of the first two days of the three-day event, and most of the more than 300 exhibitors seemed pleased with the attendance.

Most companies, in particular the assembly equipment suppliers, reported strong bookings for the quarter. Several added that they've raised their full-year forecasts as result of the surge.

A few years ago, there was a big push toward the connected factory. The branding and implementation of the machine-to-machine standard known as Connected Factory Exchange, or IPC-CFX, is now so ubiquitous, it was only sporadically mentioned throughout the week.

Noting data mining issues with PLCs, Aegis showed PLC Gateway, a web server that opens connections to PLCs, displays CFX message types and maps the two. The platform-independent system acts as an edge server and works with "anything that uses CFX," said Jason Spera, CEO.

AIM's newest zero-halogen solder paste features improved electrochemical reliability, powerful wetting and exceptional fine-feature printing. The material is designed for automotive, LED and aerospace assemblies.

ASMPT's DEK TQ L stencil printer will be the company's primary platform going forward, ASMPT's Mark Odgen said, noting an entire shift can run on a single solvent tank and one roll of paper. The company also revealed Virtual Assist, an AI-based training tool (it learns and responds to user questions) that operates via an Android/IOS app or a browser, is adaptive and collects practical experience from the service staff throughout the whole enterprise.

ECD showed its latest M.O.L.E. thermal profiler, the EV6. A "travelling" device, it operates via a capacitive touchscreen, which allows configurations to be set up on the display, eliminating the need for a computer to conduct oven analysis. It is backwards-compatible with the legacy Rider system.

Eurolacer showed its Stock Management tool which monitors and controls the supply of components to the assembly line in real time. The system is intended to reduce the time it takes to locate and replenish components on the placement machine.

Fuji's AIMEXR placement platform is designed to handle larger panels such as server boards. The machine can be outfitted with two custom heads and has additional feeder slots.

Glenbrook Technologies has a new dual x-ray image processor called the GTI-5000 that switches the field of view from 25 microns to 82mm and can show the entire part and an individual wire with a single touch of a button.

Juki's new LX-8 placement machine has a 20-nozzle head and is capable of up to 105,000cph (company rated). The 8-nozzle Takumi head can be changed on the fly, and the 160-feeder capacity allows exceptionally long runs.

Mirtec has installed a new GUI that is 25% faster than the previous version used on its inspection machines. It enhanced the image quality on the MV-3 Omni 3-D AOI, and added a PCB flipper for its inline machines.

Mycronic's inspection systems took a step forward with new head technology known as IRIS for its 2-D and 3-D AOI. The system features higher resolution and is 30% faster. The new MyWizard software has an escape tracker that automatically updates the user's library based on what the operator diagnoses is a false call or a true defect.

nScript showed an eye-opening range of precision dispensing products, from solder to printed antennas to curved resistors, done on a wide variety of

substrates. Its SmartPump can also print active devices, including bare die, the company said.

PVA noted its Ultrafine spray valve, with a 2mm width that can get close to keepout areas.

Saki's 3Xi-M110 V3 AXI reports cycle times that are twice as fast as the machine previously could do. Its combination of planar CT for solder joint defect detection and Real 3D volumetric inspection to spot voids and head-in-pillow issues uses 40% less power per board than the older models.

Yamaha featured the YRM20DL SMT placement machine, with a high-rigidity dual-lane conveyor said to improve productivity and be capable of handling PCBs up to 330mm in width, and PCB lengths of up to 380mm in parallel mounting mode. The placement speed is 120,000cph with an accuracy of $\pm 15\mu\text{m}$ (Cpk=1.0). Zestron revealed its latest cleaning technology, the X728, a pH-neutral defluxing agent.

New Exhibitors

New to the show was DarwinAI, a Toronto-based OEM of solder inspection equipment. The three models of its VQI AOI range from mobile (capable of inspecting boards up to 13 x 17") to inline versions (24 x 24", max.). The top feature is its fast programming time, which in demos took less than one minute.

One of the more interesting developments we saw was from Loveland, CO-based X2F, which supplies moulding equipment for protecting electronics from heat. Using third-party materials, the system offers an alternative to potting and conformal coating by overloading even the most viscous materials. Three platforms are available, ranging from low to high volume capacity.

Fab Developments

The fabrication side of Apex was much smaller than the assembly segment. New printed circuit board processing equipment is hard to find at the show; many of the machines on display were first seen at Productronica in 2019 or 2021, and won't be mentioned here.

Isola emphasized its Terragreen 400G low-loss laminate and prepreg. The halogen-free material is easy to handle and has a Tg of 210°C, Td of 400°C, and a Dk of 3.5.

Ucamco showed Jayda, a website-based workflow engine tool that exposes basic characteristics of a company's data set – e.g., the board type, number of layers, line widths and spaces, etc. – and performs online quoting.

Ventec showed a host of laminates designed for RF/microwave applications. The tec-speed 30.0 RF PTFE material features a thermal conductivity of 1.15W/mK, for superior thermal performance in high-temperature applications, and a low Dk of 3.5, good insulation resistance and high dimensional stability. The new tec-speed 20.0 (VTM-1000i) is a hydrocarbon laminate, said to offer excellent thermal reliability and Dk of 9.8 and Df of 0.0023. The redesigned tec-speed 6.0 (VT-462SH NF/LF) is an ultra-low-loss low-flow/no-flow environmentally friendly material for drones and UAVs.

All-in-all, a good way to start the year.

Printed Circuit Structures, the Evolution of Printed Circuit Boards

The PCS concept will allow passives, actives and even antennas to move out of the XY plane and into the XZ and YZ planes.

March 2023

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Summary

The Printed Circuit Board (PCB) is the backbone of electronics and a large number of consumer devices. The challenge to put more function in a smaller space requires more components utilizing smaller bond pads, smaller lines and tighter pitch. The electronic packaging industry has aggressively pursued novel ways to shrink and stack multilayer boards inside smaller volumes. Industry is approaching serious obstacles in the continued size reduction requirements with the need for wires, epoxy, vias, solder and sometimes bolts and screws to mount the boards.

The next logical step is to move beyond 2D stacking, which is 2.5D to make 3D packages and to utilize the 3rd dimension directly. Eliminate the traditional 2D FR4 board and the wires, epoxies, vias and solder and make the next generation packages utilizing the 3rd dimension; the Printed Circuit Structure (PCS).

The PCS concept will allow passives, actives and even antennas to move out of the XY plane and into the XZ and YZ planes. This new dimension will appear to be very complex and next generation circuit optimization will be required, but the end result will net a significant improvement in volume utilization. In addition, if new materials are developed and utilized properly, the PCS will be the box or the package thus eliminating all the bolts and screws necessary to

mount a PCB in a traditional box or package, thus again saving space and reducing weight.

nScript and the University of Texas at El Paso will present 3D Printing of Printed Circuit Structures. A demonstration of true 3D electronic structures will be demonstrated and shown as well novel approaches which utilize Computer Aided Design (CAD) to 3D Printing which will include the electronics portion.

Conclusions

DPAM is able to combine 3D printing's structures with printed electronics' functionality at the resolution of DP. But it is still early, requiring labor intensive procedures that take time to produce the desired products and the desired automation that current 3D printers have achieved. While 3D printing has been around for more than three decades, DPAM has been around for less than one.

The future of PCB will be heterogeneous printing thus enabling a new generation of electronic packaging. Future work for this will be in material research to functionally load materials for specific mechanical and electrical properties that promote 3D building. Additionally, new processes will be important to achieve proper features during printing; surface roughness or excess voids will need to be controlled. The DPAM process has not been fully studied nor optimized and this will be important.

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NEWS FROM MALAYSIA

Victory Giant to buy Singapore's MFS Technology for up to US\$460 million

Thu, Jul 27, 2023

[The Business Times](#)

Chinese electronics parts manufacturer Victory Giant Technology Huizhou said on Wednesday (Jul 26) it had agreed to buy Singapore's printed circuit board maker MFS Technology for up to US\$460 million.

Victory Giant will pay in cash to acquire Pole Star Limited to indirectly own MFS Technology (S) and all its subsidiaries, with equity value worth of about US\$365 million and debts worth up to US\$95 million, according to a filing by Victory Giant in the Shenzhen stock exchange.

Acquiring the target, which makes flexible printed circuits, will diversify products and improve competitiveness for Victory Giant, which is strong in making rigid printed circuit boards, the filing said.

The announcement comes four months after Reuters reported that Chinese private equity firm DCP Capital, founded by former KKR dealmakers David Liu and Julian Wolhardt, was seeking to sell MFS for US\$550 million, with BDA Partners and Jefferies advising on the sale.

DCP bought a controlling stake in MFS in 2018 from Navis Capital Partners and Novo Tellus Capital Partners for an undisclosed amount.

Founded in 1989, Singapore-headquartered MFS manufactures circuit boards with applications focused on automotive, industrial, medical and data storage end-markets.

It manufactures in China and Malaysia, and has sales teams in Germany and Canada, its website shows.

Victory Giant said in the filing funds for the deal will come from channels including its own capital and bank loans, and the deal is pending registration procedures with local commerce authorities and China's state planner, as well as approval from State Administration for Market Regulation.

PwC acted as an advisor of Victory Giant, the filing showed. [REUTERS](#)



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NEWS FROM SWITZERLAND

Cicor Group continues on its growth path and increases operating margin

Bronschhofen, July 25, 2023 - Cicor Group (SIX Swiss Exchange: CIGN) continued on its growth path in the first half of 2023 and further increased its operating margin. Net sales grew by 26.2% year-on-year to CHF 199.2 million in the first half of 2023 (1st half 2022: CHF 157.7 million). EBITDA increased by 42% to CHF 21.3 million (1st half 2022: CHF 15.0 million), representing a margin of 10.7% (1st half 2022: 9.5%). The outlook for the second half of the year remains positive, supported by an order intake of CHF 221.4 million (1st half 2022: CHF 181.8 million), corresponding to a ratio of new orders to sales of 1.1.

Cicor's strategic focus on the markets of industrial electronics, medical technology and aerospace & defence continues to deliver results. Robust demand from customers supported Cicor's growth in the reporting period. As a result, organic growth in local currencies was 9.5%. Acquisitions contributed with 20.2% to growth, while the continued appreciation of the Swiss franc had a negative impact of -3.4% on sales. Order intake increased significantly thanks to the demand of both existing and newly acquired customers. In the current economic environment, we consider the order growth of 21.8% and the book-to-bill ratio, which remains well above 1, as a clear sign of Cicor's strength in the market for sophisticated development and manufacturing services for high-end electronics.

The increase in the EBITDA margin by 1.2 percentage points year-on-year to 10.7% is also the result of the continued focus on the strategic markets, which contributed 84% to total revenue in the first half of the year (1st half 2022: 80%). The operating margin was also supported by a significant

reduction in brokerage costs, which are passed on to customers without a significant mark-up. This impact had still diluted margins in the prior-year period. In line with its strategy, Cicor is growing in businesses with low asset intensity. This has led to a 1.5 percentage point increase in Core EBIT margin to 7.6% and Core EBIT growth of 57.5% to CHF 15.2 million (1st half 2022: CHF 9.7 million, 6.1% margin). Core net profit increased by 86.5% to CHF 9.2 million (1st half 2022: CHF 4.9 million).

The shortage in the supply of materials has partially eased, enabling a reduction in inventories. A key focus of Cicor's management is on reducing net working capital. As a result of the initial successes of these efforts, free cash flow (before acquisitions) improved to CHF 5.2 million in the reporting period (1st half of 2022: CHF -21.8 million).

EMS Division

With a sales growth of 32.5% to CHF 179.0 million (1st half 2022: CHF 135.1 million), Cicor continues to pursue its growth strategy. In addition to organic growth (13.0% adjusted for currency effects), the newly acquired companies in Germany contributed to this result. Both SMT Elektronik (now Cicor Deutschland), which was consolidated for only two months in the same period of 2022, and the EMS operations acquired from Phoenix Mecano (now Cicor Digital Elektronik) on January 1, 2023, performed very satisfactorily. On the other hand, the strong Swiss franc and lower brokerage costs, which were passed on to customers, had a slowing effect. In the previous year, broker costs had been more than CHF 1 million per month. This has fallen by around 60% in this reporting period.

The integration of the new Cicor companies in Germany is progressing as planned. Together with RHe Microsystems, Cicor has now created an EMS business in Germany with locally generated sales of around EUR 100 million annually. This makes Cicor one of the most important EMS providers in Europe's largest electronics market, with a clear focus on core markets.

The division's EBITDA margin reached a new record level of 11.4% (1st half 2022: 10.2%), driven by a further improved product mix, higher production capacity utilization, an under proportional increase in overhead costs and a reduction in the dilutive effect of passed on broker costs. As a result, EBITDA increased by 48% to CHF 20.4 million (1st half 2022: CHF 13.8 million).

In Vietnam, a newly acquired production building was opened in close proximity to the existing site. By doubling the floor space to around 12,000 square meters, adding a clean room for the production of miniaturized

electronics and investing in a fourth automated PCB assembly line, Cicor is preparing for further growth. Customer commitments have been received for several important new ramp-ups, including the relocation of production volumes from China to Southeast Asia, which will increase Cicor's market share.

AS Division

The AS Division reported an 11.5% decline in sales to CHF 20.6 million in the first half of the year (1st half 2022: CHF 23.3 million), representing 10.4% of Group sales (1st half 2022: 14.8%). Reduced shipments of printed circuit boards to medical customers and the expiry of a multi-year order for hybrid circuits contributed to the decline in sales. The EBITDA margin decreased to 11.8% (1st half 2022: 13.2%) due to capacity utilization effects. In the reporting period, Cicor completed the acquisition of the thin-film business of AFT microwave GmbH in Beckoning, Germany, as part of an asset deal effective as of March 1, 2023. This acquisition strengthens Cicor's position as a leading supplier of thin-film substrates in the European market.

The AS Division business is expected to develop positively in the second half of the year, as demand for hybrid substrates from a customer in the medical technology sector is forecasted to increase significantly.

Outlook for the second semester and the full year 2023

The continued growth momentum in order intake and sales leads to higher expectations than previously communicated. Provided that there are no significant changes in the economic and geopolitical environment as well as in exchange rates, Cicor expects to achieve annual sales of CHF 380 to 410 million in 2023 (previous guidance: CHF 360 to 400 million) and an operating result at EBITDA level of CHF 40 to 45 million (previous guidance: EBITDA margin comparable with last year's figure of 10.3 percent).

Cicor intends to continue on its growth path. The focus will remain on the European market for sophisticated development and production services for high-end electronics. Supported by long-term market growth and Cicor's track record in integrating acquired companies, above-average growth rates in sales and operating profit should continue to be achieved in the future.

At the same time, Cicor is making significant efforts to achieve its ESG goals, for example by reducing the energy intensity of its business. To this end, Cicor's managers have included ESG objectives in their performance target agreements.

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The European Institute for the PCB Community

EIPC SPEeDNEWS

The Weekly On-Line Newsletter

Issue 23– July 2023

NEWS FROM THE USA

Rogers Corporation's TC Series Laminates, Thermal Management for High-Power Applications

Rogers Corporation has introduced its latest innovation - the TC Series laminates for Printed Circuit Boards (PCBs). The TC Series laminates are designed to address the critical thermal management needs of applications requiring high-power RF signals, offering improved performance and reliability in demanding environments.

The TC Series laminates are composed of PTFE, woven fibreglass, and high thermal conductivity ceramic-filled materials. This unique combination provides a range of benefits, including low loss tangent, high thermal conductivity, low coefficient of thermal expansion, and excellent temperature phase stability. As a result, these laminates offer reduced junction temperature, improved reliability, and enhanced thermal dissipation capabilities for high-power applications.

One of the key advantages of the TC Series laminates is their ability to maintain a stable dielectric constant (Dk) even with temperature variations. This characteristic makes them an ideal choice for applications sensitive to Dk changes with temperature, such as power amplifiers, filters, and couplers.

The TC Series includes three high-performance laminates, each catering to specific application requirements:

TC350 Laminates: Offering a Dk of 3.50, high thermal conductivity of 0.72 W/m-K, and low TCDk of -9 ppm/°C, TC350 Laminates are well-suited for power amplifiers, communication systems, and thermal solutions.

TC350 Plus Laminates: With a Dk of 3.50, high Z-Axis thermal conductivity of 1.24 W/m-K, and low TCDk of -42 ppm/°C, TC350 Plus Laminates are particularly suitable for applications that demand superior thermal management and reliability.

TC600 Laminates: Offering a Dk of 6.15, high thermal conductivity of 1.1 W/m-K, and stable TCDk of -75 ppm/°C, TC600™ Laminates are ideal for backhaul radios, thermal solutions, and communication systems.

These laminates also provide reliable attachment to active components and plated vias, ensuring seamless integration within complex PCB designs. Moreover, PCB fabricators can benefit from the processing flexibility offered by the TC Series laminates, enabling optimized panel size and layout.

www.rogerscorp.com

Taiyo America are now LiloTree's sales representative for North America and Europe.

Taiyo America has announced a new partnership with LiloTree. This partnership is part of the ongoing strategy to provide innovative technology to the PCB industry. LiloTree has developed an innovative nickel-free and Cyanide-free gold plating process that offers many advantages to the standard ENIG process.

The benefits of LiloTree's technology are:

- ✓ No corrosion on pads / no black pads
- ✓ Long term reliability of gold-plated surface
- ✓ Able to plate tight HDI features
- ✓ Sustainability with cyanide-free

“With our strong solder mask presence in the marketplace, we will introduce the LiloTree technology to all the PCB manufactures in North America and Europe. LiloTree's technology fits in line with Taiyo's continued support to the industry in providing the most innovative products for the manufacturing of PCBs.” says Zach Maekawa, President at Taiyo America.

“LiloTree is extremely happy about this new partnership says Kunal Shah, President of LiloTree. “Taiyo's has a long-standing relationship with all the

PCB manufacturers in North America and Europe and we are confident that they will help us in introducing our technology to the PCB industry. We both share a common goal to bring new technology to the market.” Taiyo America was established in 1990, in Carson City, NV as a manufacturing subsidiary of Taiyo Holdings Co., Ltd. (located in Japan). We have been exceeding the industry’s needs for solder mask products, legend inks, thermal management inks, and direct imaging products to consistently meet the ever-growing and changing demands for printed circuit boards. LiloTree is a global supplier of surface finishes to PCB and IC manufacturing.

It is an advanced materials technology company, providing next-generation technology solutions through chemistry and materials innovations. Based in Redmond, Washington, we manufacture Ni-less ENIG-Premium, ENIG-Premium and other surface finishes, eco-friendly patented plating solutions offering optimum performance and better reliability at lower cost for electronic assemblies.

July 24, 2023
Taiyo America



Issue 23 - July 2023

NEWS FROM THE TPCA

2023 Inventory of PCB Industry Planned/Listed Companies in Mainland China

July 19, 2023

TPCA

Mainland China's A-shares will officially close in the first half of 2023, and the initial public offering (IPO) situation will also be announced. According to Wind data, based on the date of listing, in the first half of this year, 173 new A-shares were listed, raising a total of 209.677 billion yuan. Compared with the same period last year, the number of new shares increased slightly by 1.17%, and the amount of financing fell by 33.98%.

From the perspective of the CSRC industry, the 173 IPO companies listed in the first half of 2023 are distributed in 35 industries. The top three industries are: computer, communication and other electronic equipment manufacturing (28), special equipment manufacturing (16), and electrical machinery and equipment manufacturing (14).

In the printed circuit board industry, the pace of corporate listing and financing has also slowed down this year. As of July 16, only Tiancheng Technology and Unicomp Technology (with PCB-related business) have landed on the A-share science and technology innovation board, and Dongwei Technology, which successfully issued GDR on the Swiss Exchange in June.

Another 17 companies have made new progress in their IPOs. Among them, Defu Technology and Weiergao have been registered and are about to be listed on the A-share market; Guanghe Technology, Qiangda Circuit, Tongyu New Materials, and Jiangxi Copper Foil have successfully met; 8 companies have reached the inquiry stage, and 2 companies have terminated their IPOs; and Jiali Chuang, which recently received a new acceptance for Shenzhen motherboards (June 30).

As of 7/16, more than 20 companies in the PCB industry have registered with the China Securities Regulatory Commission for guidance, among which Tongbo Technology's guidance work has been completed, and it is a step closer to listing.

Taiwan should strengthen high-end PCB supply chain to tap AI server opportunities - TPCA

The printed circuit board (PCB) for AI servers is a high-end, high-value PCB for terminal applications, and the process technology threshold is higher, so fewer manufacturers have the ability to produce it. However, the Taiwan Printed Circuit Association (TPCA) pointed out that there remain gaps in Taiwan's high-end PCB supply chain and called for efforts to address the issue.

In view of the higher unit price of the product, AI servers have been regarded as a market with vast new opportunity by Taiwan's PCB industry players, including Unimicron, Nan Ya PCB, and Kinsus. PCB board makers GCE, Tripod Technology, copper-clad laminate (CCL) manufacturers including Elite Material Corp (EMC), and ITEQ are also optimistic about the AI boom.

If compared with international counterparts, Taiwanese manufacturers have a competitive advantage in communication products with both technology and mass production experience and strength, but there are some gaps in the Taiwanese supply chain to produce products suitable for AI servers. For example, there is insufficient domestic capacities of high-level PCBs, including high-frequency circuit boards and substrate materials, such as BT resin substrates, ABF films, ultra low-loss grade copper clad substrates, and specialized chemicals such as electroplating solutions and additives.

Taiwan also heavily depends on importing advanced equipment such as aligners, laser drilling machines, and electrical testing machines.

Currently, AI servers are mainly equipped with Nvidia GPUs, which are composed of GPU modules, CPU modules, and accessories including cooling, hard disk, power supply, and other modules. GPU and CPU chips require high-level ABF substrates for packaging. The accelerated versions of GPUs (OAMs) require 5 layers of HDI (high-density interconnect) PCBs. At the same time, with the increase in chip computing performance, the

bus between hardware would require a PCIe5, and the motherboard uses “Ultra Low Loss” grade of copper-clad substrate.

Overall, as the demand for AI computing power increases, ABF substrates will require multi-layer and large area products. With such a higher technology threshold, the yield rate will become the key to the profitability of the substrate board manufacturers.

TPCA also pointed out that many international customers will strategize their supply chain positioning due to the national security sensitivity of AI servers by taking factors such as tensions between China and the US, as well as other geopolitical risks, into consideration. It predicts that Southeast Asia and the Americas will be the main bases for US customers to diversify the risk of the supply chain, while China will do its best to build up its own AI industry and strengthen its high-level manufacturing strengths, in the long run.

Unimicron’s capex further reduced, exacerbating uncertainty in the short-term PCB supply and demand

On the 26th, Unimicron held its Q2 2023 earnings conference, chaired by senior vice president Zhong Mingfeng. He mentioned that the revenue for Q3 showed only a slight increase compared to Q2 and remained relatively stable, with Q4 still needing further observation. The trend of the PCB supply and demand is expected to become clearer only in 2024. It is worth noting that Unimicron has always adjusted its capital expenditure budget based on market conditions and customer demand dynamics. Today, it announced that the capital expenditure for 2023 is approximately NT\$30 billion, with about 70–80% of it allocated for PCB investment.

In fact, Unimicron’s original capital expenditure budget for 2022 was approximately NT\$44.286 billion. However, due to the weaker market conditions from Q3 2022, the full-year budget was reduced by 12.05% to approximately NT\$38.949 billion by December 2022. The capital expenditure budget for 2023 was further reduced from NT\$42.287 billion to NT\$35.42 billion, with a decrease of about 16.24%. Now, with yet another reduction, it seems that the slowdown in demand for PCBs has intensified the uncertainty in the short-term PCB supply and demand trend.

Zhong expects that in Q3, the ABF substrate utilization rate will be around 65–70%. The HDI substrate will see an increase in utilization rate to 80–90% due to the strong demand for new mobile phones and AI servers. The PCB utilization rate will also rise to 80–85% driven by seasonal stock-up demands, leading to a gradual recovery in various consumer electronics sectors.

In Q2 2023, Unimicron's revenue was NT\$25.235 billion, and after-tax net profit reached NT\$2.389 billion, which decreased by 0.35 percentage points on a quarterly basis and 17.59% on a yearly basis. The cumulative revenue for the first half of 2023 was NT\$51.801 billion, with a gross profit margin of 20.39%, a decrease of about 14.87% compared to 2022, and an after-tax net income of NT\$6.662 billion, a decrease of 52.66% compared to the previous year.

From the product line perspective, in the first half of 2023, PCB revenue accounted for 66%, a decrease of 22% from the previous year. Within this, ABF substrates accounted for 81%, and BT substrates accounted for approximately 19%. HDI revenue accounted for 18%, a decrease of 29%, while traditional PCB revenue accounted for 13%, a decrease of 7%. Soft board revenue accounted for 2%, a decrease of 35%.

In terms of end applications in the first half of the year, consumer electronics products accounted for approximately 15%, a decrease of 11% from the previous year. Network communication products accounted for around 27%, a decrease of 4%. Automotive products accounted for about 6%, a decrease of 27%. PC and NB products had an overall share of 52%, a decrease of 30% from the previous year.

[NEWS FROM THE IPC](#)

[PFAS](#)

On May 9, 2023 IPC released an urgent [“Call to Action”](#) to prompt electronics and chemical manufacturers to provide data and information on the industry's uses of perfluoroalkyl and polyfluoroalkyl substances (PFAS). This “Call to Action” was prompted by a universal ban being

proposed by the European Chemicals Agency (ECHA), effectively ceasing all manufacturing and use of thousands of PFAS in the EU by 2026. ECHA is requesting technical and detailed data during a stakeholder consultation (ending September 2023) to consider whether uses of PFAS within industry sectors qualify for exemptions from the forthcoming ban.

Following the “Call to Action,” IPC received responses from the electronics industry highlighting some of the barriers and difficulties associated with identifying PFAS uses because of the number of chemicals being considered for the ban and the multi-functional uses of PFAS. IPC created a [questionnaire for the industry](#) to use to provide information to IPC’s advocacy team in compiling responses to the stakeholder consultation. While we understand that respondents may not have all the information requested in the questionnaire, we ask that you consider answering to the best of your knowledge. IPC will compile information received to showcase a comprehensive view of uses. Please respond to questionnaire by Friday, August 4.

In addition to the questionnaire, IPC offers the following resources to help to identify information needed to effectively advocate for the electronics industry.

- [OECD Global Database on Per and Poly Fluorinated Chemicals](#): The OECD developed a new list PFAS based on a [comprehensive analysis](#) of information available in the public domain. In total, 4730 PFAS-related CAS numbers have been identified and categorized in this study, including several new groups of PFAS that fulfil the common definition of PFAS (i.e. they contain at least one perfluoroalkyl moiety) but have not yet been commonly regarded as PFAS. This list is an update from a list published by the OECD in 2007. ECHA plans to ban PFAS chemistries listed on the OECD list.
- [PFAS in Electronics Datasheet](#): IPC in conjunction with a number of associations across North America and Europe have developed a datasheet that outlines possible PFAS uses in electronics. This datasheet is sourced from publicly available information and is not industry-backed, or fact checked. However, this datasheet can be a

useful resource to begin considering if and how PFAS are used in components, products, and manufacturing processes.

- **[Presentation on Potential PFAS Uses in Electronics](#)**: This presentation provides an overview on where PFAS may potentially exist in electronics – specifically printed circuit boards, wires and cables, and semiconductors. This presentation was presented at a Chemical Watch conference December 2022 to prepare industry for the upcoming REACH Restriction.
- **[Trade Names Document](#)**: The trade names document provides examples of types of PFAS, the chemistry makeup of commonly used PFAS, and the trade names of commonly used PFAS. This document should help recognize some chemistries or products that may be used in your products or supply chain as containing PFAS.

We hope these resources and questionnaire will support your search for PFAS in products and processes. If you have any questions, please contact Suhani Chitalia, IPC's environmental regulatory affairs manager, at SuhaniChitalia@ipc.org.



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International Diary

2023

EIPC @ FED Conference

Augsburg, Germany
20 & 21 September

22nd EIPC Technical Snapshot Webinar

Registrations via www.eipc.org
October

EIPC @ Productronica 2023

Stand B3-529
14-17 November
München, Germany

23rd EIPC Technical Snapshot Webinar

Registrations via www.eipc.org
December

2024

EIPC Winter Conference

Germany
30 & 31 January