The European Institute for the PCB Community

EIPC SPEeDNEWS

The Weekly On-Line Newsletter
Issue 28 – September 2023

ARTIFICAL INTELLIGENCE NEWS

AI in Manufacturing: Transforming Efficiency, Sustainability, and Tomorrow

9/19/2023
Matthew Terry
Manufacturing & Engineering Magazine

In the rapidly evolving landscape of manufacturing, the spotlight shines brightly on Artificial Intelligence (AI), the catalyst behind a transformative wave. AI is revolutionizing processes, enhancing efficiency, and propelling manufacturing into a future brimming with possibilities.

AI at Work: Real-World Examples
To understand the profound impact of AI in manufacturing, let's explore real-world examples:

Predictive Maintenance in Aviation
Consider the aviation industry, where predictive maintenance is crucial. AI monitors aircraft engines in real time, collecting data on temperature, pressure, vibration, and more. Advanced algorithms analyze this data to predict maintenance needs with remarkable precision. This proactive approach reduces costly downtime, increases aircraft availability, and, most importantly, enhances passenger safety.

Predictive maintenance isn't limited to engines; it extends to the entire aircraft, including avionics, hydraulics, and structural components. By replacing components only when necessary, airlines save millions in maintenance costs, reduce unscheduled repairs, and prolong the lifespan of their fleets.

Quality Control in Electronics

In electronics manufacturing, where minuscule components play a critical role, AI-driven computer vision systems are the new quality control champions. These systems meticulously inspect components like microchips, circuit boards, and connectors. They detect even the tiniest defects that might elude the human eye, ensuring that only flawless products reach consumers.

Consider a smartphone assembly line, where thousands of components come together. AI's precision prevents defects like soldering flaws or microchip imperfections, ultimately safeguarding a manufacturer's reputation and minimizing costly product recalls.

Supply Chain Optimization in Automotive Manufacturing

In the automotive manufacturing sector, supply chain efficiency is paramount. AI is a key player in optimizing the entire supply chain. From sourcing raw materials to delivering finished vehicles, AI-driven algorithms work tirelessly.

Suppose a car manufacturer sources parts from various suppliers globally. AI analyzes supplier performance data, demand forecasts, and production schedules. By doing so, it minimizes lead times, reduces inventory costs, and ensures that parts arrive just when they're needed on the assembly line. The result? Streamlined operations, reduced expenses, and increased competitiveness in the market.

Human-Robot Collaboration in Pharmaceuticals

Pharmaceutical manufacturing involves precision and safety at every step. To enhance both, the industry is turning to collaborative robots, known as cobots. These robots work alongside human operators, offering their unique capabilities.

For example, cobots are used in drug compounding, a task that demands extreme precision. AI-driven robots can precisely measure and dispense ingredients, reducing the chance of human error and contamination. Meanwhile, human operators can focus on research and development, ensuring the production of safe and effective medications.

Energy Efficiency in Steel Production

Energy-intensive industries like steel production are also benefiting from AI. Steel manufacturing consumes vast amounts of energy, making energy efficiency a top priority. AI continuously monitors energy usage and

production processes, collecting data on temperature, pressure, and machine performance.
AI algorithms analyze this data and make real-time adjustments to optimize energy consumption. By fine-tuning machinery settings, AI reduces energy waste, leading to significant cost savings and a smaller environmental footprint. Manufacturers not only save on energy bills but also contribute to a more sustainable future.

Mass Customization in Apparel
The fashion industry is no stranger to rapid changes in consumer preferences. AI-driven mass customization platforms are making it possible to meet these evolving demands. These platforms use customer data to design and manufacture individualized clothing items.
Imagine a scenario where an AI system recommends designs, fabrics, and sizes based on a customer's preferences and body measurements. Such a system doesn't just offer personalized clothing; it transforms the entire fashion landscape. It reduces waste by producing only what's ordered, eliminates excess inventory, and enhances customer satisfaction.

Challenges and a Vision for the Future
While AI in manufacturing offers remarkable advantages, it's not without its challenges. Data security is a paramount concern; as more data is collected and analyzed, ensuring its protection becomes crucial. Manufacturers must also navigate the initial implementation costs of AI systems, which can be substantial. Lastly, cultivating a workforce with the necessary AI skills is an ongoing challenge, as these skills continue to be in high demand.
However, the potential for growth, innovation, and sustainability in manufacturing far outweighs these challenges. The roadmap to the future is clear:

Further Integration of AI: Manufacturers will continue to integrate AI into their operations, exploring new applications and leveraging data to improve processes.

Enhanced Data Security: Stricter data security measures will be implemented to protect sensitive information, ensuring the confidentiality and integrity of manufacturing processes.

Cost Reduction: Over time, the costs associated with AI implementation are likely to decrease as technology becomes more accessible and economies of scale kick in.

Workforce Development: Efforts to cultivate an AI-skilled workforce will intensify, with education and training programs designed to meet industry needs.

Sustainability: Manufacturers will increasingly adopt AI to reduce their environmental impact, embracing sustainable practices and eco-friendly technologies.

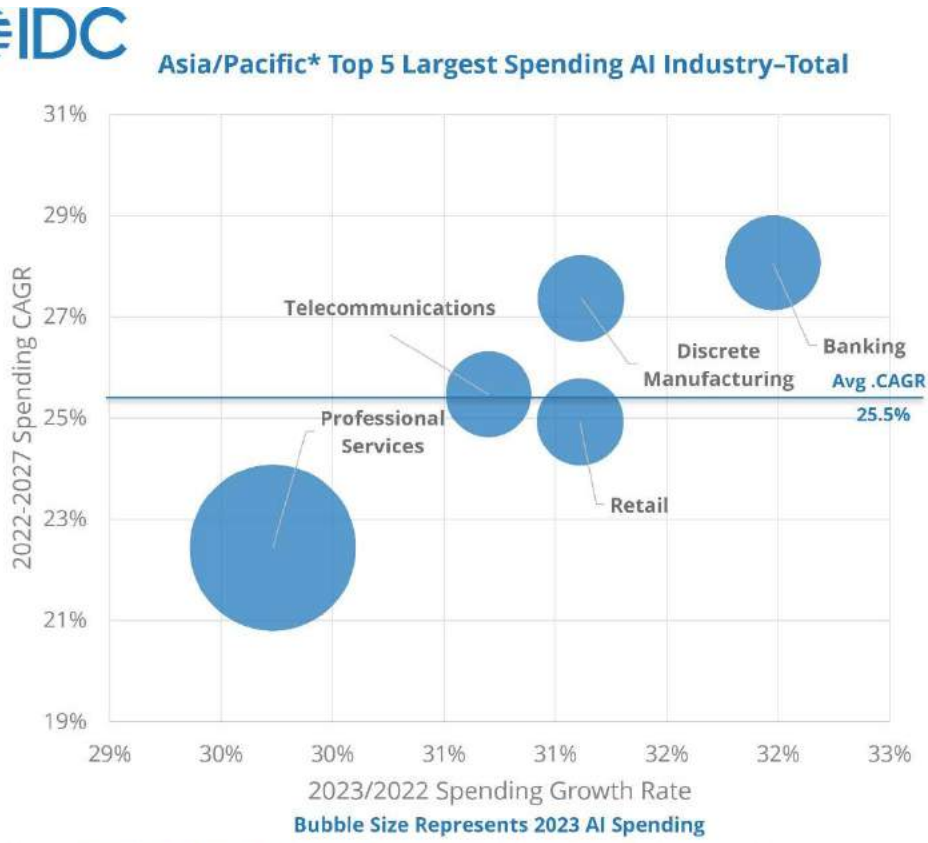
AI's presence in manufacturing is not a fleeting trend; it's a powerful force propelling the industry toward unprecedented efficiency and sustainability. From aviation to electronics, automotive to pharmaceuticals, steel production to fashion, AI is redefining manufacturing processes across sectors. As the industry evolves, those who embrace AI will lead the way, reshaping production for a brighter and more sustainable future.

AI is not just a conductor of change; it's a partner in innovation and progress, shaping manufacturing into a beacon of efficiency, sustainability, and endless possibilities. The future of manufacturing is AI-driven, and the journey has only just begun.

Asia/Pacific* AI Spending Surge to Reach a Projected $78 Billion by 2027 - IDC

Artificial Intelligence

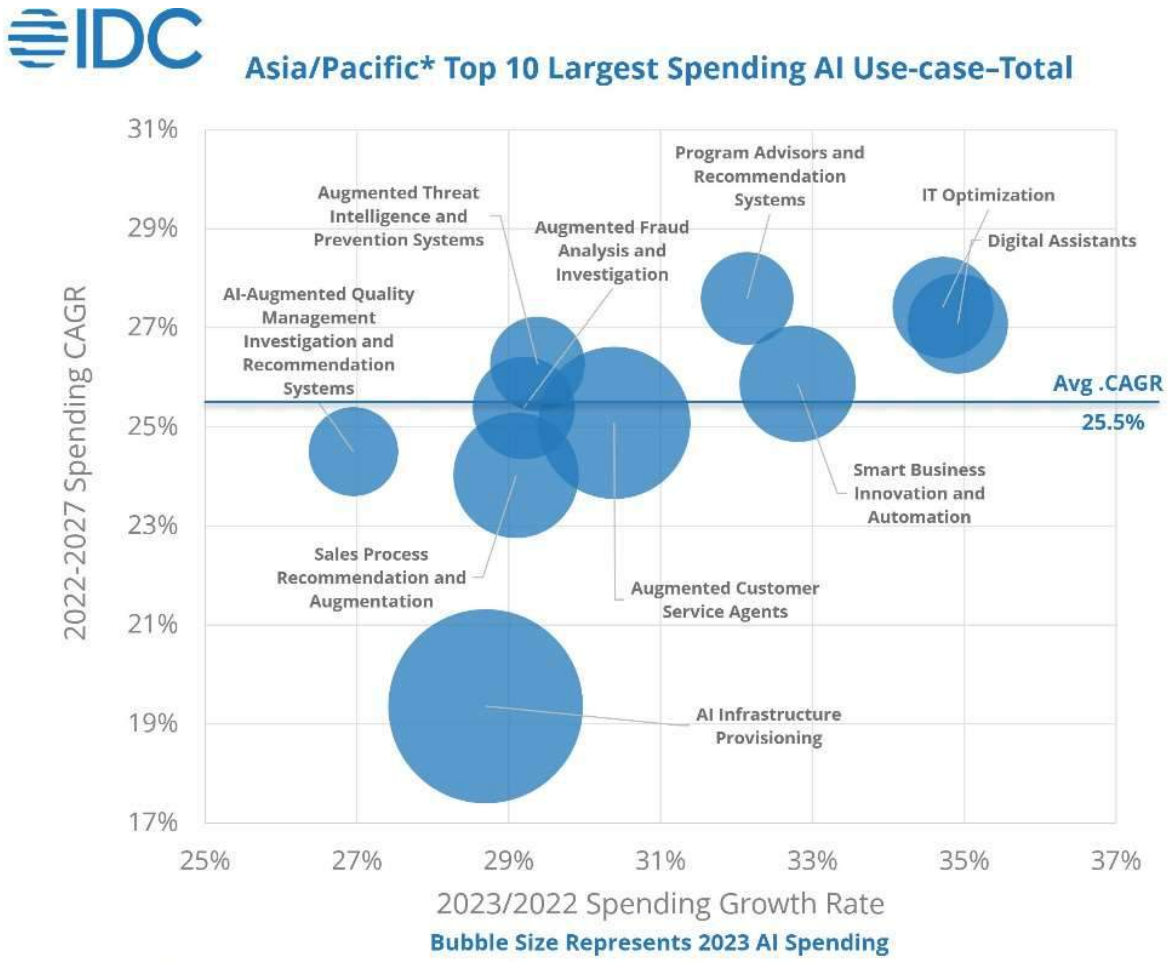
Asia/Pacific* spending on Artificial Intelligence (AI), including software, services, and hardware for AI-centric** systems will grow to $78.4 billion in 2027, according to International Data Corporation's latest Worldwide Artificial Intelligence Spending Guide. The increase in AI spending reflects a shift toward leveraging cutting-edge technology to re-imagine operations, improve customer experiences, and maintain a competitive edge in a rapidly changing market. IDC forecasts a compound annual growth rate (CAGR) of 25.5 percent for the period 2022-2027.



With a market share of 28.5 percent in 2023, the professional services industry is one of the leading industries in AI adoption, growing at a CAGR of 22.4 percent from 2022 to 2027. The majority of AI investment in Professional services is spent on AI Infrastructure Provisioning, in which infrastructure service providers create and manage the IT infrastructure for AI systems, and end users gain access to these resources required for computing and storage for AI system development or the provision of AI services. In the banking industry, AI is revolutionizing customer experiences through personalized financial recommendations and efficiently detecting fraudulent activity or the increased risk of fraud.

The industry's investment in AI-driven algorithms ensures secure transactions and anticipates customer needs, assisting in narrowing down the best available option and making a better decision, all of which contribute to a seamless and secure banking environment. Retail industries are harnessing AI to transform the way customers interact with their products and services. AI-enabled customer service agents, personalized recommendations, and dynamic pricing strategies enhance customer engagement.

“In the dynamic landscape of AI evolution, Generative AI has gained a huge momentum. Majority of the organizations in Asia/Pacific* started investing in Generative AI or are navigating its potential in 2023,” says Vinayaka Venkatesh, Senior Market Analyst, IT Spending Guides, Customer Insights & Analysis, IDC Asia/Pacific. “Some of the key challenges faced by organizations while exploring AI are trustworthiness, privacy, security, copyright and finding a suitable business partner. However, these hurdles can be overcome as and when the technology matures,” he added.



Source: *Worldwide Artificial Intelligence Spending Guide, August 2023* *Including PRC and Japan

AI infrastructure provisioning is top leading use case where Infrastructure services providers create and manage IT infrastructure for AI systems. Infrastructure service providers grant access to this infrastructure to users, providing resources needed for computing and storage for AI systems development, or the provision of AI services to end customers. The second fastest growing use-case is augmented customer service agents which focus on improving customer experiences through instant query resolution, efficient issue escalation, and tailored recommendations. Sales process recommendation and augmentation is the next leading use-case helping

business with AI-powered algorithms that analyze customer behaviour and historical data to provide real-time insights to sales teams, enabling them to make data-driven decisions, improve customer engagement, and close deals more effectively.

In this cycle, we've incorporated generative AI (GenAI) use cases which are broad and generic in coverage. IDC's forecast that the GenAI market is poised to expand by $3 billion by 2027, with a CAGR of 85% from 2022 to 2027 within the Asia/Pacific region*. This allows us to acknowledge the increased use of GenAI even though spending is currently small. As the field of generative AI continues to evolve, we anticipate that use cases will diversify and become more tailored to specific applications.

China continues to be the leader in AI adoption in Asia/Pacific* in terms of AI spending, accounting for 50 percent of total AI spending in Asia/Pacific*, which is expected to reach nearly $38.4 billion by 2027 at a CAGR of 24.8 percent. China's commitment to AI-driven advancements is reshaping sectors and driving its emergence as a global AI superpower.

The Asia/Pacific region excluding Japan and China (APeJC) is emerging as a vibrant hub of AI innovation, accounting for 34% of total AI spending in Asia/Pacific*. which is expected to grow at a CAGR of 26.8 percent to nearly $28.2 billion by 2027. AI adoption is being led by countries such as India, Australia, and Korea. The region's AI commitment favours economic growth, digital transformation, and technological leadership.

Japan is the third-highest investing region in AI solutions, with a $12 billion investment expected by 2027 growing at a CAGR of 25%. The country's commitment to cutting-edge research is yielding breakthroughs in AI-powered automation and analytics. AI is being adopted by Japanese industries to improve productivity, quality control, risk management and customer experiences, thereby driving economic growth and technological leadership.

"IDC predicts AI systems will grow into an essential IT tool for businesses to improve productivity and better engagement with customers, employees, and stakeholders in Japan. The challenge will be to develop appropriate industrial use cases that have an impact on business while paying attention to security, accuracy, and ethics," says Takashi Manabe, Group Director, Data and Analytics, IDC Japan.

The Worldwide Artificial Intelligence Spending Guide sizes spending for technologies that analyze, organize, access, and provide advisory services

based on a range of unstructured information. The Spending Guide quantifies the AI opportunity by providing data for 42 use cases across 19 industries in nine regions and 32 countries. Data is also available for the related hardware, software, and services categories.
*Asia/Pacific including China and Japan
**Taxonomy Note: The IDC Worldwide Artificial Intelligence Spending Guide uses a very precise definition of what constitutes an AI Application in which the application must have an AI component that is crucial to the application - without this AI component the application will not function.

This distinction enables the Spending Guide to focus on those software applications that are strongly AI Centric. In comparison, the IDC Worldwide Semi-annual Artificial Intelligence Tracker uses a broad definition of AI Applications that includes applications where the AI component is non-centric, or not fundamental, to the application. This enables the inclusion of vendors that have incorporated AI capabilities into their software, but the applications are not exclusively used for AI functions only. In other words, the application will function without the inclusion of the AI component.

About IDC Spending Guides
IDC's Spending Guides provide a granular view of key technology markets from a regional, vertical industry, use case, buyer, and technology perspective. The spending guides are delivered via pivot table format or custom query tool, allowing the user to easily extract meaningful information about each market by viewing data trends and relationships.

For more information about IDC's Spending Guides, please contact Vinay Gupta at vgupta@idc.com

About IDC
International Data Corporation (IDC) is the premier global provider of market intelligence, advisory services, and events for the information technology, telecommunications, and consumer technology markets. With more than 1,100 analysts worldwide, IDC offers global, regional, and local expertise on technology, IT benchmarking and sourcing, and industry opportunities and trends in over 110 countries. IDC's analysis and insight helps IT professionals, business executives, and the investment community to make fact-based technology decisions and to achieve their key business objectives. Founded in 1964, IDC is a wholly owned subsidiary of International Data Group (IDG), the world's leading tech media, data, and marketing services company. To learn more about IDC, please visit

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NEWS FROM GERMANY

Isola Group's Materials Channel Millimetre Waves at 2023 EuMW

Isola Group (www.isola-group.com) is a long-time supplier of dependable materials for high-speed-digital (HSD), RF and microwave circuits and, increasingly, for millimetre-wave circuits. Isola's representatives will be on hand to welcome visitors to their booth #326C at the upcoming 2023 European Microwave (EuMW) Exhibition and offer advice and guidance on the best use of their circuit materials for different applications, including in compact mixed-signal, multilayer circuit assemblies.

The 2023 EuMW Conference & Exhibition (www.eumweek.com) is scheduled for September 17-22, 2023, in Messe Berlin HUB27 (Berlin, Germany). With more than 300 participating companies, the exhibition is expected to draw strong attendance from September 19 to 21, 2023. Visitors to Isola's booth can check out examples of one of the electronics industry's most diverse lines of high-performance circuit materials, including its I-Speed®, Astra® MT77, I-Tera® MT40, Tachyon® 100G, and TerraGreen® 400G circuit materials. The materials are available as laminates with a choice of copper thicknesses or as prepregs without metallization.

Low-cost I-Speed® laminate and prepreg materials bring affordability to emerging applications operating to 60 GHz and beyond, such as automotive in-cabin radar sensing systems. These RoHS-compliant circuit materials are based on an epoxy resin system and are FR-4 process compatible for fabricating multilayer circuits with excellent thermal stability. They are available with standard copper weights of 0.5 to 2.0 oz. as well as thinner and thicker copper. The typical dielectric constant (Dk) is consistent with

frequency, ranging from 3.65 at 1 GHz to 3.63 at 10 GHz, both measured in the z-axis or thickness of the material. I-Speed® features low loss, with typical dissipation factor (Df) or loss tangent of 0.0058 at 1 GHz, rising only to 0.0071 at 10 GHz.

When stability with temperature is critical, especially at millimetre-wave frequencies, Astra® MT77 is an excellent foundation for many RF/microwave circuits, with lower Dk and less loss than I-Speed® materials. Also RoHS-compliant, Astra® MT77 exhibits a steady Dk value of 3.00 in the thickness or z-axis at both 2 and 10 GHz across operating temperatures from -40 to +140°C. And with a typical Df value of 0.0017 at both 2 and 10 GHz, it is among the electronic industry's lowest-loss circuit materials available for RF through millimetre-wave frequencies.

Tachyon® 100G laminates and prepregs offer material characteristics well suited to HSD circuits in networking, computer, and aerospace/defence applications, blending well with other Isola circuit materials on mixed-signal, multilayer circuit. With typical z-axis Dk of 3.04 at 2 GHz and 3.02 at 10 GHz, Tachyon® 100G circuit materials support HSD circuits running at data rates of 100 Gb/s and beyond. Typical Df is 0.0021at 1, 5, and 10 GHz. Laminates have standard copper weights of 0.5 and 1.0 oz., with thinner copper available. And for those designing and building circuits for halogen-free applications, Isola will be at the 2023 EuMW Exhibition with their FR-4-process-compatible TerraGreen® 400G laminates and prepregs, with Dk of 3.15 in the z-axis at 2, 5, and 10 GHz and across temperatures from -55 to +125°C.

Isola's representatives invite 2023 EuMW Exhibition attendees to Booth #326C to share their solutions concerning high-frequency, high-speed circuit designs and fabrication. They will be happy to discuss how the characteristics of the materials support different applications and how various manufacturing approaches can lead to cost-effective, repeatable circuits to 110 GHz and beyond. For more information about any of these materials, please visit the Isola website at www.isola-group.com.

About Isola

Isola Group (www.isola-group.com) is a leading global developer and supplier of advanced electronic circuit materials for high-voltage, high-power, high-speed, and high-frequency PCBs. By performing ongoing R & D on emerging circuit applications, such as military radar and EW systems, commercial 5G communications networks, and vehicle electronification, and operating a network of global factories, Isola provides cost-effective,

high-performance solutions for the most challenging electronic single-layer and multilayer PCB applications.

Dymax Achieves MIL-I-46058C Certification for 9771 Conformal Coating on PCBs

Wiesbaden, Germany, September 6, 2023 – Dymax is pleased to announce that its innovative Dymax 9771 protective coating has passed the rigorous qualification tests for the American military specification MIL-I-46058C. This UL94V0 and UL746E recognized dual-cure coating has also been approved according to the IPC-CC-830B standard and is fully compliant with RoHS2 directives 2015/863/EU.

The MIL-I-46058C standard specifies the requirements for conformal coatings and evaluates them against an extensive list of properties, including curing time and temperature, material thickness, moisture resistance, fungus resistance, insulation resistance, flexibility, hydrolytic stability, and flame resistance. With its inclusion in the QPL (Qualified Products Listing) database, U.S. defence manufacturers can now rely on this protective coating from Dymax.

In addition to this important qualification, the Dymax 9771 conformal coating meets NASA's ASTM E595 (Low Outgassing) specification for chemically pure PCBs under extreme conditions, as well as Mil-Std 883 Method 5011 (Low Ionic Content). In addition, Dymax 9771 is listed on NASA's MAPTIS list and has the material number 09841, so suppliers looking for low-outgassing coatings can easily find it in the database.

Dymax Protective Coating 9771 is a high-performance, reworkable conformal coating that is 100% solvent-free. It cures UV/visible light and moisture in seconds and contains a blue, fluorescent tracer that makes it easy to check full coverage during the manufacturing process.

Altus Group to support key suppliers at Productronica 2023

Altus Group will be supporting key suppliers at Productronica 2023 in Munich, Germany from 14-17 November. Altus aims to maximise engagement opportunities with partners and customers, connecting

attendees with new product launches and live equipment demonstrations from their suppliers.

Productronica is anticipated to attract a considerable audience, positioning itself as one of the most highly-attended industry events in recent years. Altus is strategically leveraging their entire sales team's presence at the exhibition to accommodate a high volume of supplier and customer meetings and ensure their clients can view the latest equipment innovations.

Altus CEO, Joe Booth said: "It's exciting to have Productronica back on the calendar, with attendance levels reminiscent of pre-pandemic times.

"We've spoken with many of our UK and Irish partners, and they are planning to send sizable delegations, eager to catch up with the industry's latest technologies from around the world. What's particularly exciting for us is that several of our suppliers are set to unveil and demonstrate new technologies for the first time at the event. This means we will have brand new processes to bring our local partners into 2024, with new features and enhanced value."

At Productronica 2023, Altus will host its customers at their suppliers' booths, facilitating hands-on product demonstrations and meetings.

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NEWS FROM ISRAEL

Eltek receives a $2.9 million purchase order from an existing customer

PETACH TIKVA, Israel, Sept. 19, 2023 /PRNewswire/ -- Eltek Ltd. (NASDAQ: ELTK), a global manufacturer and supplier of technologically advanced solutions in the field of printed circuit boards, announced today that the company has received a purchase order in the amount of $2.9 million from an existing customer. The order will be supplied by Eltek over a period of 16 months commencing in February 2024.

“The order is the result of a product development process with a customer that took place over four years. We are happy that the project concluded with our receiving an order from the customer. I am sure that the technological developments we achieved in this development process will contribute in the future to our receiving more orders with a high level of technological complexity, from other customers,” commented Eli Yaffe, CEO of Eltek.

About Eltek
Eltek - “Innovation Across the Board”, is a global manufacturer and supplier of technologically advanced solutions in the field of printed circuit boards (PCBs), and is an Israeli leading company in this industry. PCBs are the core circuitry of most electronic devices. Eltek specializes in the manufacture and supply of complex and high quality PCBs, HDI, multilayered and flex-rigid boards for the high-end market. Eltek is ITAR compliant and has AS-9100 and NADCAP Electronics certifications. Its customers include leading companies in the defense, aerospace and medical industries in Israel, the United States, Europe and Asia.

Eltek was founded in 1970. The Company's headquarters, R&D, production and marketing center are located in Israel. Eltek also operates through its subsidiary in North America and by agents and distributors in Europe, India, South Africa and South America.
For more information, visit Eltek's web site at www.nisteceltek.com

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NEWS FROM JAPAN

Japan's PCB output has shrunk for nine consecutive months, in July 2023 dropped 16.4% to 818,000 square meters, shrinking for the 18th consecutive month; output fell sharply by 22.6% to 49.772 billion

Statistics released by the Japan Electronics Packaging Circuits Association (JPCA) on September 14 pointed out that Japan's printed circuit board (PCB; hard board + flexible board + module substrate) production in July 2023 dropped significantly compared with the same month last year. 16.4% to 818,000 square meters, shrinking for the 18th consecutive month; output fell sharply by 22.6% to 49.772 billion yen, shrinking for the 9th consecutive month, and the decline reached double digits (10%) for the 5th consecutive month Above) level, the second largest decrease this year (only lower than April 2023; it dropped 24.7% that month, the largest decrease since February 2013).

In terms of type, Japan's Rigid PCB output fell 15.9% to 648,000 square meters in July from the same month last year, shrinking for the 17th consecutive month; output dropped sharply by 20.8% to 30.824 billion yen, the 11th consecutive month months into decline.

Flexible PCB output fell 15.0% to 121,000 square meters, shrinking for the second consecutive month; output fell 10.2% to 2.397 billion yen, the eighth decline in nine months.

Module substrate (Module Substrates) production dropped 24.7% to 49,000 square meters, declining for the 14th consecutive month; output dropped 27.2% to 16.551 billion yen, shrinking for the fourth consecutive month.
From January to July 2023, Japan's PCB production decreased by 14.1% to 5.765 million square meters compared with the same period last year, and

the output decreased by 16.0% to 341.160 billion yen. Among them, the output of hard boards fell 13.4% to 4.687 million square meters, and the output fell 19.3% to 208.226 billion yen; the output of flexible boards fell 8.1% to 780,000 square meters, and the output fell 8.5% to 15.707 billion yen; modules Substrate output dropped significantly by 34.2% to 299,000 square meters, and output shrank by 10.6% to 117.227 billion yen.

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PCB INDUSTRY NEWS

The Branford Group in partnership with Maynards Europe, will be hosting (2) public online auctions to sell surplus assets of Tring and Fela - renowned PCB Manufacturers

The Branford Group ("Branford"), a leader in asset valuation and disposition services, in partnership with Maynards Europe, will be hosting (2) public online auctions to sell surplus assets of Tring and Fela – renowned PCB Manufacturers.

The equipment offerings will be available for bidding via two online auction events with Fela closing on September 20th at 11:00 am (CET) and Tring closing on October 4th at 11:00 am (CET).

Scott Lonkart, Partner and Senior Vice President at Branford stated, "These offerings provide an excellent opportunity for local manufacturers to take advantage of significant cost savings by purchasing high quality PCB equipment via auction. These facilities are very well-maintained with some pieces as new as 2020 - featuring brands like Schmoll, atg, Schmid and more – there's something for everyone."

Complete sale details including the Lot Catalogues with equipment photos and descriptions as well as registration details can be found on Branford's website.

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RAW MATERIAL NEWS

Panasonic has developed New Copper Clad Stretch (CCS) flexible printed circuit technology for 6G flexible printed circuit boards

September 26, 2023

OSAKA, JAPAN – Flexible printed circuit boards (FPCs) have found uses in a wide variety of applications, including health/wellness, mobile devices, aerospace and many more. Conventional FPCs consist of copper patterns formed on the surface of a flexible film using standard subtractive printed circuit board fabrication processes.

Historically, polyimide resin (PI) has been widely used because it is readily available and possesses heat-resistant properties which make it compatible with high-volume assembly processes like solder reflow. However, new applications and device designs like wearables are driving the development of more conformable circuits. Stiff, high-modulus films such as polyimide are not suitable for these products. Currently available pliable, low modulus films like thermoplastic polyurethane (TPU) are not compatible with conventional surface mount (SMT) assembly processes. Researchers at Panasonic Electronic Materials are developing a new material technology that overcomes the limitations of these conventional FPCs.

Development of Copper Clad Stretch (CCS)
To address the limitations imposed by (1) the stiffness of polyimide and (2) the poor heat durability of TPU, the researchers developed an innovative approach using a copper-clad pliable and stretchable thermosetting resin. This construction is abbreviated CCS for Copper Clad Stretch technology; meaning it can be stretched, unlike conventional copper clad laminates (CCLs). The same resin system is used for both the circuitry layer and the insulating coverlay. The coverlay construction consists of a PET protective film, uncured resin, and polyimide release liner. The unique thermosetting

polymer technology can be used in both fully-cured and un-cured format depending on the application. The polyimide release liner in the coverlay also acts as a mechanical support for the soft circuit board during SMT process discussed later in the paper.

Heat Durability

Assuming exposure to typical SAC (Tin-Silver-Copper alloy) reflow conditions in the SMT process, the researchers conducted a solder float test at 288°C for 10 seconds and confirmed that no blistering or delamination of the CCS occurred. And the bare film made by etching CCS showed pliability and stretchability even after the solder float. On the other hand, TPU which is a thermoplastic resin melted almost instantaneously and turned out to be incompatible with this SMT process.

Mechanical Properties

The resin of CCS is much more pliable than polyimide, leading to accommodation of various device form factors such as twisting and bending. Therefore, it is well-suited for non-planar and dynamic applications in healthcare, wearables, and the like.

A 10%-stretch cycle test for 10,000 cycles was conducted using a serpentine-patterned CCS. The sample finished the test without any failures in copper pattern. That means CCS has durability for stretch and is suitable for application requiring movements.

CCS Compatibility with Standard FPC Fabrication Processes

CCS was evaluated for standard PCB double-sided processes compatibility which consist of mechanical drilling, wet desmear, plating, chemical etching, coverlay patterning-molding, and surface mounting technology (SMT). The CCS could pass through the process. The polyimide release liner in the coverlay acted as a support structure for avoiding deformation during SMT.

Conclusion

This new CCS technology exhibits pliability and stretchability not possible with polyimide FPC products. Because of the temperature-resistant thermosetting resin system, CCS is compatible with reflow in the SMT process that TPU cannot withstand. As a result, CCS can be a foundational technology for building more pliable, conformable, and even stretchable devices utilizing conventional FPC manufacturing processes.

As a use case of CCS, a reconfigurable intelligent surface (RIS) has been developed by researchers in Osaka University to effectively deliver the

radio waves in 6G band. The radio waves at these frequencies are easily blocked by buildings and other physical structures. Researchers in Osaka University fabricated a metasurface reflector that can be attached to various locations and whose angle can be adjusted by expanding and contracting. By the combining a metasurface pattern and the inherent stretchability of CCS, it is possible to reflect radio waves efficiently.

In addition to the research noted above, there are many product development projects in progress using the CCS technology. Panasonic Industry is proceeding with the development of CCS technology together with our customers and preparing for mass production.

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NEWS FROM THE USA

APCT Appoints Peter Austin as President and CEO, Effective September 1st.

APCT, a leading name in the PCB and electronics industry, is delighted to announce the appointment of Peter Austin as its President and CEO, effective September 1. Peter takes the reins from former CEO, Steve Robinson, who has retired after years of dedicated service to the company. Peter Austin joins APCT with a rich history in the semiconductor and electronics sector, spanning over 25 years. Most recently, Peter served as the Chief Operating Officer (COO) at PEI Genesis, a global leader in the distribution, manufacturing, and integration of electronic connectors and cable assembly solutions.

Recognised for his forward-thinking approach, exceptional drive, and strategic C-suite leadership, Peter Austin is poised to lead APCT into a new era of growth and innovation. In his role as President and CEO, he will oversee all of APCT's facilities, with corporate responsibilities extending to Engineering, Manufacturing, Finance, Sales & Marketing, and Business Development across all divisions.

Commenting on his appointment, Peter Austin said, "I am honoured to join APCT, a company with a strong legacy of excellence and innovation in the PCB and electronics industry. I look forward to working alongside our dedicated team to drive growth, deliver exceptional value to our customers, and lead APCT to new heights."

Peter Austin expressed his commitment to the company's future, saying, "I firmly believe that we possess the talent, technology, and passion to continue to substantially grow APCT in the coming years. My goal is to grow our revenue, profitability, and global footprint. In line with this vision, APCT

will be placing a strong emphasis on becoming a customer-centric company, with a unified sales organization and selling approach."

The APCT team is confident that Peter Austin's wealth of experience and leadership will play a pivotal role in advancing the company's mission and ensuring continued success.

News from
WECC members

WECC
World Electronic Circuits Council

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NEWS FROM THE IPC

Product Demand Weakens This Month, Though Operations Remain Generally Healthy

IPC Releases September Global Sentiment of the Electronics Supply Chain Report

Though product demand weakened this month with Orders and Backlog Indexes slipping, overall electronics industry operations remain healthy per IPC's September 2023 Global Sentiment of the Electronics Supply Chain Report.

"Both inventory indexes remain strong, suggesting inventory is available from suppliers and inventory is available to customers," said Shawn DuBravac IPC chief economist. "We continue to hear of long lead times for some parts but overall inventories appear well balanced."

Additional survey data show:

- Cost environment continues to improve: The Labor Costs Index and the Material Costs Index both fell this month. Both are near the lower part of their ranges and should continue to improve in the coming months.
- Nearly two-thirds (63%) of electronics manufacturers are currently experiencing rising labor costs, with more half (52%) reporting rising material costs.
- The Shipments Index slipped four points this month but remains in expansionary territory. Manufacturers expect shipments to weaken further in the coming months.
- Per a special question asked about cutting hours in order to keep workers, roughly 22 percent of electronics manufacturers report they are cutting hours to keep workers even though they are facing slower demand.

For the report, IPC surveyed hundreds of companies from around the world, including a wide range of company sizes representing the full electronics manufacturing value chain. View full report.

NEWS FROM THE TPCA

Worldwide PCB industry's output value climbed 6.7% annually to US$96.5 billion in 2022, with Taiwan holding the top spot with a 31.97% share - N.T. Information

Taiwan's PCB board factory market ranks first in the world, with five of the top ten factories

Taiwan's PCB industry output value ranks first in the global market share. Among the top 10 manufacturers in the world, Taiwanese companies have five, and the first, second, and fourth are all Taiwanese companies. However, Chinese-funded companies have also been catching up in recent years. It ranks second in the market, with Japan and South Korea ranking third and fourth respectively.

According to the 2022 global PCB analysis and top PCB manufacturer rankings released by the well-known market research organization " N.T. Information", the global PCB output value in 2022 is estimated to reach US$97.5 billion, an increase of 6.7% compared with 2021. If calculated in terms of capital, Taiwan-funded factories are still Ranking first in the world with a market share of 31.97%, Chinese-funded factories ranked second with 31.52%, followed by Japan with 15.9% and South Korea with 10.67%.
Dr. Hayao Nakahara, the person in charge of N.T. Information, said that the global PCB industry has a trend of "big ones becoming bigger", in which the "winners' circle" is accelerating growth, while the "chasers" are slowing down or falling into recession.

According to statistics, Taiwanese companies still perform well in the global rankings, with 5 of the top 10 board manufacturers occupying the first, second and fourth places, namely Zhending-KY, Xinxing and Huatong.
N.T. Information said that the global highlight in 2022 is IC carrier boards, whose output value is about 20% of the overall PCB bare board (excluding component revenue, approximately US$88 billion). At the same time, IC carrier board manufacturers are quite active in investing in the future. With an estimated scale of US$30 billion, when these investments are converted into production, the proportion of carrier boards in PCBs is expected to rise

to 25% in the future, and the global output value of carrier boards is expected to reach US$22 billion in 2025.
(News source: Science and Technology News)

Taiwan PCB suppliers develop low-carbon materials, eyeing RE100 opportunities

The highlight of Apple's 2023 Autumn Product Launch event was the announcement that Apple Watch has achieved 100% "carbon neutrality," surpassing the carbon neutrality goal set by Apple for 2030. It is reported that currently, 300 Apple suppliers have committed to using green energy in their processes, and the adoption of new energy sources is the biggest contributor to reducing carbon emissions.

Many Taiwanese PCB manufacturers, such as Unimicron, Kinsus, Zhen Ding and Flexium, are Apple suppliers, and their commitment to green energy and carbon reduction efforts is evident. Flexium has stated that Apple has been evaluating the use of green energy by its suppliers in recent years and even assigns scores.

In the second half of 2022, Flexium officially joined RE100, becoming the world's first PCB manufacturer to enter the "Global Renewable Energy Initiative RE100." Flexium stated that its primary goal is to lead the group in achieving energy transformation within the specified timeframe by establishing goals for the use of renewable energy and extending carbon management goals to the supply chain, thereby enhancing the group's carbon management.

Flexium spokesperson Xiong Yashi pointed out that ESG, green energy, and carbon neutrality are irreversible trends, and by joining RE100 and setting goals for renewable energy usage, the company hopes to achieve energy transformation within the designated timeframe while communicating carbon management goals to the supply chain, thereby improving the group's carbon management.

In recent years, Unimicron has also emphasized ESG efforts. PCB industry experts have noted that PCB manufacturing processes generate solid waste and high-concentration wastewater, posing significant environmental hazards. Therefore, Unimicron has implemented strict mechanisms for waste storage, transportation, and disposal, and there has been a

continuous reduction in emissions intensity per unit of revenue in wastewater treatment efficiency.

Additionally, Unimicron has been constructing hydrogen fuel cell power plants at its six major plants in Taiwan. It plans to invest NT$4.041 billion in hydrogen energy within five years, with an additional NT$3 billion to NT$4 billion in the second phase (2026-2030). It is estimated that the current share of electricity generation accounts for about 10% of total electricity consumption, which is expected to increase to 12-15% in the coming years. Unimicron chairman Tzyy-Jang Tseng previously mentioned a focus on process, equipment, energy conservation, waste reduction, replacing energy-intensive lighting and motors, reducing water and electricity usage, enhancing waste management, and gradually introducing green energy and energy storage facilities to improve in-house power quality and curb peak electricity demand.

As market demands continue to evolve, materials with high functionality, environmental friendliness, and recyclability have become development trends. Copper-clad laminate (CCL) manufacturer ITEQ successfully developed Resin Coated Copper (RCC) materials at the end of 2021.

The industry expects that Apple's mainboards in 2024 will transition to using RCC materials. This change is primarily because RCC does not use fibreglass cloth, which reduces production steps for PCB manufacturers and further lowers carbon emissions. It will be one of the highlights under the trends of energy efficiency, carbon reduction, and environmental sustainability.

Currently, major Taiwanese PCB manufacturers all adhere to the ESG concept, which comprises environmental protection, social responsibility, and corporate governance. They are developing in the direction of energy efficiency and power conservation in all aspects, including electricity usage, raw materials, and processes, to achieve high-value carbon reduction.

PCB capacity expansion investments in Thailand amount to THB43 billion (US$1.205 billion) and will create over 15,000 job opportunities - TPCA

The Taiwan Printed Circuit Association (TPCA) and the Thailand Trade and Economic Office (TTEO) recently jointly held the inaugural "Thai Student PCB Job Fair" aiming to help Taiwanese PCB makers address the urgent

need for Thai talent to serve at their newly expanded manufacturing facilities in Thailand.

The matchmaking event, held September 14 at TPCA's headquarters in Taoyuan City, northern Taiwan, saw not only the participation of Thai students from universities and colleges across Taiwan, but also the attendance of 13 PCB supply chain players, including Zhen Ding Technology, Unimicron Technology, Compeq Manufacturing, Wus Printed Circuit, Gold Circuit Electronics, Unitech, Topoint Technology, and Taliang Technology, among others.

The initiative is designed to connect the employment needs of Thai students in Taiwan with the PCB supply chain, helping them better understand the importance of the PCB industry in the global electronics and semiconductor production and fostering bilateral exchanges between Taiwan and Thailand.

Twekiat Janprajak, representative of TTEO, emphasized that talent is one of the key factors in attracting foreign investment, and that working at Taiwanese companies will also provide Thai students with opportunities for world-class training and technical learning. Accordingly, he continued, the collaboration between Thailand and Taiwan in establishing a talent platform is crucial for creating a resilient and sustainable supply chain.

TPCA's deputy secretary general Michelle Hung noted that Taiwan's PCB supply chain has been building new manufacturing bases in various Southeast Asian countries in response to customer requests for risk diversification. As Thailand is set to become the third industrial cluster for Taiwanese PCB makers, TPCA will continue to promote industry-academia collaboration and professional training programs in Thailand to strengthen the resilience of Taiwan's PCB industry within the global supply chain.

According to TPCA statistics, the ongoing round of PCB capacity expansion investments in Thailand amount to THB43 billion (US$1.205 billion) and will create over 15,000 job opportunities, involving upstream and downstream makers of CCL (copper clad laminates), FCCL (flexible CCL) and diverse PCB products.

Among them, FCCL maker Taiflex Scientific is scheduled to commercialize production of double-sided adhesive-free copper foil substrates at a new plant in Thailand in mid-2024, mainly to leverage the existing automotive production hub in the country and tap the business potential of the Southeast Asian automotive market.

CCL makers Taiwan Union Technology and Iteq have also confirmed their investments in Thailand, and major PCB suppliers including Unimicron,

Compeq, Dynamics Electronics and Wus have all disclosed plans to expand production lines there. In addition, veteran investors in Thailand such as Apex International, Chin Poon Industrial and APCB Group have all established their subsidiaries in the country.

Taiwan PCB Techvest (TPT) is constructing a new plant in Vietnam that will manufacture PCBs for primarily automotive and network device applications, and expects it to be fully operational and ready for production in 4Q23

Located in Hanoi, the new plant may incur additional operating costs in the third quarter, said TPT VP of IR Hsiu-Hsing Hu.

TPT disclosed earlier this year plans to invest a total of VND432.4 billion (US$17.7 million) in establishing a new plant in Vietnam in response to a shift in the global supply chain structure driven by worldwide geopolitical uncertainties.

According to TPT president Ming-Hsi Lee, customers' "China+1" strategy has prompted the PCB manufacturer to diversify its production bases. With the new plant in Vietnam, TPT will also explore new customer opportunities, Lee indicated.

TPT's new Hanoi plant is expected to begin trial production in the fourth quarter of this year, Lee said. The company broke ground on the new plant in the fourth quarter of 2022, with construction nearing completion. Equipment and facilities have been installed and are currently undergoing inspection.

In addition, TPT expects automotive products as a proportion of company revenue to grow this year. The product segment accounts for about 10% of TPT's total revenue, derived mainly from orders placed by Japanese and Korean customers.

International Diary

2023

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
Visit Schweizer Electronic AG
Schramberg/Villingen-Schwenningen, Germany
Tuesday 30 & Wednesday 31 January

EIPC Summer Conference
Tuesday 4 & Wednesday 5 June
Location TBC