The European Institute for the PCB Community

EIPC SPEeDNEWS

The Weekly On-Line Newsletter

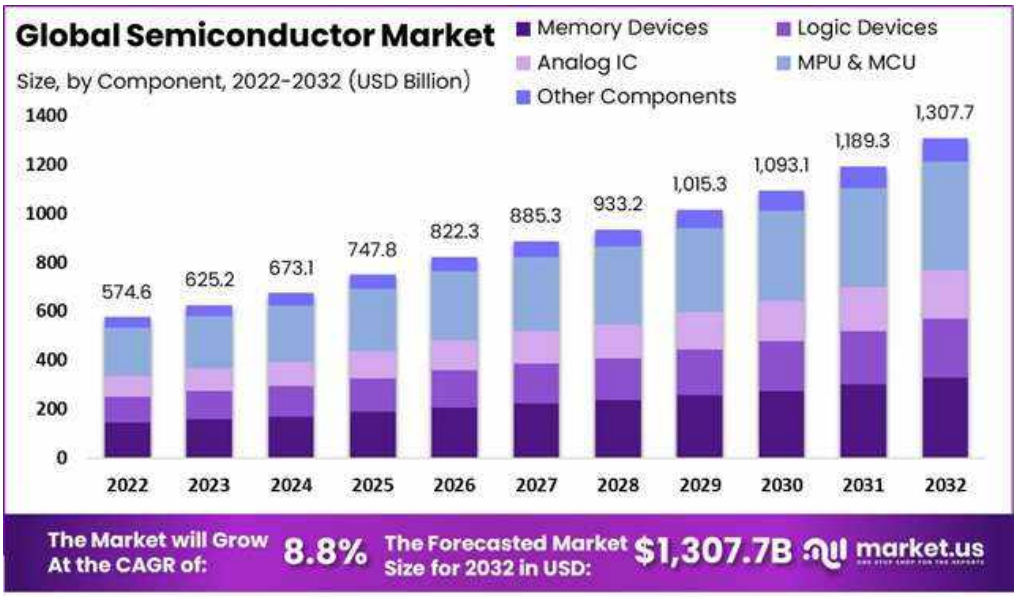
Issue 14 – June 2024

ARTIFICIAL INTELLIGENCE NEWS

AI enables sustainable future but presents environmental challenges

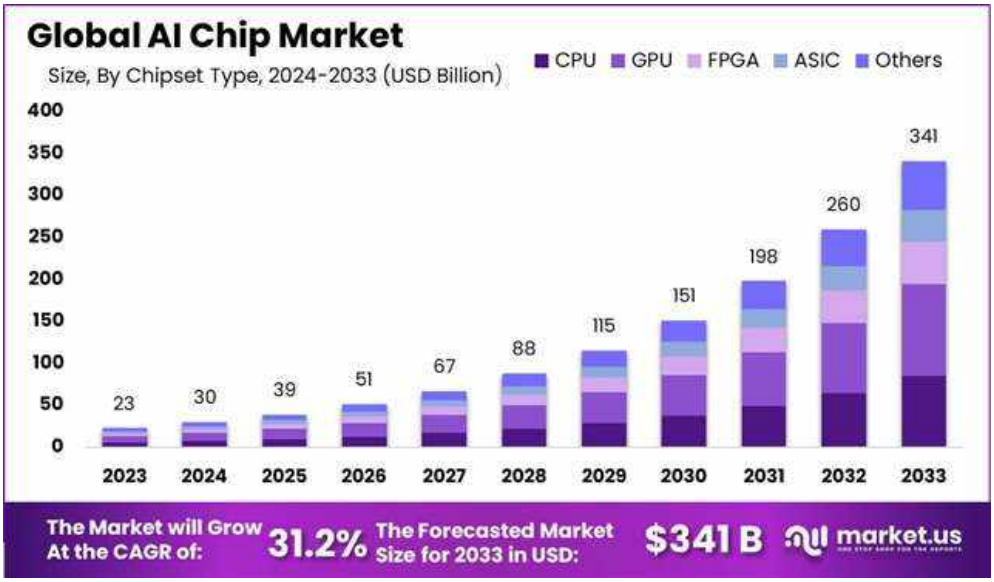
Vyra Wu, DIGITIMES Asia, Taipei, Tuesday 11 June 2024

Artificial Intelligence (AI) presents opportunities and challenges for accelerating a sustainable future, industry experts warn at the InnoVEX 2024. While AI can drive innovation and efficiency, its growing computational demands raise environmental concerns over energy, carbon emissions, and water usage.



The semiconductor industry, driving AI capabilities, is projected to grow from US$600 billion in 2023 to US$1 trillion by 2030, with AI chips surging from $20 billion to $150 billion in the same period. Raymond Chik, Board Chair at chip startup Untether AI, cited research predicting

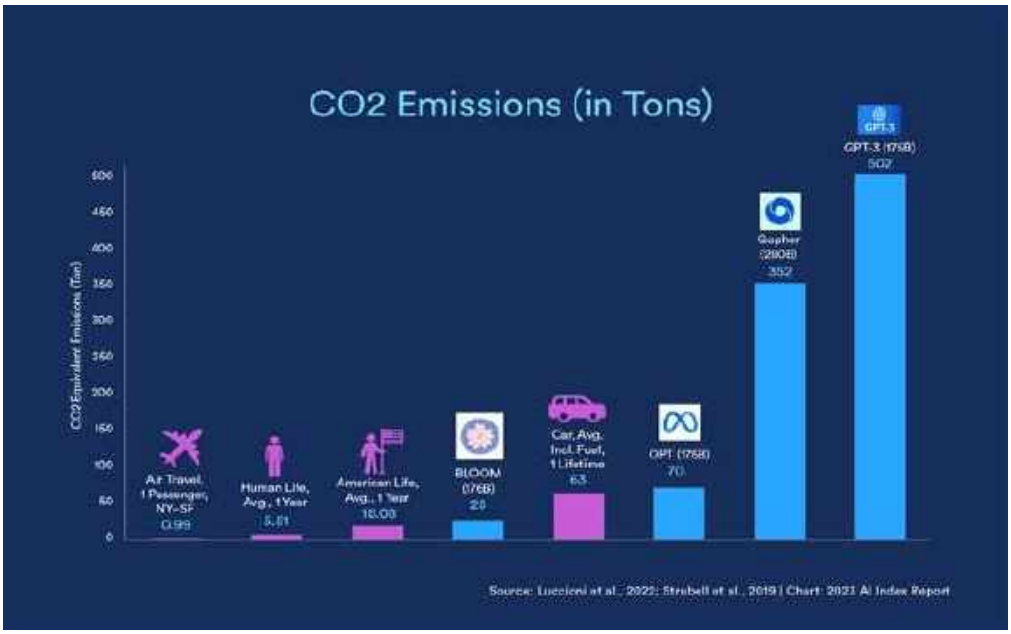
that 20% of the world's electricity could be used by AI computing within a decade.



Training large language models like GPT-3 requires 1,300 megawatt-hours of energy, equivalent to the monthly consumption of 1,500 US households. Even generating a single AI image can consume as much energy as a smartphone charge. "We need sustainable manufacturing processes and energy-aware AI computing infrastructure," Chik emphasized, advocating for AI-accelerated material discovery, optimized manufacturing, and energy-efficient chip architectures like Untether AI's memory-centric design.

Sengmeng Koo, Senior Deputy Director at AI Singapore, quantified the resource demands, stating that **training a large language model consumes enough energy to power** an average American home for 120 years. A single interaction with such a model uses 20 times more water than a Google search.

Koo further discussed the carbon emissions from AI model training, which contribute to 1-2% of global energy-related greenhouse gas emissions, equivalent to the entire aviation industry. He highlighted that AI model training can emit as much CO2 as five cars over their lifetimes. He also cautioned that the growing demand for hyperscale data centers could exacerbate water scarcity issues, particularly in regions already facing water shortages.



Niven Huang, Managing Director at KPMG Sustainability Consulting, emphasized the need for **a "paradigm shift" from a financial-driven to an ESG mindset in business operations.** "We are running out of time to work out the dilemma we are facing in environmental and social and economy," he warned, stressing the urgency for responsible resource use and climate action.

Huang believes AI can guide this transition by revealing facts, trends, and real solutions beyond mere compliance reporting. However, he cautioned that AI itself consumes significant energy, potentially increasing carbon emissions. "We still have a lot of concern," he said, questioning whether AI's benefits outweigh its environmental impact.

Sustainable Solutions on the Horizon

Despite these challenges, the speakers highlighted emerging opportunities. Huang believes transformative business models, new materials, energy sources, mobility solutions, and manufacturing processes enabled by AI and **advanced computing can drive sustainability**.

Chik highlighted prospects in renewable energy integration, water recycling processes, and designing energy-efficient data centers from the ground up. For technology providers, developing faster and more efficient products, algorithms, and chip architectures like memory-centric design could significantly reduce computing demands and operational costs.

Koo echoed similar opportunities, adding that AI Singapore has implemented sustainable practices such as specialized cooling, power management systems with a low Power Usage Effectiveness (PUE) of under 1.2, repurposing hardware, and dynamic resource allocation for efficient utilization. In addition, he cited Google's success in reducing energy consumption by 40% through machine learning algorithms.

As AI continues its exponential growth trajectory, pioneers across industries must confront its environmental paradox head-on. Balancing the technology's transformative potential with sustainable practices and responsible resource management will be crucial for securing a prosperous future for all.

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NEWS FROM BELGIUM

Ucamco announce that a global leader has implemented their groundbreaking Jayda software in its new web shop

This strategic collaboration represents a significant leap forward in redefining the landscape of online PCB procurement, leveraging Jayda's capabilities to streamline and revolutionize the industry.

What is Jayda?

Ucamco's Jayda is a highly responsive and ultra-fast data input and analysis sales tool designed to empower online web portals and quotation engines. Leveraging state-of-the-art technology, Jayda communicates seamlessly with web servers, extracting key PCB characteristics from visitor archives and safely storing them for accurate price calculation. Its progressive result gathering feature ensures a smooth user experience, eliminating endless back-and-forth communications with customers.

Jayda's best-in-class stack-up engine offers unsurpassed first-pass hit rates at record speed, empowering businesses to deliver timely and precise quotations, thus achieving a significantly higher quote-to-order conversion.

Huge benefits

Integrated into the web shop of this global leader, Jayda enhances the user experience by providing instant quotes. With over 25 years of experience in the electronic industry, our customer understands the importance of efficiency and quality in PCB procurement.

Jayda's automatic Gerber data extractor represents a significant improvement over previous systems, meeting customer demands and

simplifying the ordering process, getting users their quotes in less than 5 minutes.

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NEWS FROM JAPAN

MacDermid Alpha and Meiko Electronics Announce First Direct Metallization installation for Rigid PCBs in Japan

MacDermid Alpha Electronics Solutions is supporting Meiko Electronics on their first installation of the carbon-based direct metallization technology for rigid PCB applications in Japan.

The industry-first installation of direct metallization capabilities at Meiko's Tendo Factory, which was completed this month, highlights both Meiko's and MacDermid Alpha's commitment to the automotive, industrial, and electronics industries in Japan. The installation will utilize MacDermid Alpha's Blackhole® direct metallization chemistry, a trusted alternative to standard electroless copper processing. Blackhole provides reduced operating costs, greater efficiency, and substantial environmental benefits. The carbon-based technology delivers reliability and versatility while enabling users to reduce cycle time, decrease overall water consumption, eliminate the use of formaldehyde, and generate less waste than electroless copper plating.

MacDermid Alpha and Meiko have a long-standing partnership, working together to support and advance the PCB industry. Joe D'Ambrisi, Executive Vice President of MacDermid Alpha Electronics Solutions comments, "We are proud and excited to be part of this ground-breaking opportunity working with Meiko. This further advances our established long-term global relationship, which includes their factories in China and Vietnam."

"This new direct metallization capability at our flagship factory in Japan allows us to minimize our carbon footprint and provide our customers with a more sustainable circuit board", commented Atsushi Sakate,

Representative Director and Executive Vice President of Meiko Electronics Co.,

News from
WECC members

WECC
World Electronic Circuits Council

Issue 14 – June 2024

NEWS FROM THE TPCA

Printed circuit board industry is booming and with the accelerated evolution of AI applications, the demand for PCBs for servers continues to ferment

TPCA

AI blessing PCB concept continues to be strong! The industry is recovering and the HDI track is gaining momentum. Some listed companies claim that they are “taking orders on a daily basis.”

The printed circuit board industry is booming and with the accelerated evolution of AI applications, the demand for PCBs for servers continues to ferment. Among them, HDI, which has a high line distribution density and uses micro-buried blind via technology to achieve electrical interconnection between board layers, is popular. .

A reporter from Cailian News called Zhongjing Electronics, Shenghong Technology and other companies and learned that the PCB industry is gradually recovering, and HDI production capacity and orders are becoming full. Sources from relevant listed companies said, “We have already started picking orders.” There are currently many listed companies deploying AI-related products. Market analysts believe that AI server PCBs are fully evolving towards HDI, and AI is expected to drive substantial growth in HDI usage in the future.

The industry welcomes AI opportunities.

Multiple sources of information indicate that the impact of inventory depletion and accelerated growth in downstream application demand on the PCB industry seems to be beginning to emerge. Industry analysts point out that the PCB market will resume growth in 2024 and is expected to enter a new growth cycle.

Relevant people from Bomin Electronics told reporters that the overall situation of the PCB industry is getting better. So far it is indeed stronger than last year. Many sectors have rebounded, but the strength of the rebound varies. A staff member from the securities department of Hongchang Electronics, a copper-clad laminate manufacturer in the upstream of the industry chain, said that the overall shipment volume of copper-clad laminates has shown an improvement trend compared with last year.

From the perspective of application fields, driven by factors such as the iterative upgrade of traditional servers from PCIE4.0 to PCIE5.0 and the long-term increase in AI server shipments, AI may bring considerable incremental demand for PCBs. According to Prismark's forecast, server PCB output value is expected to reach US$12.5 billion in 2026, with a compound growth rate of 9.87% from 21 to 26 years.

Industry companies have benefited from the growth of this application market. Last year, under the unfavourable situation of generally declining market demand in the PCB industry, Guanghe Technology, whose server PCB products contributed nearly 70% of its revenue, will see double-digit year-on-year revenue and net profit growth in 2023.

Guanghe Technology said that the company currently has ample orders on hand, and its performance growth in 2024 will be driven by the restorative growth of the traditional server market, the optimization of order structure brought about by product iteration, and the growth in investment demand for computing infrastructure brought about by the application of AI technology.

Li Shu, an analyst at the Toubao Research Institute, told reporters from the Financial Associated Press that there are significant differences in the design and manufacturing of PCBs for servers and PCBs for consumer electronics. Server PCBs usually have high-level data, high reliability and stability, Features such as high-density interconnection and high-speed signal transmission.

Li Shu further said that the number of server PCB layers is usually more than 10 layers, and some high-end server boards may reach 20 layers or more to meet complex circuit design and signal transmission requirements. Because server PCBs need to remain stable under long-term high-load operation and need to support high-speed data transmission and high-density interconnection, they have higher requirements for material selection, manufacturing processes, and quality control, such as the use of

more advanced technologies such as HDI (high-density interconnection). density interconnects) and high-speed materials.

The HDI track is “out of the circle”.

Reporters from the Financial Associated Press learned from multiple interviews that under the AI opportunity, the demand for HDI in the PCB subcategory is increasing.

According to market news, NVIDIA GB200 servers will be officially launched in the second half of the year. The AI ??server PCB is mainly added to the GPU board set. At the same time, the AI server has higher transmission rate requirements and requires the use of 20-30 layer HDI boards, and in Ultra-low loss materials will be used in material selection, and their value will be further increased.

“The application of HDI technology in PCB is indeed increasing, especially in the fields of high-performance computing and AI servers.” Li Shu said that HDI PCB has higher wiring density, smaller apertures and more complex circuit design capabilities. Able to achieve higher performance in a limited space, the evolution of AI server PCB to HDI technology is in line with market and technology development trends.

Looking forward, Founder Securities predicts that in the context of the increase in integration and complexity of terminal products represented by AI servers, as well as the continuous upgrade of performance indicators such as transmission rates, demand for HDI products is expected to continue due to their advantages such as heat dissipation and high transmission rates. increase. Prismark research shows that the HDI PCB market size is expected to reach US$14.58 billion in 2027, with a compound annual growth rate of 6.2% from 2023 to 2028, higher than the industry average growth rate of 5.4%.

In fact, HDI is already gaining popularity. Zhongjing Electronics revealed that “the company’s HDI orders are currently relatively full.” Sources from the company’s securities department said that overall the market is recovering moderately this year, and applications in new fields such as AI servers will also drive demand for circuit board products. The company’s products are gradually moving in the high-end direction. HDI mainly focuses on products of level three and above, and can technically reach any level.

Bomin Electronics stated that the company has AI-related products. Kexiang Co., Ltd. said that the company has always been engaged in HDI-related sectors, and the application fields need to be customized according to customer needs. Guanghe Technology said that its Guangzhou factory currently has supporting HDI production lines for data center products.

A staff member of the Securities Department of Shenghong Technology told a reporter from the Financial Associated Press who called as an investor that since the third and fourth quarters of last year, there has been some recovery in the downstream and it is now better than before. We have begun to pick orders to do it. HDI production capacity is relatively full, and has been for more than half a year. In addition to consumer demand, AI computing power-related demand also takes up a lot of the company's overall HDI production capacity.

According to an institutional survey conducted by Suntec Technology in May, the company's order volume in the server industry has grown rapidly. The Whitley platform has been shipped in batches and is currently cooperating with customers on small batch trial production of the new generation Eagle Stream platform and other AI server PCB products. As Zhuhai Chongda Factory II will be put into production in 2024Q2, the new high-multilayer board production capacity will be applied to the communications and server fields.

The broad market prospects also continue to attract PCB manufacturers to increase investment and research and development in HDI technology to meet future needs in the AI field. For example, Jingwang Electronics is building an HDI printed circuit board project with an annual output of 600,000 square meters; according to media reports, the major optoelectronic panel manufacturer Zhichao will focus on AI PC, with capital expenditures of NT$2 billion in 2024 to invest in HDI board production expansion.

Elephantech seeks strategic partners for sustainable PCB manufacturing in response to surging demand

Elephantech Inc., the first company in the world to successfully manufacture Printed Circuit Boards (PCBs) using metal inkjet printing, is seeking strategic partners to scale up manufacturing in light of rising demand.

Masaaki Sugimoto, Co-founder and Board Director of Elephantech, joined the InnoVex Startup Exhibition in Taipei at the invitation of Epoch Foundation during Computex 2024, told DIGITIMES Asia that the company is seeing significant growth in demand, thanks to the decarbonisation trend that attracts new customers.

“We are looking for strategic partners who can help us build a stable supply chain together,” said Sugimoto. He explained that since the metal inkjet PCB is a very new process, Elephantech needs to collaborate tightly with other more experienced supply chain partners because it is difficult for itself to expand its capacity.

Elephantech has signed an MOU with Liteon Technologies to introduce its additive manufacturing technology and collaborate in producing flexible PCBs. Its investors include Epson, Mitsui Chemical, Sumitomo, etc. Those strategic investors have been very helpful in building up Elephantech’s prototypes, proof-of-concept, and eventually manufacturing facilities and supply chain management system.

The traditional way of manufacturing PCBs is prone to produce massive toxic pollution and is wasteful of water and materials due to the etching process. Elephantech’s mission - “Make the world sustainable with new manufacturing technologies” - finally has started to resonate with customers’ ESG goals.

Decarbonization, being environmentally friendly, and addressing climate change are crucial topics nowadays, and that has increased customer interest in Elephantech’s technology. Sugimoto emphasized, “It’s not just about cost; it’s about making substantial changes. Setting clear goals, like aiming for a temperature increase target of 1.5 degrees instead of 2.0 degrees, as agreed upon at events like COP 26 in Glasgow, shows how even a 0.5-degree difference can have a significant impact.”

This urgent need for change means clients are under pressure to act quickly. Larger companies, due to their size and influence, carry a significant responsibility in this context. “We are currently at a point where challenges intersect with opportunities thanks to the heightened environmental awareness worldwide,” said Sugimoto.

Environmental awareness has been around for a long time, and people are aware of the harmful effects of toxic substances. “However, the crucial aspect now is the timing,” said Sugimoto.

Understanding why action needs to be taken promptly is fundamental. Engaging in science-based discussions is invaluable as it leads to impactful outcomes.

These outcomes are influencing different sectors, including the electronics industry and its suppliers. It's not just about technological advancements but also understanding and meeting end users' needs and preferences.

Sugitomo said there has been a noticeable shift in customer demands and attitudes toward decarbonization technologies. Decarbonising isn't a concern of board members or company owners only.

Students are also recognizing its value for businesses. This shift has turned decarbonization into a marketing strategy, as consumers prefer eco-friendly products and are conscious of environmental impact.

This change in consumer preferences has prompted marketing teams to collaborate with design teams to create products using sustainable technologies. Procurement teams are now faced with decisions that align with these values, emphasizing the importance of embracing this transformative change.

Elephantech's P-Flex PCB was certified to UL94 V-0, a US safety standard, in 2021. Its R&D center was established in Shin-Kiba, Koto District of Tokyo.

Sugimoto is confident that Elephantech's eco-friendly PCBs can be produced in countries with the most rigorous environmental protection regulations. The on-shoring demand for the electronic supply chain is creating windows of opportunity for its market expansion to the US and even Europe, said Sugimoto, who emphasized that the company is ready to go where the customer demand is. The company has successfully raised Series E financing (JPY3 billion) to accelerate global expansion in March 2024.

NEWS FROM THE IPC

Sharp Decline in European Electronics Manufacturing Jeopardizes Strategic EU Priorities - IPC

Key segments of EU electronics manufacturing industry set to decline undermining Europe's security, industrial resiliency, and global competitiveness

A new report by IPC reveals Europe's growing dependency on other regions for electronics manufacturing in critical and strategic sectors including aerospace and defence. Despite the adoption of the European Chips Act, the Securing EU's Electronics Ecosystem report finds the EU's market share in critical electronics components beyond chips, including printed circuit boards (PCBs), electronic manufacturing services (EMS) and advanced packaging, will decline to 15 percent by 2035.

The PCB industry segment has faced significant erosion over the last two decades. Revitalizing and growing electronics manufacturing - beyond chips - is essential to building a secure and robust European electronics ecosystem. A "silicon to systems" approach is necessary to support ongoing EU technological leadership and meet strategic goals.

"An innovative and resilient European electronics manufacturing industry is vital to ensuring the region's access to defence and aerospace systems, medical technologies, and communications infrastructure. The growing strategic dependencies highlighted in the report are alarming as they undermine Europe's ability to achieve key strategic priorities from a strengthening of the defence

industrial base to the green and digital transitions," says Sanjay Huprikar, president of Europe and South Asia Operations, IPC.

The report assesses how reliant Europe is on non-EU manufacturing across eight strategic sectors including aerospace/defence, automation, mobility, healthcare, and renewable energy.

Highlights of the report include:

Across the key sectors, EU electronics production is expected to lag behind global trends and decline from 16.5% global market share today to 15% by 2035.

Those numbers become starker when looking at subsectors of the European electronics manufacturing industry, such as PCB production (1.7% global market share by 2035), advanced packaging (1.4%) and IC substrate production (0.7%) respectively.

Europe's share of electronics manufacturing has fallen significantly in the last two decades despite demand for electronics soaring.

Global PCB production has more than doubled since 2000 with European demand today at an estimated EUR 7.87 billion.

Despite soaring demand for PCBs, European PCB production is projected to satisfy only 11 percent of European demand for PCBs (down from 17.5% today).

The study findings echo growing calls for strategic investments and comprehensive policies to enhance the EU's competitiveness including the 17 and 18 April European Council conclusions stating that Europe "needs to reduce its strategic dependencies in sensitive sectors- energy, critical raw materials, semi-conductors, health, digital, food and critical technologies - and in other sectors such as chemicals, biotechnology and space."

In response to the study, the European electronics manufacturing industry calls for an "Electronics Manufacturing Strategy" under the 2024-2029 European Commission mandate to help the EU better withstand global disruptions and maintain a competitive edge. An industry "Call-to-Action" shared today includes support from leading European electronics manufacturers and Trade Associations raising awareness for this situation.

"Any new industrial policy supporting competitiveness needs to embrace electronics manufacturing as a key enabler for innovation and resiliency in strategically important sectors, like aerospace and defence. A dedicated strategy, including EU targets for electronics manufacturing, will help Europe compete with global competitors" said Alison James, IPC senior director, European government relations.

IPC is hosting a meeting today with representatives of the European Commission and industry experts to review the study and call-to-action. This event will provide a forum for discussion of the situation and the need for a more ambitious and focused strategy to revitalize European manufacturing. View full Securing Europe's Electronics Ecosystem <https://emails.ipc.org/links/IPC-Securing-Europe-Electronics-Ecosystem.pdf> report.

View Call-to-Action for a European Silicon to Systems Electronics Manufacturing Strategy <https://emails.ipc.org/links/CalltoActionElectronicsManufacturing.pdf> on behalf of industry members and associations.

International Diary

2024

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Registrations via www.eipc.org
September

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20 & 21 September
Ulm, Germany

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Registrations via www.eipc.org
October

EIPC @ Electronica
12-15 November
Munich, Germany