

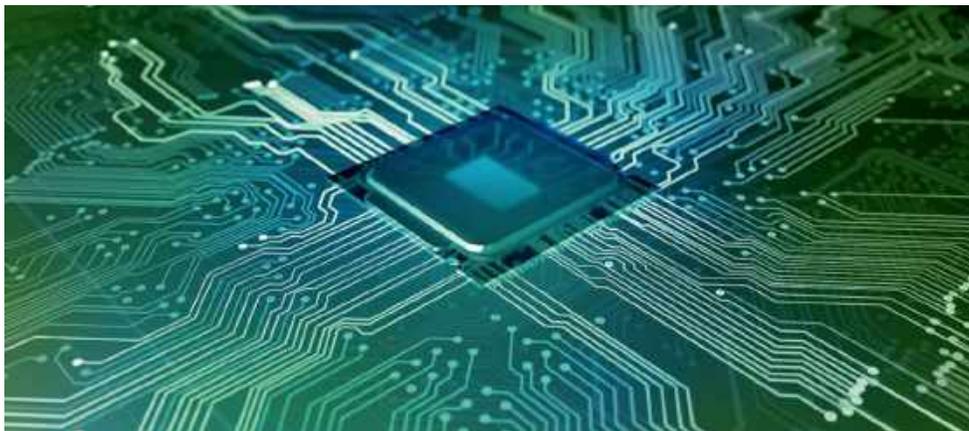


The European Institute for the PCB Community

EIPC SPEeDNEWS

The Weekly On-Line Newsletter
Issue 25 - September 2022

NEWS FROM ELECTRONICA



After a nearly four-year interruption, the wait will finally come to an end in November: electronica will open its doors once again. We are really looking forward to welcoming our visitors live and in person following the pandemic-imposed break.

Climate change, the energy transition and the raw materials crisis: As the technology driving the energy transition, electronics are more important than ever before. Our news in the industry portal give insights in material shortage, building automation and empty desks. Learn more in the latest articles.

From November 15 to 18, electronica 2022 will showcase the technologies of the future in its typically exciting and fascinating way. Gain inspiration from the absorbing supporting program and look forward to hearing discussions by experts.

Electronics industry: Material shortage well into next year

The material crisis still has a firm grasp on German industry. The electronics and automotive industries in particular are complaining about the scarcity of resources and supply bottlenecks. And there's no end in sight.

The procurement of raw materials and preliminary products is still a big problem. While the [ifo Institute](#) is reporting that the situation is easing slightly in August, this is by no means an all-clear. The key sectors of the German economy such as mechanical engineering (85.7 percent) or the electronics industry (80 percent) in particular are reporting on the persistence of the material crisis. And not a single sector expects an end to the supply problems this year.

Semiconductors, components or integrated circuits

Electronic components in particular are in short supply, but so too are steel and aluminium in various forms.

According to a study by Katek SE, half of the companies surveyed primarily complained about bottlenecks in chips and semiconductors. Nearly a third of organizations is struggling with a shortage of integrated circuits. And 22 percent indicated that there is a shortage of production materials such as soldering metal as well as capacitive and inductive components.

What exactly is missing varies from industry to industry. The automotive industry, for example, is affected by a lack of chips and semiconductors. One in four companies also has insufficient stocks of cable harnesses and plastic. Mechanical engineering and industrial engineering are primarily lacking in semiconductors, followed by chips and integrated circuits. And in the telecommunications industry, chips are right at the top of the list, followed closely by semiconductors and integrated circuits. In the area of renewable energy and the environment, semiconductors and integrated circuits top the list of shortages for 55 percent of the organizations surveyed.

Losses in revenue are inevitable

The material crisis is leading to losses in revenue between 10 and 19 percent for a third of companies. A fifth predict a decrease between 20 and 29 percent. In the telecommunications industry, 38 percent state that they will either lose no revenue, or no more than 9 percent. Meanwhile a third of companies from the automotive industry surveyed fear that sales will decrease 10-19 percent or 20-29 percent due to a lack of parts.

Lockdowns and limited container shipping

The main reason for the procurement crisis in the electronics industry is the lack of supplies from East Asia. Two thirds of all chips come from there. Currently, however, lockdowns and the challenging situation in maritime traffic caused by the pandemic are leading to unstable supply chains to Europe.

The [Kiel Trade Indicator](#) shows that bottlenecks and traffic jams in container shipping are intensifying. At present, around 11 percent of all shipped goods are stuck. In the North Sea, for example, significantly more than two percent of the world's freight capacity is at a standstill and can be neither loaded nor unloaded. In the German bay alone, 19 container ships are waiting for their goods to be unloaded.

Queues are also growing in front of the US states of South Carolina and Georgia with the important container port of Savannah. In contrast, there is a cyclical reduction in traffic jams in front of China's ports. In the Red Sea, one of the most important maritime trade routes between Europe and Asia, however, 16 percent fewer goods are being shipped compared to normal conditions.

In maritime trade from Asia to Northern Europe and to the west coast of North America, cargo rates have fallen from over USD 14,000 per container to around USD 4,000 and USD 8,000 respectively since the beginning of the year. However, the traffic jams are preventing a return to the pre-pandemic level.



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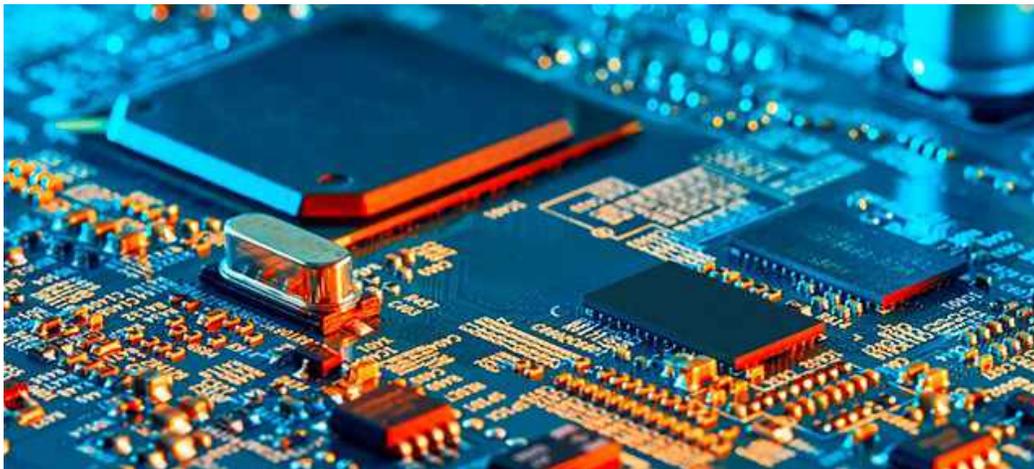
ELECTRONICS INDUSTRY NEWS

The Impact Of IoT In PCB Design And Manufacturing

Posted by [IoT.Business.News](#)

Date: September 21, 2022

in: [Digital Transformation & Marketing](#)



It's already a cliché, but technology is rapidly improving. And for many businesses, it's hard to catch up. However, it's not just the average Joe that's having difficulty keeping up with the massive introductions of new technology on the market. The manufacturers of these devices must be on their toes to ensure that they can accommodate, design, and manufacture the printed circuit devices (PCBs) that new technologies demand.

One technology pushing these manufacturers and designs to the limits is the Internet of Things (IoT). Many companies and enterprises have slowly incorporated IoT-enabled devices and appliances into their businesses, even if 53% of them find it challenging. And because of this massive driving force, the production of smart IoT devices on the market has increased significantly.

It's interesting to know IoT's effects on PCB manufacturing.

Understanding IoT

The internet of things (IoT) is a technological movement aiming to connect and network devices, appliances and possibly any object in order to optimize operations, processes,

maintenance or to offer new features or services. It is crucial to companies like [Nortech Systems](#) as they mainly manufacture complex high-tech devices. These devices often embed a wireless connectivity solution and they operate in many different industries. The built-in connectivity allows IoT-enabled devices to communicate with each other, and this results in the possibility for manufacturers to develop and offer new features, functionalities and services.

IoT has been progressively penetrating the business, industrial and consumer spaces. You may even already experience it on a daily basis if you work in a smart building or in a [smart office](#). You may also have a smart home solution in your house and therefore you've already seen how IoT works. Connected objects and equipments, and their associated services, offer businesses and consumers more comfort, security and efficiency in their everyday activities.

IoT in relation to PCB design and manufacturing

So how does IoT affect PCB design and manufacturing? IoT influences PCB design because it needs wireless communication capabilities to be embedded into the myriad of smart objects coming to the market. And adding RF technology components to a product imposes strict design rules on the whole system, including the Printed Circuit Board. It also requires specific test and validation processes at the end of the manufacturing process.

Whether it is for an industrial sensor, a wearable device or a location tracker, adding one or several chips dedicated to wireless connectivity challenges the product design team in several ways:

- **Integration:** more components to be fitted into a (generally) compact form factor
- **RF design:** designing a product with embedded RF communication requires to follow very stringent design rules to maximize the radio performance, avoid interferences (with other components or systems) and satisfy any applicable regulation or standard in terms of RF pollution, power transmission, ect...

This impacts the [PCB routing](#) as well:

A first aspect to take into consideration during RF signal routing concerns the impedance matching. A circuit without impedance matching, in fact, generates not only significant power losses, but also dangerous signal reflections along the PCB traces. Since most systems and RF modules have an impedance of 50 Ω , it is preferable that the traces of an RF PCB have the same characteristic impedance. The two types of traces commonly used on PCBs are microstrips, where traces are placed on the outer layers of the PCB (usually above a ground plane) and striplines, where each trace is sandwiched between two ground planes.

Another important factor that affects routing is the choice of the stack-up, that is the number and type of layers that make up the printed circuit. RF PCBs are normally composed of 2 or 4 layers, but in some cases, they can reach 8 layers. A 4-layer PCB greatly facilitates routing, with more space available for components and the ability to create both ground and power planes.

The PCB designer has also to make sure that RF signals are properly isolated, avoiding unwanted coupling with other signals. The common practice is to use a solid (uninterrupted) ground plane, placed immediately below the upper layer where components and transmission lines are placed.

On top of PCB routing, the design team must take special care of the shielding to avoid any interference between the RF circuitry and the baseband section.

Then, special requirements apply to the PCB and complete product assembly processes, without forgetting the testing processes which most likely will require RF testers on the line.

Conclusion

So, what's the impact of IoT on PCB manufacturing and designing? Since most [internet of things](#) circuit boards are often loaded with modules, sensors, and other integrated circuits, it pushes PCB designers and manufacturers to create more compact designs. Manufacturers turning their products into IoT devices are generally not willing to sacrifice the form factor of their devices.

Moreover, because of the wireless/RF nature of IoT devices, IoT imposes strict PCB design and manufacturing rules to the engineering team. And with a wider perspective, we can say that IoT pushes PCB designing technology and practices to innovation to ensure all IoT products reaching the market work at their best in a crowded RF environment.

Ford reveals the harsh lessons learned from the semiconductor crisis

A top Ford executive has conceded the auto industry pushed tech companies too far when negotiating on price. Now car manufacturers are spending billions of dollars to reduce their reliance on the world's biggest computer-chip suppliers.

[Joshua Dowling](#)



The chief financial officer of US car giant [Ford](#) has conceded the auto industry pushed semiconductor suppliers too far when negotiating on price – a move which led to chronic shortages of the hi-tech parts and crippled vehicle production around the world.

At the start of the COVID-19 pandemic two years ago, most major car companies cancelled forward orders of the critical computer components – which power everything from wiper motors to infotainment systems and safety tech – because they feared a chronic downturn in new motor vehicle sales.

However, demand for new motor vehicles globally recovered faster than expected.

When automotive companies tried to revert to their original semiconductor orders, tech companies had already filled their production allocation slots to other industries that paid more for computer chips.

The car industry found itself at the back of the queue – at a time when the number of semiconductors in new cars was increasing due to the technology and safety systems being rolled out.

Now one of the most senior executives within Ford globally, John Lawler, the chief financial officer for the firm, has given a glimpse into how it all went wrong for the car industry when it came to the semiconductor crisis.

"I think our industry and many industries got to the point where they were chasing the last few pennies (when negotiating on parts prices), and from a risk profile that might not have been the best move," Mr Lawler told media in the lead-up to the 2022 Detroit motor show.

"One thing we're learning about the whole semiconductor crisis that's happening globally is that the traditional low (profit) margin auto industry took just-in-time (manufacturing), and ... the lowest cost as the number one priority.

"That's not what happens in the tech industry, right? They're looking at making sure they have diffused risks, and they've got guaranteed supply, and they've gone way down into the supply chain to secure their computer chips."

Mr Lawler said car companies need to follow the tech industry's lead. "We're going to have to follow that as well. Because these products we're creating are hi-tech products, especially when they're fully networked, and they've got (electric) propulsion.



"We've got to control our destiny ... when it comes to those critical components all the way down through the supply chain." Mr Lawler said Ford is in the middle of reassessing its "global footprint" of suppliers of critical components. "We need to think about our global footprint, where our manufacturing is, where the supply base is, for each of our manufacturing centres, and making sure we have an optimal footprint globally," said Mr Lawler.

The US Government recently announced a semiconductor rescue package and an expedited rollout of hi-tech manufacturing facilities to support domestic technology and automotive sectors.

"You'll see more manufacturing of (semiconductors) within the United States. And I think other countries will also see more (semiconductor) manufacturing on their shores as well, because currently about 80 per cent of (the global supply of semiconductors) comes out of two markets. From a risk profile, that's not sustainable."



When asked if the rapid roll-out of electric cars accelerated the shortage of semiconductors, Ford's global parts supply expert, Lisa Drake, vice president of electric vehicle industrialisation, told a group of international media:

"I don't think so. The semiconductor shortage didn't discriminate. You have wiper motors on vehicles that are a couple of years

old that had to have a chip in it. It didn't discriminate between (electric cars and petrol vehicles). It was just that convergence of what happened with COVID, and the consumer electronic industry that boomed."

Ms Drake said Ford is well-progressed in future-proofing the sources of hi-tech components by establishing agreements with raw material suppliers, in addition to technology suppliers. "When it comes to (electric vehicle) components in particular ... we're got those all mapped out," said Ms Drake. "For the next generation (of electric cars) we will control some of that sourcing directly. We got into the battery raw materials space ... because you want to be able to control that very valuable material (by the time it gets to) the end of the supply chain. Once you have it, you control your own destiny."



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SEMICONDUCTOR INDUSTRY NEWS

Proceedings Now Available

Future Horizons' Mid-Term Semiconductor Industry Outlook

Find out why we were the only analyst back in January 2021 to correctly forecast 2021's shortages and double-digit growth and the current 2022-23 market downturn

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News from the UK

3RD INTERNATIONAL CONFERENCE ON PHOTONICS AND OPTO PACKAGING (POP3) - 17-18 OCTOBER 2022 AT SOUTH DEVON COLLEGE, PAIGNTON
LINKING OPTOELECTRONICS DESIGNERS AND MANUFACTURERS

The pOp3 Conference covers a wide range of topics in a single day, including:

- Applications: LIDAR, Quantum Computing, Communication, Intelligent Sensing, Underwater and Space
- Materials and Processes: Getters, adhesives, pluggable interconnects
- Net Zero and Sustainable Manufacturing

Take the opportunity to meet the following Exhibitors to discuss your needs: Alter Technology, Bay Photonics, Carl Zeiss, Inseto and Rydon Technology.
The event is sponsored by Lumentum and Palomar Technologies and is supported by THTC, SDC, the EPIC Centre and the EPIC organisation.

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NEWS FROM THE USA

A new cold war i brewing, fuelled by technology

Despite President Biden’s assurances at Wednesday’s United Nations meeting that the US is not seeking a new cold war, one is brewing between the world’s autocracies and democracies—and technology is fuelling it.

Late last week, Iran, Turkey, Myanmar, and a handful of other countries took steps toward becoming full members of the Shanghai Cooperation Organization (SCO), an economic and political alliance led by the authoritarian-regimes of China and Russia.

The group, formed in 2001, has quickly become one of the most important forces in global politics and has indicated that technology is a big part of its strategic future. Although much of the SCO’s focus is on regional development, such as railways and trade agreements, it has been a key player in the proliferation of technologies designed for social control, which foreign policy experts call “digital authoritarianism.”

Following China’s lead, research shows that the majority of SCO member countries, as well as other authoritarian states, are quickly trending toward more digital rights abuses by increasing the mass digital surveillance of citizens, censorship, and controls on individual expression.

Democracies use massive amounts of surveillance technology as well, of course. The United States is one of the most surveilled countries in the world, and it buys much of that tech from China. Yet it’s the technology trade relationships between authoritarian countries everywhere—SCO members, as well as its allies—that are rapidly growing deeper, and such states have begun to adopt similar playbooks for digitally enabled social control.

What do we mean when we say “digital authoritarianism”?

Four years ago, Freedom House, a non-profit research and advocacy group for global democracy, focused on “the rise of digital authoritarianism” when it published its annual report on the state of freedom and the internet in 2018. “Digital

authoritarianism is being promoted as a way for governments to control their citizens through technology, inverting the concept of the internet as an engine of human liberation.” Since then, this has been a common way for Washington to frame the US-China power competition in the tech realm.

There is a strong correlation between governance systems and the state of digital rights, with authoritarian regimes more likely than democratic regimes to use tech as another domain for social control.

This huge Chinese company is selling video surveillance systems to Iran

A new report sheds light on a shadowy industry where authoritarian states enthusiastically export surveillance technologies to repressive regimes around the world.

Freedom House researchers have worked to quantify this phenomenon in its annual reports, scoring countries on a variety of factors—including privacy protections, censorship, and obstacles to internet access. Globally, scores have been on the decline for 11 consecutive years, meaning the world is generally trending away from an internet that protects the digital rights of users. None of the non-democratic countries were determined by Freedom House to have a “free” internet, whereas all the democratic countries were deemed either “free” or “partially free.”

All of the SCO’s eight current members—China, Russia, Tajikistan, Uzbekistan, Kazakhstan, Kyrgyzstan, India, and Pakistan—consistently score poorly. Their scores declined an average of 10 points over the past decade.

China was ranked at the bottom of Freedom House’s report card last year, as it has been every year since 2014.

And while it's not yet a full member of the SCO, Iran scored second to last. It’s no coincidence that its economic relationship with China has been heating up in recent years, and Iran has been one of many enthusiastic consumers of the superpower’s digital technology.

Electoral democracies

Internet freedom

The Chinese model

Experts in the West disagree on whether China really is strategically “exporting authoritarianism” or whether US propagandists and other observers have demonized Chinese tech supremacy while ignoring their own soaring demand for surveillance tech. We’ve previously written about how a Justice Department initiative intended to suss out Chinese spies unravelled into a big mess. Other research points to a strong demand for Chinese surveillance tech in countries with high levels of crime, regardless of whether they are democracies or not.

But it is a largely accepted fact that the Chinese state—through the SCO and the Belt Road Initiative (BRI), its major foreign policy enterprise that offers infrastructure development in over 140 countries—and state-affiliated companies have provided other countries with security and surveillance technology, in addition to infrastructure like roads and 5G networks.

China's influence on digital authoritarianism is hard to overstate. Its public and private social credit programs, first announced in 2014, collect and aggregate data about people's purchases, traffic violations, and social activities. And Chinese cities are the most heavily surveilled in the world, with more CCTV cameras per square mile than anywhere else. Those cameras are often equipped with sophisticated facial recognition and visual computing analytics, making the surveillance easier for the Communist Party to act on.

Closed-circuit television (CCTV) cameras per square mile

And other countries are following its lead.

The SCO's biggest projects are usually led and funded by China; they include the trans-Afghan railroad that connects Uzbekistan to Pakistan, a digital trade platform in Chongqing, and joint military exercises. But it has also boosted initiatives like the Thousand Cities Strategic Algorithms program, which encourages central governments to use mass amounts of data to inform their decisions.

Between January and August of this year, Chinese trade with SCO countries increased by 26% over the same period last year. Chinese exports of electronic components, including data processing technologies, drove a large portion of that volume.

The SCO's members, along with a dozen other states with various levels of attachment to the group, met just last week, and more countries showed eagerness to formally join the group. Notably, Turkey wants to become the first NATO country to fully join the SCO.

Beyond the SCO, Venezuela's autocratic regime announced in 2017 a smart identification card for its citizens that aggregated employment, voting, and medical information with the help of the Chinese telecom company ZTE. And Huawei, another Chinese telecom corporation, boasts a global network of 700 localities with its smart city technology, according to the company's 2021 annual report. This is up from 2015, when the company had about 150 international contracts in cities.

Chinese surveillance platforms used for policing and public security

Democracies are implicated in digital authoritarianism, too. The US has a formidable surveillance system built on a foundation of Chinese tech; a recent study by the industry research group Top10VPN showed over 700,000 US camera networks run by the Chinese companies Hikvision and Dahua.

US companies also prop up much of the digital authoritarianism industry and are key players in complex supply chains, which make isolation and accountability difficult. Intel, for example, powers servers for Tiandy, a Chinese company known for developing “smart interrogation chairs” reportedly used in torture.

Networks of Hikvision and Dahua cameras outside China Beyond the code

Digital authoritarianism goes beyond software and hardware. More broadly, it’s about how the state can use technology to increase its control over its citizens.

Internet blackouts caused by state actors, for instance, have been increasing every year for the past decade. The ability of a state to shut off the internet is tied to the extent of its ownership over internet infrastructure, a hallmark of authoritarian regimes like China and Russia. And as the internet becomes more essential to all parts of life, the power of blackouts to destabilize and harm people increases.

Early this year, as anti-government protests rocked Kazakhstan, an SCO member, the state shut down the internet almost entirely for five days. During this time, Russian troops descended on major cities to quell the dissent. The blackout cost the country more than \$400 million and cut off essential services.

Other tactics include models for using data fusion and artificial intelligence to act on surveillance data. During last year’s SCO summit, Chinese representatives hosted a panel on the Thousand Cities Strategic Algorithms, which instructed the audience on how to develop a “national data brain” that integrates various forms of financial data and uses artificial intelligence to analyze and make sense of it. According to the SCO website, 50 countries are “conducting talks” with the Thousand Cities Strategic Algorithms initiative.

Relatedly, the use of facial recognition technology is spreading globally, and investment in advanced visual computing technologies that help make sense of camera footage has also grown, particularly in Russia.

Internet blackouts in 2021 “A closer SCO community”

In his speech at the SCO summit last week, Chinese president Xi Jinping went so far as to acknowledge the global cold war mentality and the increasingly protectionist attitude toward trade. Xi urged that cooperative agreements “in such areas as trade and investment, infrastructure building, protecting supply chains, scientific and technological innovation, and artificial intelligence” be “adopted within the framework of the summit.”

His solution? Bring more nations into the Chinese orbit. While he espoused the values of peace and multilateralism, he called for “a closer SCO community with a shared future.”

That future is already beginning to take shape. At this year's meeting, China formally announced a new educational program, the China-SCO Institute of Economic and Trade at Qingdao University, which began in January and will train students in SCO and BRI states on topics like economic development and digital trade. (This builds on previous training China has conducted on digital media management with BRI countries.)

As countries with questionable human rights records—like Iran, Turkey, Belarus, and Myanmar—move to more closely integrate their economies with the China- and Russia-led SCO, digital authoritarianism is ripe for far greater expansion and far-reaching harm. And there will be little to halt the continued growth of this thorny and increasingly global web.

by Tate Ryan-Mosley, MIT.



Issue 25 - September 2022

NEWS FROM THE IPC

North American PCB Industry Sales Up 15.1 Percent in August

IPC releases PCB industry results for August 2022

IPC have announced their August 2022 findings from its North American Printed Circuit Board (PCB) Statistical Program. The book-to-bill ratio stands at 0.98.

Total North American PCB shipments in August 2022 were up 15.1 percent compared to the same month last year. Compared to the preceding month, August shipments rose 7.5 percent.

PCB year-to-date bookings in August were down 7.7 percent compared to last year. Bookings in August increased 12.7 percent from the previous month.

“The PCB sector's book-to-bill ratio remains unchanged this month, but the underlying data suggests some marginal improvements,” said Shawn DuBravac, IPC’s chief economist. “Shipment strength improved notably this month, consistent with easing supply chain constraints. Order flow was less negative this month, suggesting a small uptick in demand compared to earlier this year.”

Detailed Data Available

Companies that participate in IPC's North American PCB Statistical Program have access to detailed findings on rigid PCB and flexible circuit sales and orders, including separate rigid and flex book-to-bill ratios, growth trends by product types and company size tiers, demand for prototypes, sales growth to military and medical markets, and other timely data.

Interpreting the Data

The book-to-bill ratios are calculated by dividing the value of orders booked over the past three months by the value of sales billed during the same period from companies in IPC's survey sample. A ratio of more than 1.00 suggests that current demand is ahead of supply, which is a positive indicator for sales growth over the next three to twelve months. A ratio of less than 1.00 indicates the reverse.

Year-on-year and year-to-date growth rates provide the most meaningful view of industry growth. Month-to-month comparisons should be made with caution as they reflect seasonal effects and short-term volatility. Because bookings tend to be more volatile than shipments, changes in the book-to-bill ratios from month to month might not be significant unless a trend of more than three consecutive months is apparent. It is also important to consider changes in both bookings and shipments to understand what is driving changes in the book-to-bill ratio.

IPC's monthly PCB industry statistics are based on data provided by a representative sample of both rigid PCB and flexible circuit manufacturers selling in the USA and Canada. IPC publishes the PCB book-to-bill ratio by the end of each month.



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International Diary

2022

EIPC @ FED Conference

29-30 September
Bamberg, Germany

HDP Fall Member Meeting

12 & 13 October
Rock Hill, South Carolina USA

EIPC Technical Snapshot Webinar

Registrations via www.eipc.org
19 October

TPCA Taiwan

26-28 October
Taiwan

EIPC @ Electronica

15-18 November
Munich, Germany

EIPC Technical Snapshot Webinar

Registrations via www.eipc.org
30 November

2023

EIPC Winter Conference

9 & 10 February