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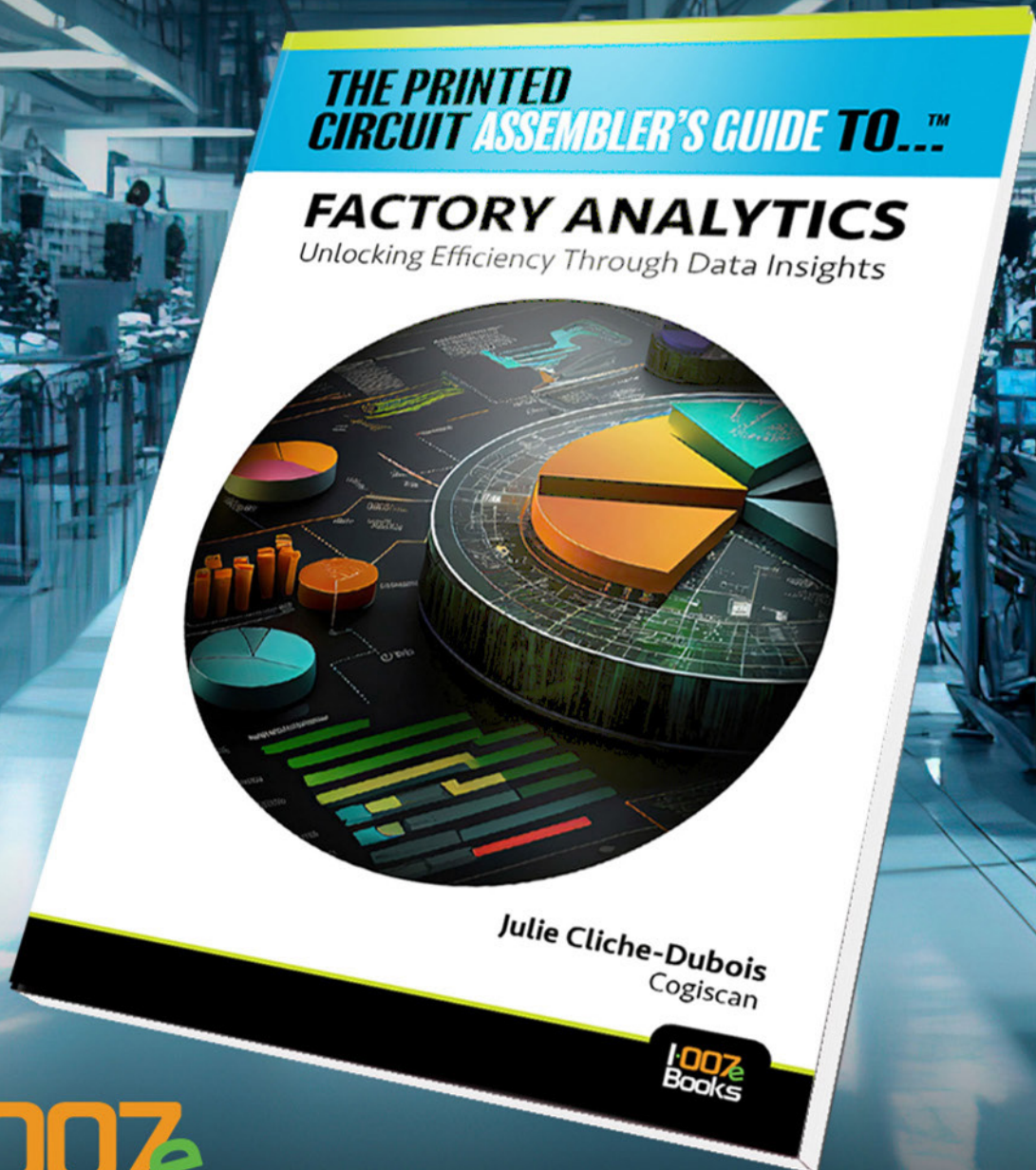


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Look inside

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The Path Ahead

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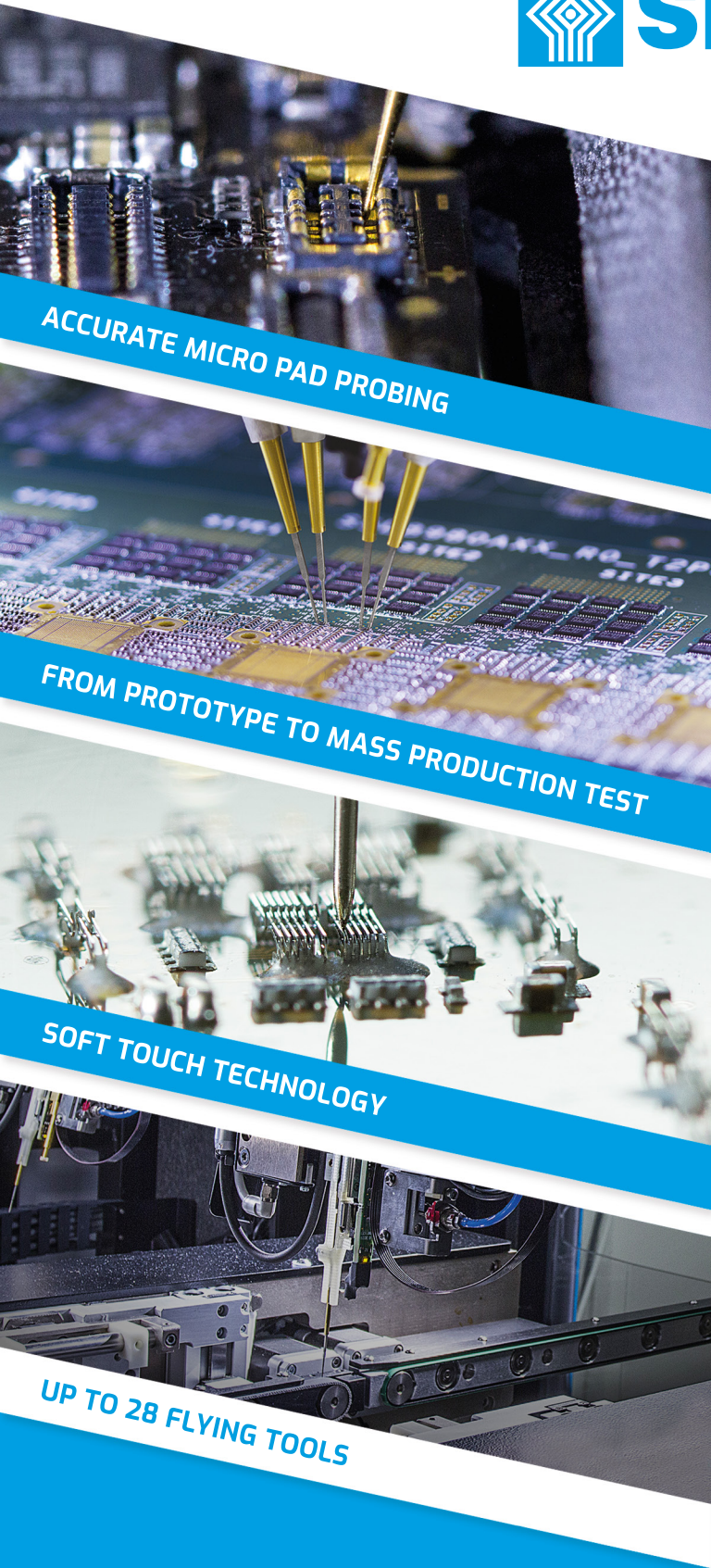
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Emerging Trends in 2025

Nolan's Notes

by Nolan Johnson, I-CONNECT007

January is a traditional time to mark changes in our lives. A new year can signal new beginnings. But change is constant. So, as we flip over the calendar into 2025, we look at what's ahead for the EMS supplier industry. What are your concerns and challenges? What trends are emerging? What can you expect from a new administration?

Here's what I found:

- **Tariffs:** The incoming U.S. administration is expected to shake things up. What we don't know is how, when, or to what degree.
- **Technical capabilities:** This is taking form as UHDI capabilities, skilled workforce, and automation.
- **Artificial intelligence:** How do machine learning and predictive engineering fit into the manufacturing environment?
- **Margins:** Shake the economic magic 8-ball on the margin question, and the answer comes up, "All indicators point to uncertainty." How will you be defending your margins in 2025? That isn't so clear here at the start of the year.
- **Nearshoring:** China Plus One is an adjacent topic; it goes really well with this discussion.



It doesn't take much thought to realize just how tightly all five are intertwined. Nudge one, and they all move a little; shove one hard, and they all move a lot. No matter how you look at it, there's a lot of jiggling going on.

The experts we talked to emphasized exercising caution as you start the new year. They used words like "trepidation," "confusion," and "uncertainty," but it wasn't gloom-and-doom thinking or a "woe is me" attitude. There was resolve and even optimism at the core of all the caution. So, here's what we have for you in this issue.

Widening our scope, we present two interviews with industry analysts James Kim and Dennis Reed. Kim is an attorney with expertise in tariffs, and Reed is a technology manufacturing analyst with Edgewater Research. Their perspectives paint a rather detailed picture of the current market dynamics.

From AI to EVs, our columnists always keep it interesting. Jennie Hwang discusses the predominant methods for interacting: prompts and prompt engineering. Dan Beaulieu teaches you how to maximize your trade show return, and Tom Yang continues his series on the U.S.-China relationship. This time, his topic is our environmental footprint: "Profit-driven motives can coexist with environmental responsibility when companies view sustainability as a path to long-term resilience." Be sure to check it out.

In his column, Mike Konrad addresses the troubles with EV charging stations, touching on one of my technology triggers in the process. He cites an alarming statistic: 22% of all public charging stations are non-functional at any given moment. Now just imagine if one in five gas stations were randomly

closed. We'd have a huge supply chain crisis, much like the oil embargo days in the early '70s. (I may have been young, but I remember it.) I'm an advocate for EVs, but I have

some personal misgivings about the economic impact of EV charging. The challenges are two-fold. First, there's the inherent delay of recharging during long-haul travel. Less obvious but more concerning to me is the economic impact of the service station supply chain. These retail stores, often run as mom-and-pop shops, are a hub to the community. Too many sit in locations where converting to

all-electric charging for profit would simply not pencil out. Read Mike's column and draw your own conclusions, but I think that the slowing EV adoption globally could be influenced by both of these factors.

My solution? Hydrogen is a much more easily integrated option into the existing distribution network. Filling your hydrogen tank would look very similar to filling a gas tank. Local businesses continue their role in the local economy, and the predicted copper shortages worldwide could be reduced. I've read that some automakers are signaling a shift to hydrogen, so we will see what happens.

These topics and others make this a salient time to examine our priorities, the trends we want to follow, and what has captured your interest. Welcome to an exciting new year. **SMT007**



Nolan Johnson is managing editor of *SMT007 Magazine*. Nolan brings 30 years of career experience focused almost entirely on electronics design and manufacturing. To contact Johnson, [click here](#).

Artificial Intelligence, Part 4: Prompt Engineering

SMT Perspectives and Prospects

by Dr. Jennie S. Hwang, CEO, H-TECHNOLOGIES GROUP



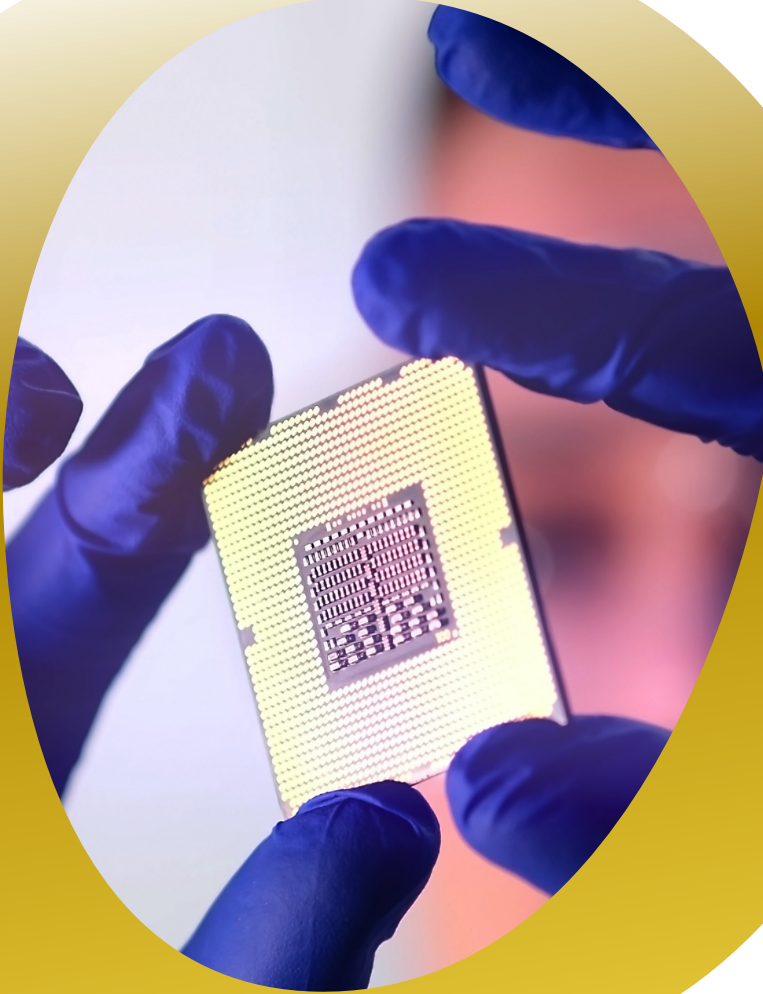
The introduction of Generative AI models and ChatGPT-4's rise to fame has brought about a relatively new term: prompt engineering. What is prompt engineering and what its impact? What prompt engineering techniques, tools, and platforms can optimize the use of Generative AI models, particularly large language models (LLMs)? What tips, pointers, and best practices can be used to hone prompt engineering? The following column addresses these questions.

What Is Prompt Engineering?

Destined to maximize the utility of Generative AI models, prompt engineering devel-

ops, designs, and optimizes specific prompts to enhance the output of LLMs or foundation models (FMs). Prompt engineering allows us to use AI models more effectively and achieve more accurate, relevant, and timely responses. It refines LLMs with specific prompts and recommended outputs, along with refining inputs to generate texts or images.

Maximizing the utility of an AI model, particularly for LLMs to achieve their targeted outcomes, often requires experimentation and various iterations. Reducing these attempts is possible by better understanding prompt engineering's elements and techniques.



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What Are the Impacts of Prompt Engineering?

Prompt engineering is an emerging field and a new skill. Prompt engineers program in English instead of computer programming languages such as Python. They use plain words to achieve results, for example, assisting researchers in abstracting essential content from literature, helping businesses analyze large quantities of documents to summarize, pull out key points, and highlight company earnings call transcripts. They also fine-tune prompts that go into an LLM to extract valuable information and can analyze and create prompt tools. Prompt engineers can also determine how to evaluate different models via a given prompt or a series of prompts about applications.

Prompt Engineering vs. Fine-tuning

Fine-tuning is primarily based on supervised learning and requires labeled data with specific datasets to improve model performance. It is an expensive process.

Prompt engineering works similarly to fine-tuning. However, there is no need for labeled data. It uses prompt techniques to guide the pre-trained LLM/FM to give more relevant and accurate answers by interacting with

LLM/FM with natural language via a series of instructions, questions, and statements.

Well-curated prompt engineering is a more effective way to fine-tune pre-trained large LLMS and FMs.

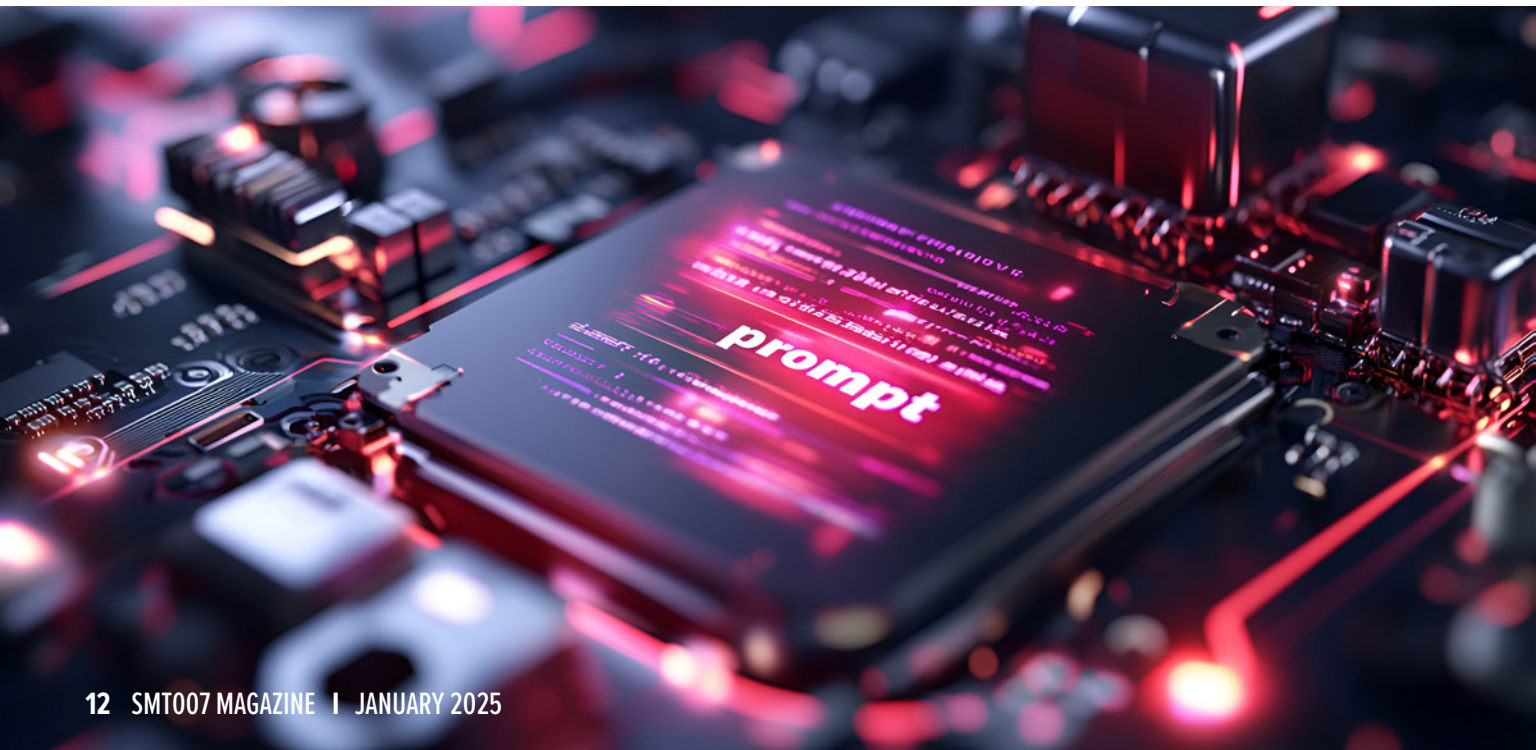
Prompt Engineering Techniques and Approaches

One technique is chain-of-thought prompting, which uses a series of well-thought-out questions with logical or strategic sequences to interact with the model. It does this by breaking down questions step-by-step and asking the models to check their work as they go. It works as follows:

Request → Answer → Feedback → Request → Answer → Feedback → Continue Fine-tuning

Another technique is called a “persona prompt,” which tells the model to assume a role. Additionally, one can choose new information prompts by adding new information that the LLM might not know.

Through question-refinement prompts, we can ask the model to suggest improved or alternative questions to achieve more refined answers and write elaborate prompts to achieve the desired output, such as in aesthetic imag-



ery. We can also use Zero-shot or Few-shot techniques. Zero-shot does not give examples, which is usually better for larger LLMs. Few-shot gives contextual output or format information. The technique needs to follow the token limits of LLMs.

Prompt Engineering Tips

To leverage prompt engineering to achieve the desired output, these tips are ranked in ascending order of depth or skills:

Level 1

1. Understand the issue at hand.
2. Know what questions to ask.
3. Understand the desired outcome, then articulate the question.
4. Form clear and actionable requests.
5. Use clear and direct wording to avoid producing unexpected and undesirable results.

Level 2

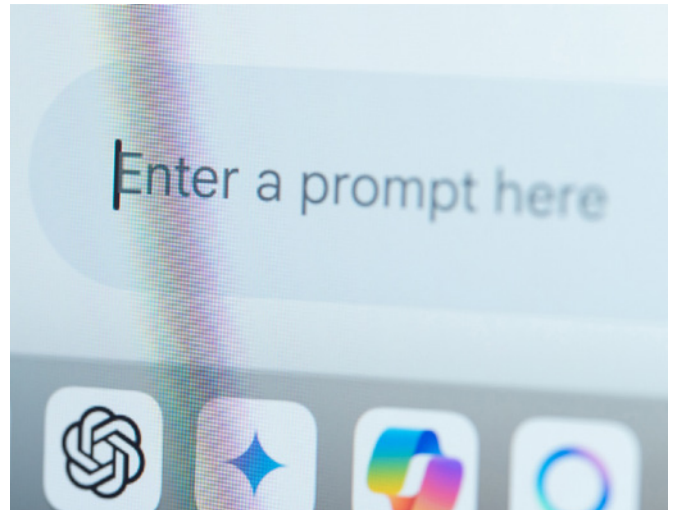
1. Set a strategy to create and refine effective prompts.
2. Think about how to ask the questions effectively.
3. Rephrase a question, which can lead the LLM to produce a completely different response.
4. Pose open-ended questions or requests.
5. Add detail and context.

Level 3

1. Break down complex tasks into simpler prompts.
2. Iterate and experiment with different prompt structures.
3. Know the training dataset.
4. Have a working knowledge of underlying model architecture.
5. Understand prompt interface mechanics.

Prompt Engineering Tools and Platforms

Several commercially available tools are available for testing and use. Their respective



features and strengths vary with applications. To name a few:

- **PromptSource:** A tool kit that uses an iterative development process to create natural language prompts through PromptSource's API; available on GitHub.
- **Prompter:** A debugging tool for GPT-3.5 and GPT-4 (4+) that allows users to identify and address issues with their prompts.
- **FusionAI:** Prompt engineering software that helps improve and expand prompts and is often used for creative writing, idea generation, and brainstorming.
- **PromptPerfect:** A tool that allows users to input the prompt and adjust the settings (e.g., prompt length, output quality, and the number of iterations); a third-party plugin that works with text generation models (ChatGPT, Claude, DALL-E 2, Midjourney, and Stable Diffusion). This is used with paid versions of ChatGPT.
- **PromptLayer:** A tool that allows users to monitor and control prompt interactions to see what changes improve results over time.
- **OpenAI Playground:** A platform to experiment, test, and refine prompts with various GPT models.

Prompt Engineering Cautions

Generative AI models continue to gather information from their interactions with users.

They absorb and store information. When prompting, be mindful of information that is private, confidential or proprietary.

Prompt Engineering Best Practices

1. Experiment and test different methods of phrasing instructions or questions.
2. Create and manipulate the optimal question or input by understanding the underlying model's algorithmic architecture and dataset constraints.
3. Test multiple models for a specific application. **SMT007**

Appearances

Dr. Jennie Hwang will lead two Professional Development Courses, "Artificial Intelligence—Opportunities, Challenges and Possibilities" and "High-reliability Electronics for Harsh Environments," March 16, 2025, at IPC APEX EXPO 2025. She will also teach IPC webinar courses on "SMT Manufacturing Productivity and Yield—Mitigating Production Defects, Part 1 and Part 2," Feb. 4–13, 2025.



Dr. Jennie S. Hwang, an international businesswoman, speaker, and business and technology advisor, is a pioneer and long-standing leader in SMT manufacturing since its inception, and in developing and implementing lead-free electronics technology and manufacturing.

She has served as chair of Artificial Intelligence-Justified Confidence for DoD Command and Control study, chair of AI Committee of the National Academies, and Review Panels of NSF National AI Institutes and Committee of Strategic Thinking for Engineering Research. An International Hall of Famer (Women in Technology), she has been inducted into the National Academy of Engineering, named an R&D-Stars-to-Watch, and received the YWCA Achievement Award. She has held senior executive positions with Lockheed Martin Corp., and was CEO of International Electronic Materials Corp. She is currently CEO of H-Technologies Group, providing business, technology, and manufacturing solutions.

She has served as chair of the Laboratory Assessment Board, the DoD Army Research Laboratory Assessment Board, and the Assessment Board of Army Engineering Centers. She is on the board of Fortune-500 NYSE companies and civic and university boards, Commerce Department's Export Council, National Materials and Manufacturing Board, NIST Assessment Board, various national panels/committees, and international leadership positions.

She is the author of 10 books (four as co-author) and 750+ technical/editorial publications. She is a speaker and author on trade, business, and education issues. Her formal education includes four academic degrees (Ph.D., M.S., M.A., B.S.), as well as Harvard Business School Executive Program and Columbia University Corporate Governance Program. To read previous columns, [click here](#).



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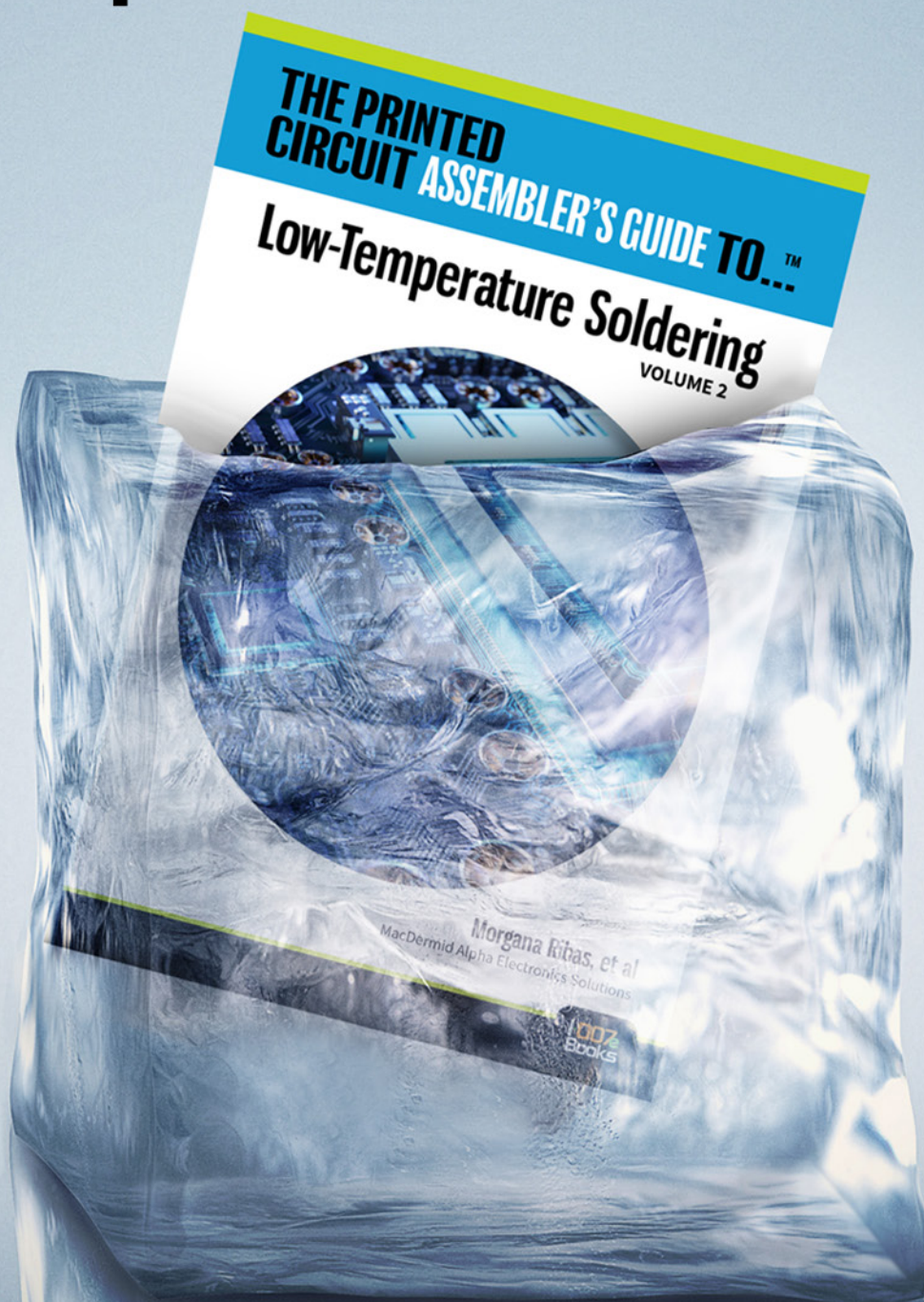
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EMS Providers Should 'Plan Prudently' in 2025

Feature Interview by Nolan Johnson

I-CONNECT007

Dennis Reed is a senior research analyst who specializes in electronics manufacturing at Edgewater Research, a leading research and market intelligence firm covering a mix of compute—CPU, GPU, memory, both flash and DRAM, and hard drive—and insights on components which includes broad line semiconductor, IP&E distribution, and channels.

In this conversation with Dennis and IPC Executive EMS Advisor Mark Wolfe, we discuss emerging trends in 2025: AI, China Plus One, inflation, tariffs, and market shifts, particularly in automotive and milaero.

Nolan Johnson: Dennis, we're here to talk about what's on the minds of EMS providers in 2025, but let's start with a quick rundown of who your company serves.

Dennis Reed: Our client base is split between two markets. The first and largest is the financial community: hedge funds, mutual funds, pensions, etc. We also sell to the industry. For those, we deploy a bottom-up research approach. For example, from a top-down standpoint, you would look at GDP's X, and we think the industry's X plus or X minus. We talk to the CEO and the CFO and use that to drive our research process.



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Dennis Reed

We work to give the industry a voice. That's really the value and, ultimately, why people work with us. We add value in the bottom-up analysis. I maintain a network of people across the supply chains whom I've cultivated over the years. We have frank discussions about what's going on with the market drivers: bookings, billings, lead times, and pricing inventories. With those, you can figure out what's happening in the industry. So, when we look at the top down and the bottom up, we can identify when the business inflects in either direction—positive or negative. There could be tiny inflections here and there, of course.

Dennis, what are some key issues our readers should pay attention to in 2025?

Reed: The first thing is the change in the administration. What will that mean from a tariff standpoint? With respect to assembly, I don't have a great answer. There is a cyclical-ity: Inventory is ongoing, and that matters. But there are some unknowns within that cyclical-ity. We know the numbers for inventory, but we don't have a handle on how much actual demand was pulled forward during the short-age years.

The next issue is about spending. I recently read that, collectively, governments world-wide—among interest rates, fiscal policy, stimu-lus, you name it—spent more, when adjusted

for inflation, on COVID than they did on World Wars I and II combined.

Assuming that's right, the challenges during COVID were the same in all markets. Your factory was shut down, and then told to reopen, but there was a labor shortage. At the same time, you might have decided to pull forward the spend on, say, HVAC upgrades to get better filtration, and an automation project because we all need to social distance our workers. It's hard to draw a line from point A to point B linking these expenditures, but it's something to really think about: What is the real demand through the cycle? I don't think people have a good answer.

Third, you should be thinking about near-shoring and the relationships between China and the West. If you plot foreign direct invest-ment into China over a 20-year window on one axis, and on the other axis you plot the Fed funds rate in the U.S., one line goes up and to the right; the other goes down and to the left. When I look at some of that data, it feels like we're in a once-in-a-generation deflation-ary environment that has kept global inter-est rates extremely low. Now, what will hap-pen with China's interest rates? Best case is an inflationary environment inside China. Worst case, China closes off to the West. Either is a distinctly different kind of cost curve than in the past 20 years.

The last trend is about industry competi-tion in general. This shortage laid bare some of the challenges of the supply chain. We'll see how short our memories are, but there is a push to qualify multiple suppliers wher-ever possible. There will be more competi-tion from other suppliers.

Mark Wolfe: There's also the "true demand" conversation. EMS companies tell me that for many of their OEM customers the solution to allocation was to double the order quantities: If you're getting half of what you order, order double. There was a lot of that. The component providers tried to limit that, but desperate



Mark Wolfe

people do desperate things. They still signed the non-cancelable, nonreturnable contracts. They drove more demand. Much of the industry is still on the tail end of that.

At the end of 2023, parts freed up, the EMS companies caught up, shipped all the orders to their OEMs, and the OEMs said, “Uh oh, we’ve got a lot of inventory here.” This “slinky effect” is diminishing, but it’s still out there.

Reed: Every supplier has a great handle on their own books of their inventory and what’s in distribution. The moment that leaves and goes to the EMS provider, it becomes less clear, but there’s still typically a decent line of sight, especially for the larger multinational suppliers. When you go beyond that to the customer, the most transparent suppliers will tell you they don’t really know.

I asked the management team at a major chip manufacturer, “What’s your real demand?” They said they don’t have exact metrics for what their average industrial customer buys in a given year, but it’s probably \$50,000 to \$100,000 a year. In desperate times, would you spend \$250,000 and buy five years of inventory at once? It’s not hard to store \$500,000 worth of components. They’re small. They’re not airplane wings or a cockpit.

The semiconductor CAGR from 2020 onward is nine. The market has tripled its growth rate. Yes, AI is making that data set harder to use

because of its halo effect, but take that halo out, and what has tripled its growth rate in size? I struggle to find anything.

If the new administration was to follow through on the tariff changes they’ve been telegraphing, how does that change the North American market for EMS suppliers? When do you see recovery?

Reed: For the assembly and test portion, this is a part of the semi manufacturing that uses more labor. A lot of expansion has occurred over the last several years outside of traditional markets like China. That’s not to say it will not move out of China because there’s Malaysia, Vietnam, Thailand, and India. That brings up the ongoing labor cost equation.

In the West, what price are EMS suppliers willing to pay to have a China-plus-one strategy? For the back end, especially on the trailing edge, the benefit is highly depreciated, low-cost labor. It’s very efficient, and a low value-add to the transaction. Do you just want optionality in the trailing-edge technologies? If so, we’ll work through the inventory.

The base case for a recovery seems to be mid-2025. That puts us close to three years after a three-year upcycle, which is in line with our historical ups and downs—that’s just cyclicity that we work through. Over the past two years, we’ve seen the diversification of some of those traditional supply locations out of China. Those new facilities have not necessarily been tested in a ramp. We won’t be in this malaise forever, despite how painful it feels right now. But what happens when it does turn, and some passive suppliers run their facilities at 50% utilization?

At electronica, my colleague and I had more than 50 meetings with a wide swath of the supply chain. We asked, “Now that the election is over, do you have clarity? Have you seen any change in demand? The election was supposed to be a bottleneck.” The answer was, “No, it hasn’t really moved the needle. There are plenty of other factors.”

“...the deflationary curve will be less than it has been over the past 20 years. Worst case, it...turns inflationary.”

The best case with China is an overarching inflationary environment, and in addition, a migration away from China is inflationary for the industry. There is the tariff overhang, which—if it’s 100% from China—will not double the prices; some of it will be absorbed, but some will be passed to the consumer.

Looking at all those things, the deflationary curve will be less than it has been over the past 20 years. Worst case, it potentially turns inflationary. That’s my best guess, based on what I can see so recently after the election.

We’ll see how much actually gets done. In Trump’s first four years, being a nontraditional politician, he tried to execute a lot more of what he promised on the campaign trails than most. My guess is he’s probably emboldened by the election results to take a harder line on China.

Of course, I hope most companies had some type of strategy, no matter who won the election. It shouldn’t be too tall an order to shift some priorities without completely destroying a company.

Is it fair to summarize this conversation by saying that we need to pay attention to our margins this year because they’ll be under attack?

Reed: That’s fair. My number one message is that I hope you are planning the cost side of your business much more prudently than the sales side because it will be another slow growth period. Plan to protect your margins and base case; if you need to grow upside to your top line, fine. You’ll want to cultivate an environment where you are protecting margins. There’s more competition. The inflation is sticky. If there’s an upside, it’s protecting margins with the ability to investor flex.

Johnson: Appreciate the insight, gentlemen.

Reed: My pleasure. SMT007



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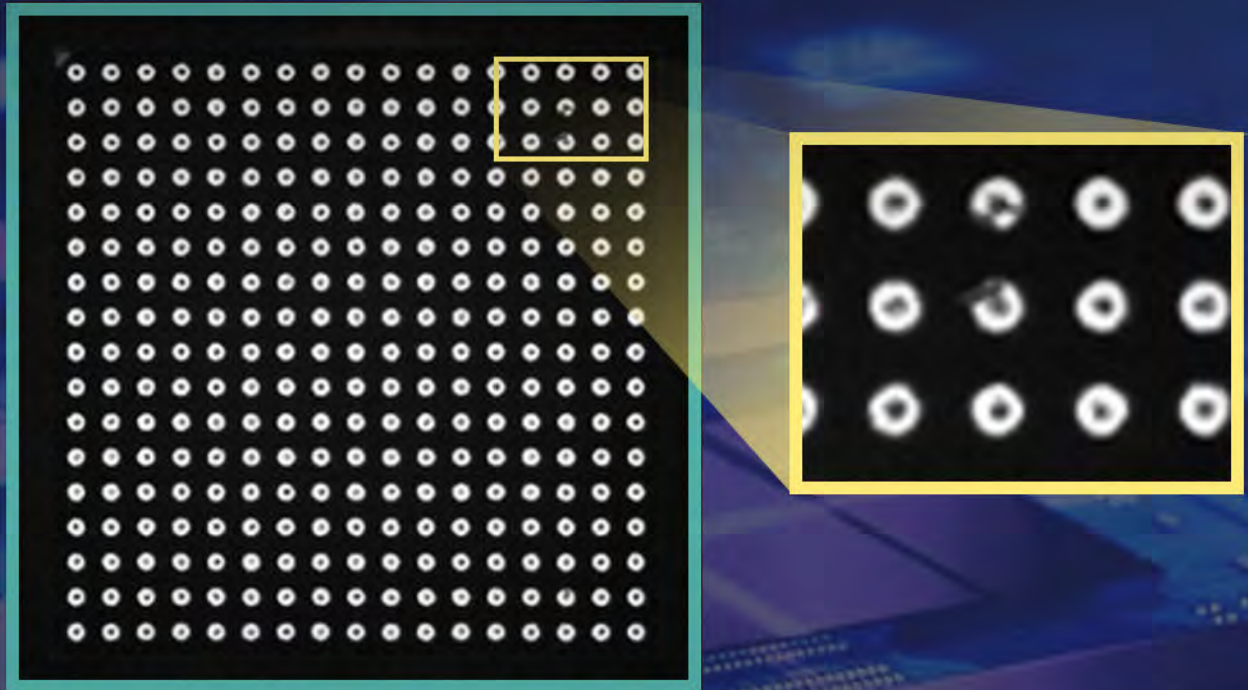
Feature Interview by Nolan Johnson
I-CONNECT007

Tom Yang, CEO of CEE PCB, understands the importance of collaboration between U.S. and Chinese fabricators. He believes that to understand the current political and economic conditions between the two countries, we must maintain a level of international business cooperation. In this interview, we discuss market conditions under a new U.S. administration, how companies like CEE are responding to potential changes, and CEE's strategic move into Thailand.

Nolan Johnson: Tom, let's start our discussion with market dynamics. What changes in agenda items and priorities do you anticipate with a new U.S. administration?

Tom Yang: The entire landscape is changing, similar to the trade war that started in 2018 between the U.S. and China. Then, the pandemic hit, and China's lockdown disrupted the entire supply chain. That's when U.S. customers started adopting the China Plus One strategy, looking to mitigate some risks by diver-

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Tom Yang

sifying beyond China. It wasn't just about the trade war but a mix of other concerns as well.

Now, U.S. and European customers have shifted parts of their supply chain to Southeast Asia. As a result, China is facing an oversupply problem with fewer customers. The market's taking a tough turn—suddenly, it's all about price, with everyone competing to undercut each other. It's honestly a bit chaotic, something we've never seen before, and it's a real challenge for Chinese suppliers.

With these changes, does there seem to be a push for Chinese suppliers to concentrate on the Chinese domestic market over an international market?

The trade war and China Plus One might seem like push factors that Chinese board shops want to focus more on the domestic market, but that's not exactly the case. Chinese suppliers are still keen to maintain relationships with current U.S. and European customers and even explore new ones.

I noticed a trend: Most of the top 50 PCB manufacturers have announced plans to set up new factories in Southeast Asia, like Vietnam or Thailand. This will lead to another highly competitive market in the region.

However, Southeast Asia comes with its own challenges. There's a labor shortage, so wages will remain high for at least a year or two. On top of that, there's also a supply chain gap, where supply costs will stay elevated. We're looking at 15–20% higher production costs in Southeast Asia compared to China.

This makes it interesting for buyers and OEMs because working with a China-plus-one strategy means managing the cost increase for the plus-one portion. Does this mean a price increase, or do they absorb it in their margins?

Customers are well aware of the situation. In the first three years, they're likely to accept the price increase. But after that, they will want costs to come down to match China's pricing. While cost might eventually decrease, it will be a tough ride in the short term.

Do you see the supply chain situation improving in Southeast Asia in the next couple of years?

Take us, for example. We are a Chinese fabricator that has already purchased land in Thailand with plans to build a factory there. The challenge is that most materials still need to be imported from China. This comes with its own set of issues: longer lead times, and extra import or transportation taxes. This could definitely drive costs higher.

It's very clear that much of the build-out for Thailand's PCB industry is coming from Chinese companies building internationally.

We bought the land at the end of 2022. Back then, there wasn't much PCB fab activity in Thailand. But since we made our announcement, we've seen about 20 factories come to Thailand. Everyone is under the same pressure from customers who now require it. For those factories looking to break into new European or North American customers, setting up in Thailand or nearby countries isn't just optional—it's a must.

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Tell me about the factory that you're building in Thailand. What are you putting there and what kind of product can customers expect?

We plan to build a fully automated factory in Thailand because there's a real shortage of skilled workers and experienced engineers in the region. Automation is going to be a game-changer. We're also aiming to invest in mid- or high-level production capabilities. In Southeast Asia, most factories stick to lower-end production, but we want to stand out by offering something more advanced.

Do you see this new factory as an opportunity to keep your current customers loyal? Is it a way to open new markets?

There are two perspectives. The first comes from our current customers; they're excited about this move. One of them already has a factory in Southeast Asia, so they're very happy that we'll be closer as they shift work from China to the facility there.

The second perspective is from developing new customers. We must do this, or we won't get approved as suppliers.

When will the Thailand facility open?

Our plan is to start construction at the end of 2025, with mass production starting in Q2 2026.

That's a rapid stand-up and qualifying process. How will the Thailand facility change your manufacturing capacity as a company?

We are aiming for a monthly capacity of 50,000 square meters with PCB and HDI, but we'll roll it out in two phases.

In phase one, we're keeping the capacity smaller since we need time to figure things out in Thailand. The talent gap is a big hurdle. Managing and operating a factory outside of China with a foreign language is uncharted territory for us, so we'll learn as we go.

What's interesting is that this industry shifting out of China is not the typical cost-driven move we've seen over the past 50 years. Normally, you relocate to cut costs, but this time, it's more about politics—you just have to do it. Whether it's a good move is still up in the air. Costs may go down in the future, but for now, they're higher.

Over time, competition in Thailand will heat up. More players from China and Taiwan are joining in, and the next couple of years will be a huge challenge.

Thank you for taking the time.

Thank you, Nolan. SMT007

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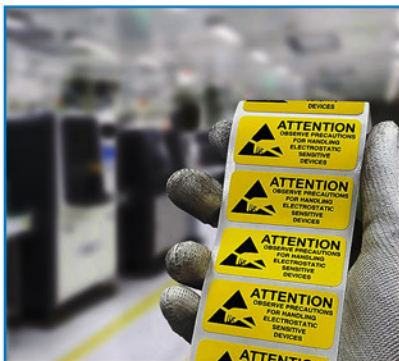
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My 2025 Industry Wish List

The Knowledge Base

Feature Column by Mike Konrad, SMTA

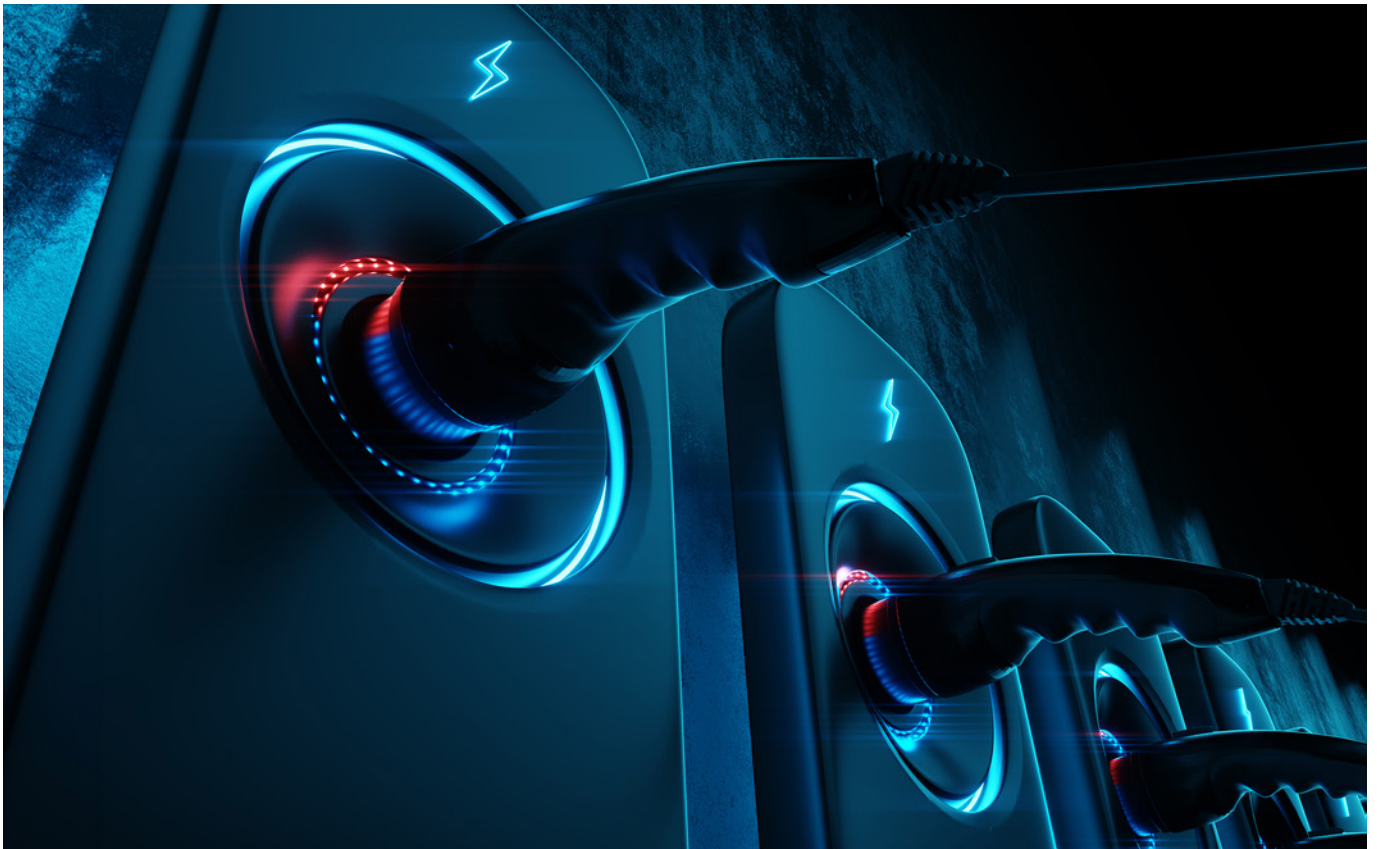
My 2025 wish list for the electronics manufacturing industry is short. In fact, there's only one item on the list: reliable EV charging stations.

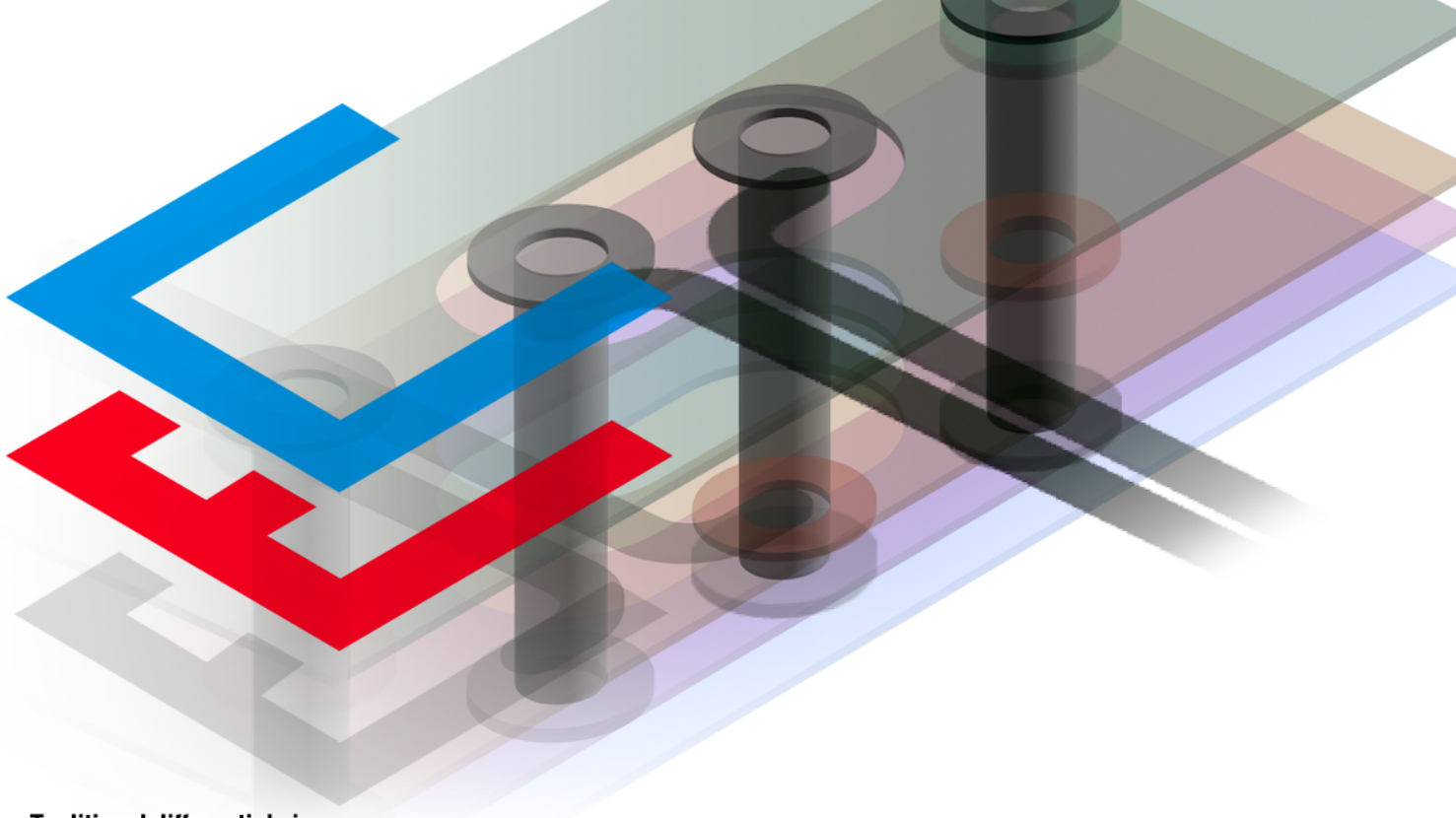
I love to drive cars, off-road vehicles, and boats. I also fly airplanes, and I'm an unabashed tech geek. From computers to tech gadgets, count me in. Because electric vehicles combine my fascination for both propulsion and technology, most of my friends and colleagues are surprised to learn that I do not yet have an electric vehicle. So, what's holding me back? The answer does not lie with the electric vehicle itself, but with the current state of public EV charging stations.

Like most things in life, challenges and opportunities frequently go together. Fortunately, there is a silver lining. Today, there is an unprecedented economic opportunity within the electronics manufacturing industry to fix this problem.

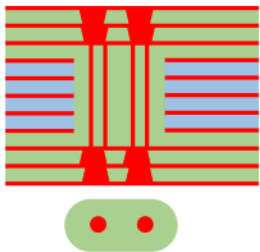
Navigating Challenges and Opportunities in the Public EV Charging Industry

The electric vehicle (EV) revolution is accelerating, with global sales surpassing 10 million units in 2023¹. However, the expansion of public charging infrastructure has not kept pace, leading to significant challenges in reliabil-

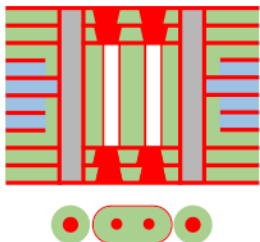




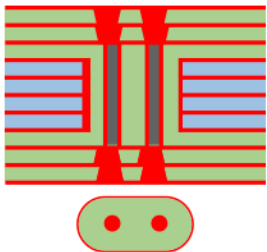
Traditional differential vias



Standard coaxial differential vias



Coaxial differential vias to overcome signal issues of buried vias



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ity and accessibility. Addressing these issues is crucial for the continued growth of the EV market and presents substantial opportunities for the electronics manufacturing industry.

Reliability Challenges in Public EV Charging Stations

Public EV charging stations are plagued by reliability issues, undermining consumer confidence and hindering widespread EV adoption. A study by the Harvard Business School revealed that approximately 78% of public charging stations in the U.S. are operational at any given time, leaving a significant portion (22%) non-functional due to various technical problems². In contrast, if 22% of gas pumps in the U.S. were nonfunctional, that would reduce the number of gas pumps by over 46,000.

There are several reasons for the poor reliability performance of public EV chargers:

- **Hardware failures:** Malfunctions in charging connectors, screens, and payment systems are prevalent, often resulting from inadequate maintenance and exposure to environmental factors.
- **Software glitches:** Problems with network connectivity and payment processing can prevent successful charging sessions, frustrating users and deterring potential EV buyers.
- **Vandalism and misuse:** Public chargers are susceptible to vandalism and improper use, leading to downtime and increased maintenance costs.

These reliability concerns not only inconvenience current EV owners but also deter prospective buyers, slowing the transition to electric mobility.

Economic Impact of Unreliable Charging Infrastructure

The economic implications of unreliable public charging infrastructure are profound. Inconsistent charging availability can lead to anxiety, discouraging consumers from pur-



chasing EVs and thereby affecting the automotive market's shift toward electrification. This hesitation hampers efforts to reduce greenhouse gas emissions and diminishes potential economic benefits from the burgeoning EV sector.

Moreover, businesses that rely on electric fleets face operational inefficiencies due to unreliable charging stations, leading to increased costs and reduced productivity. The cumulative effect of these issues can stifle innovation and economic growth within the EV ecosystem.

Opportunities for Electronics Manufacturing

Enhancing the reliability of public EV charging stations presents significant opportunities for the electronics manufacturing industry. Key areas for development include:

- **Advanced components and board design:** Manufacturing robust and weather-resistant charging hardware can reduce failure rates and maintenance needs.
- **Smart systems:** Integrating Internet of Things (IoT) technologies enables real-time monitoring and predictive maintenance, ensuring higher uptime and improved user experience.

- **Standardization:** Developing universal charging standards facilitates interoperability among different EV models and charging networks, simplifying the charging process for consumers.

Financially, the build-out of reliable public charging infrastructure is a substantial market. The Bipartisan Infrastructure Law allocates \$7.5 billion to develop a national network of EV chargers, aiming for 500,000 stations by 2030³. This investment translates into a significant demand for electronic components, control systems, and related technologies, offering a lucrative opportunity for electronics manufacturers.

Federal Investments and Reliability Standards

The Infrastructure Investment and Jobs Act underscores the U.S. government’s commitment to expanding and enhancing EV charging infrastructure. The National Electric Vehicle Infrastructure (NEVI) Formula Program, a \$5 billion initiative, provides funding to states for deploying EV charging stations along designated Alternative Fuel Corridors. An additional \$2.5 billion is allocated for the Charging and Fueling Infrastructure Grants, targeting both corridor and community charging needs.

A critical aspect of these federal programs is the emphasis on reliability. The NEVI program mandates that federally funded chargers must be operational at least 97% of the time, ensuring a dependable network for EV users. This requirement compels manufacturers and operators to prioritize quality and maintenance, fostering consumer confidence in the charging infrastructure.

Conclusion

The public EV charging industry stands at a pivotal juncture, facing challenges in reliability that impact consumer adoption and economic growth. However, these challenges also present significant opportunities for the electron-

ics manufacturing sector to innovate and lead in developing robust, smart, and standardized charging solutions. With substantial federal investments and stringent reliability standards, the path forward involves collaborative efforts to build a resilient and accessible charging network, propelling the EV revolution and its associated economic benefits.

Perhaps once the public EV charging station network is reliable, I can work on the next item on my wish list: the 2025 electric Corvette (E-Ray). **SMT007**

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Mike Konrad is founder and CEO of Aqueous Technologies, and vice president of communications for SMTA. To read past columns, [click here](#).



Tariffs and Trade Wars: What to Expect in 2025

Feature Interview by the I-Connect007 Editorial Team

James Kim is an international trade lawyer at ArentFox Schiff who keeps his thumb on the pulse of customs enforcement and import compliance. With a new administration taking over just days from now, James weighs in on the potential risks of international tariffs, some possible workarounds, and why this topic should be No. 1 on your list of concerns.

Marcy LaRont: James, with a new administration, there has been a lot of talk about tariffs. What do you expect?

James Kim: Speculation is rampant, something we saw with Donald Trump's first term. He would make off-the-cuff remarks or threaten some sort of tariff action. Sometimes, it played out that way, but a lot of times, it didn't.

Last time, he talked about imposing high

tariffs on Mexican products for the same reasons he's proposing them now. His aim is to clamp down on illegal immigration and drug smuggling. Ultimately, he backed off last time from his original proposal because he was satisfied with what Mexico said it would do to address those concerns. This time he says there are major problems with illegal immigration, and he wants to shut down the border until Mexico does something about it. He's also suggesting a 25% tariff on imports from Mexico.

He's now throwing a tariff proposal against Canada. So, we can predict something will happen. He's promised he will initiate the tariff process on Canada and Mexico as soon as he enters office. He's talked a lot about China so I would expect some action to be taken there.



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James Kim

We don't know how long those tariffs will last, but we know that Trump uses them as a negotiating tactic to get these countries to make certain trade concessions and for other foreign policy aims that have nothing to do with the products on which the tariffs are being imposed. I would expect the same this time around.

The electronics manufacturing sector is primarily concerned with China, although we have a growing amount of activity in Mexico. Many companies—including Chinese ones—are moving operations to Southeast Asia.

How will they be affected by tariffs?

China is looking to get around these tariffs in several industries by setting up manufacturing in third-party countries in Southeast Asia and Mexico. Solar panels are a good example of this. There has been a lot of trade action behind those products and China has moved into Southeast Asia to produce them. Because of that, trade investigations have been initiated in those countries to address that import surge. Even though China may be moving into these other countries, it doesn't mean that the imports from those other countries won't be affected by these tariffs.

It comes down to determining the country of origin of that product and how much processing is happening in those countries. If Mexico, for example, is acting as an export platform

and the products are just passing through Mexico without much processing happening there, then it could still be a Chinese-origin product, and it would still be hit with that same Chinese tariffs. The mere fact that you have production in a different country doesn't mean you're completely safe. That analysis needs to be done: Is my product really Chinese or is it the origin the country from where it's being shipped?

Is China Plus One a solution for de-risking anything?

Maybe it's China's aim to get some attention off products coming directly from China. But I think the U.S. understands this is China's strategy for setting up production in these other countries. That alone will not completely de-risk the supply chain. It's smart for companies that want to diversify their supply chain to look outside of China at some other countries for their production. But you have to pay attention to the nature of the production happening there.

There's always a concern that products are just being shipped through other countries, meaning they're made in China, and shipped through a different country. I used to work for U.S. Customs, and they are well aware of what's happening.

So, trying to get around the tariffs by shipping through another place really doesn't protect you? If the product comes from China first, there's still potential liability?

Contrary to what some people think, the importer actually pays tariffs, and has certain responsibilities to make declarations to U.S. Customs on imports. One of those declarations is country of origin; the tariff amount could be based on country of origin. If China is the country of origin, you could be hit with a 25% tariff. But if the country of origin is different, you may have lower or no tariffs at all. The importer is obligated to report to the government, but the government can check the paperwork after it's cleared for import to verify country of origin. They can require you to prove it.

How do you define country of origin, and how much production has to be done there to become the country of origin?

There is not just one set of rules. There are country-of-origin rules for free trade agreement purposes. The U.S.-Mexico-Canada Agreement (USMCA) has its own set of rules, for example. But for special tariffs—the Section 301 tariffs that have been placed on Chinese goods or the special tariffs on steel and aluminum—there is a different set of rules.

Without getting into the legal weeds too deeply, there's a test applied called "substantial transformation." The basic test asks if what's being done in that country is enough to transform inputs into a new product. If I'm making a widget with components, is what I'm doing in that country enough to actually transform it into a product of that country's origin? That's the test for substantial transformation.

It sounds subjective. If I'm a business owner whose profit margin is razor thin and my product gets finished in a country that doesn't have tariffs, I would call that substantial transformation.

You want to have that substantial transformation to claim that country as the country of origin. But is that the case? I agree, it can feel very subjective. U.S. Customs makes that determination based on this large body of legal cases and rulings it has issued. It will look at rulings on similar types of products, considering the complexity of the production in that country, the origin of the different inputs, and a host of factors.

Unfortunately, it's not a clear, bright-line type of test. It does feel very subjective at

times, and it can make or break the difference between 25% tariffs. It could directly affect a company's bottom line.

Let's consider a U.S. semiconductor fab. They make the wafers and then ship the die to Asia to be packaged. That's a substantial transformation, and China could well be the country of origin. Then, that package fulfills a fab and assembly order in Thailand; that's another substantial transformation. That subassembly goes to a Maquiladora in Mexico for final assembly. That's yet another substantial transformation.

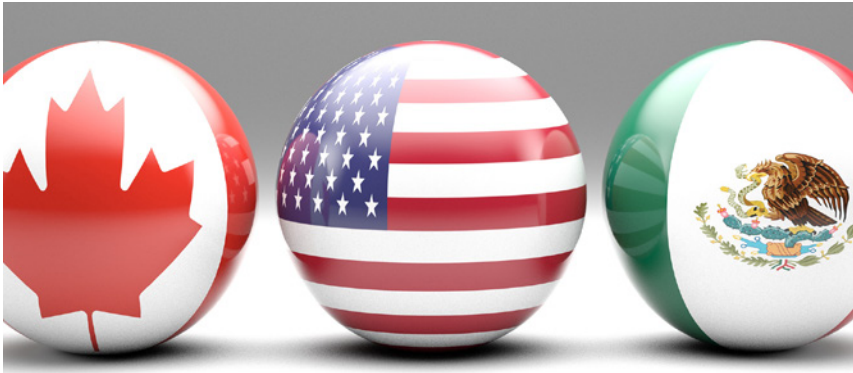
Yeah, that scenario is very typical of a global supply chain. Nowadays, many things are made in multiple countries. You can have inputs from dozens of countries for your finished goods. The tariffs are assessed on the product that's imported, so that's when tariffs are assessed.

For all the shipments prior to the shipment from Mexico, you won't be hit with U.S. tariffs. When a semiconductor die goes to China, it's actually exported, not imported. Now you may have export control issues there, but it's not a U.S. tariff issue.

If the Chinese component goes to Thailand, it's not imported into the U.S. There might be tariffs into Thailand, Mexico, or other foreign countries, but that's not a U.S. tariff issue. But when that finished product made in Mexico is imported into the U.S., you would face potential tariffs.

If tariffs exist in the different countries when it is ultimately imported as a finished product, could they potentially assess multiple tariffs?
The U.S. only assesses tariffs on the finished item that's imported. Let's say the product is

“The mere fact that you have production in a different country doesn't mean you're completely safe.”



a server imported into the U.S. from Mexico. There are some things to figure out to know what tariffs apply.

Before you get to the origin, you have to know how it's classified. Everything that comes into the U.S. is classified under the Harmonized Tariff Schedule (HTS). There's a specific classification code attached to every import. Sometimes, it's easy to figure out; sometimes, it's more ambiguous. You have to determine the classification code because every classification will have a different general tariff that usually applies regardless of what country it's from.

Second, you must determine the origin of that server. Let's assume there's enough production in Mexico to make it a Mexican product. Then you apply the tariffs on Mexican products. If there are no special tariffs on Mexican products, you just pay the regular tariff. Trump is now suggesting tariffs of 25% or more on Mexican products, but that could change.

We have a free trade agreement with Mexico, so if it qualifies under the USMCA for special tariff treatment, you could potentially bring it in duty-free, but that's a separate analysis.

There's a lot to consider, but the key to figuring out which tariffs might apply is knowing what's actually being imported.

How often is U.S. Customs checking on the country of origin? What's the likelihood that a company, especially a small one, will get checked?

Customs pulls in tons of data using its own targeting algorithm. Imagine the volume of

imports and all the information that has to be declared to customs when the import comes in. Some of that data has nothing to do with tariffs, but it could be useful for security reasons; you don't want illegal drugs or weapons or things like that coming in.

Border security has many reasons to target a shipment: Has this company had other non-compliance issues in the past? Have they been subject to an audit in the past? Are there high-risk factors like imports from China? Are the goods coming from a country known for transshipping? Those factors could put you on the radar.

Electronics get a lot of scrutiny for tariff reasons, but also for forced labor. It's a major concern and something that U.S. Customs has a major role in enforcing. Companies should think about having some transparency into their supply chains to ensure there isn't anything like that in their product.

Companies must learn how to mitigate some of these issues, such as requesting an exclusion on a good. Can you explain that process?

That's been one of the main tools that companies use to exempt their products from the Section 301 China tariffs. The U.S. Trade Representative (USTR) issued these HTS codes—classification codes subject to those tariffs—and ultimately totaled about \$300 billion worth of goods from China. That's almost everything, with certain exceptions. In the past, USTR also created a process to allow companies to request an exclusion on specific products.

The companies would have to make an argument that their product is not really available anywhere else: "We're looking for an alternative supply, but it's only being made in China. It's needed for production so we're requesting exclusions." Some companies were successful in getting those exclusions. There was criticism that there wasn't a lot of rhyme or rea-



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son for why some companies got them, and some didn't.

Right now, most of the exclusions have gone away. Mainly, they're on solar manufacturing equipment, and now they're accepting comments on domestic manufacturing equipment. I can imagine if you are a semiconductor fab in the U.S. and you need special equipment to produce semiconductors, you could request an exclusion for that equipment and potentially receive it. That exclusion process will only last until May 2025. We don't know what will happen after that. Will Trump extend that process or open it up to other types of products?

My guess is that the exclusion process will be expanded. Usually, with the announcement of tariffs comes the opportunity to request exclusions, so I would be surprised if that doesn't happen this time.

For most companies, import compliance is an afterthought, which can trip them up when it comes to cost, so what should they do and when?

It's not an afterthought anymore, especially with all that's happening. It's at the forefront of everyone's minds, and if it isn't, it definitely should be. So, what can you do? We've been getting this question often as companies get scared hearing about potential tariffs. They want to be ready if the other shoe drops.

We do an import risk profile/analysis for companies, where we take all the import data—when and how much you imported, what classification you used, country of origin, value, etc.—and assess risk areas. Maybe classifications have changed, and a company hasn't reviewed that for a while. The Harmonized Tariff Schedule gets updated regularly. Maybe you need to re-examine the origin of your products because if there's an argument

for substantial transformation, it could help you get a lower tariff. Those are some things to look at. U.S. Customs has a process where companies can ask for a ruling to find out what Customs thinks the classification or the origin of a product should be. That's where this analysis can be really helpful. It gives you more certainty to move forward and do some planning around your supply chain.



Do I need an attorney to help with the risk analysis?

While companies can definitely do it themselves, and all importers have access to their own import data, they might not be aware of all the issues. So, it can be helpful to have an expert who understands the risk areas, how to look at that import data, and devise strategies for saving on tariffs.

Our firm and other advisors and consultants do that. If you import a lot, you should consider your risk areas and prepare around them.

Do you have any closing thoughts?

This is a very fluid and fast-changing area. It can be overwhelming to keep track of, so having a good advisor who understands this area is important. I do this daily, and it's almost impossible to keep track of everything happening, but we do our best. We put out a monthly newsletter on trade and customs covering topics that companies should be aware of, which can be a helpful resource. If you're looking ahead in 2025, make sure trade and tariff risk assessment is part of your agenda.

It's better to take proactive steps to prevent this rather than end up in a situation where you're caught in the net of a customs investigation or inquiry. It's just good to be prepared as best as you can.

James, this has been informative, as always.

Thank you.

Thank you. SMT007

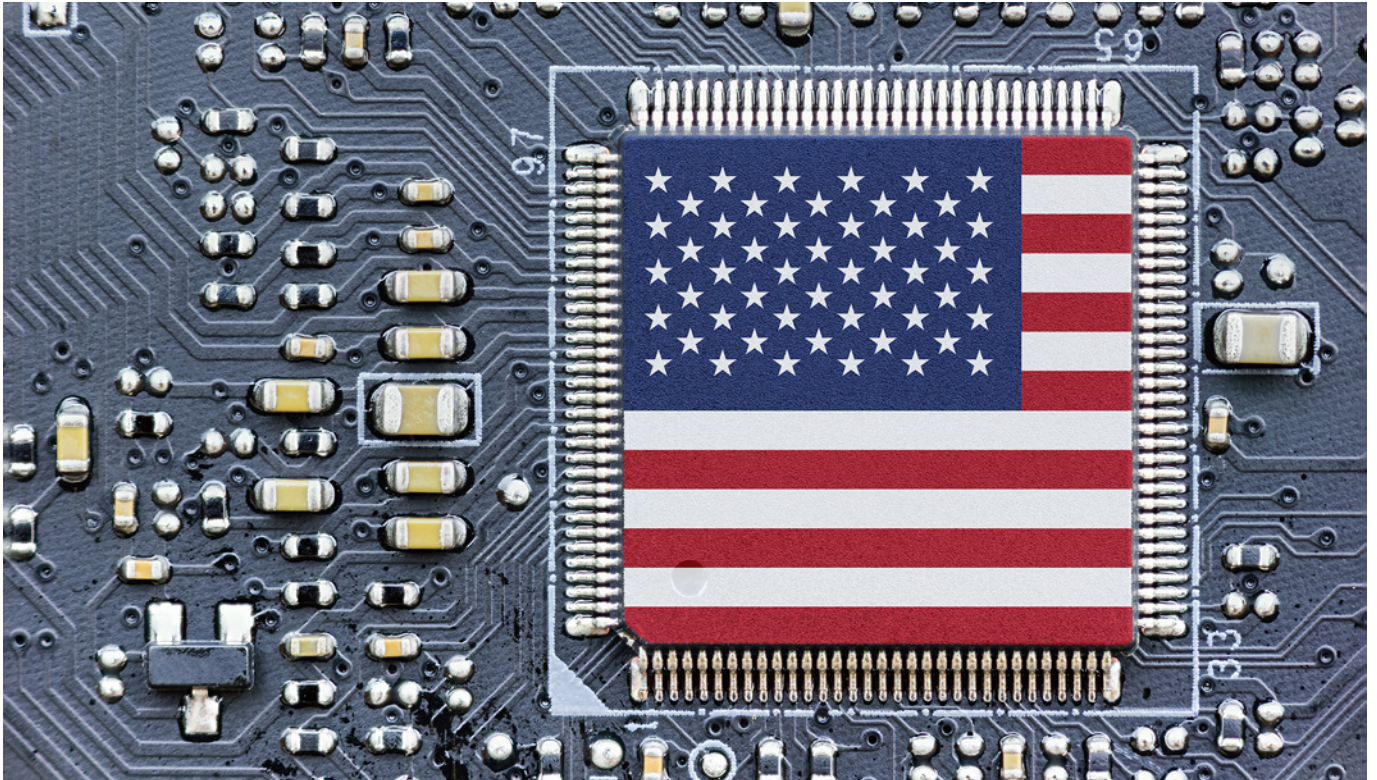
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Ensuring Compliance With the **U.S. CHIPS Act**: Identifying the Source of Electronic Components

Article by Dr. Eyal Weiss
CYBORD LTD.

The U.S. CHIPS Act aims to strengthen domestic semiconductor manufacturing and enhance supply chain security. As part of this initiative, manufacturers must ensure compliance with specific regulations regarding the sourcing of electronic components. This white paper provides an overview of the compliance



Dr. Eyal Weiss

requirements, relevant laws and standards, and introduces innovative technological solutions to verify the provenance of electronic components. Moreover, it highlights the importance

of comprehensive verification that extends beyond sourcing to include the production stage, finished goods, and semi-finished products. By ensuring that all components are original and have not been tampered with at any point in the supply chain, manufacturers can maintain product integrity and uphold regulatory compliance.

1. Compliance Requirements and Relevant Laws

The CHIPS Act emphasizes the importance of transparency and traceability in the semiconductor supply chain. Essential compliance requirements include:



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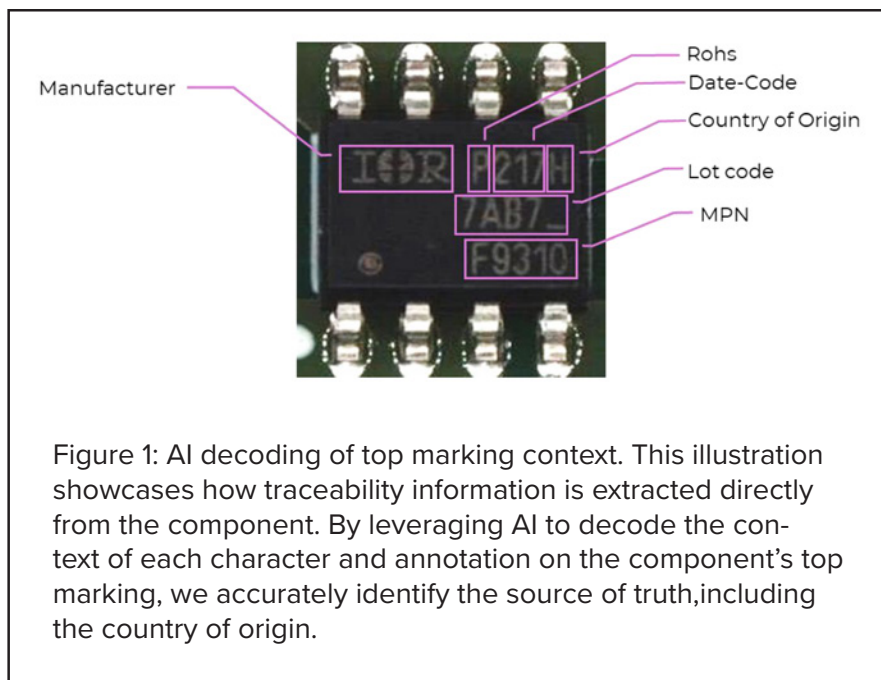


- **Documentation of origin:** Companies must maintain detailed records documenting the origin of all electronic components used in production.
- **Verification processes:** Manufacturers are required to implement processes that ensure the authenticity of the source of their components, reducing reliance on potentially fraudulent documentation.
- **Adherence to standards:** Compliance with industry standards such as IPC-1752A (Material Declaration Management) and ISO 9001 (Quality Management Systems) is essential for ensuring quality and traceability.

2. Current Solutions: A Trust-based Approach

Despite the clear regulations, current solutions predominantly rely on trust. Manufacturers depend on paper reports and documentation provided by the supply chain to verify the sources of their components. This approach has significant drawbacks:

- **Lack of ground truth:** Existing methods do not provide a technological means to obtain ground truth regarding the origins of components. Verification is limited to the accuracy of documents and trust in suppliers.



- **Increased risk:** The reliance on paperwork increases the risk of fraud and misrepresentation, which can lead to non-compliance and reputational damage.

3. Introducing Deep AI Visual Verification

Cybord offers innovative solutions designed to address these challenges through advanced visual inspection technology.

- **Deep visual analysis:** These software solutions enable the visual inspection of the top surface of assembled circuit boards to accurately identify the manufacturer and country of origin of all assembled components.
- **Provenance detection:**
 - » **Top marking recognition:** For components with visible markings, the software reads and decodes the context of the markings, extracting the country of origin and additional traceability data.
- **Direct image verification:** By capturing images during assembly from automated optical inspection (AOI) machines or after assembly using top images of the circuit board, Cybord ensures the provenance of the components. This technology guarantees that 100% of components are verified against their reported country of origin.
- **Comprehensive verification of components:**

Cybord's technology extends its verification capabilities to finished goods and semi-finished products. This ensures that all components used in the assembly are original and have not been tampered with, modified, or replaced during production, shipping, or at any point in the supply chain. By employing deep visual analysis and forensic examination, manufacturers can confidently verify the integrity of their products, ensuring compliance with regulatory requirements and maintaining the highest quality and safety standards.

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Conclusion

As compliance with the US CHIPS Act becomes increasingly significant, the need for reliable verification of electronic component sources is paramount. Traditional trust-based methods are insufficient in today's complex supply chains. Cybord's solutions provide a robust, technology-driven approach to ensure compliance and provenance. By leveraging advanced AI visual inspection and forensic analysis, manufacturers can achieve

a level of certainty that was previously unattainable. Additionally, Cybord's technology extends to verifying finished goods and semi-finished products, ensuring that all components are original and have not been tampered with or modified at any point in the supply chain. This comprehensive verification capability not only reinforces product integrity but also supports adherence to regulatory requirements, ultimately enhancing trust in the supply chain. **SMT007**

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IPC-A-610 Standard Compliance by Using Advanced AI Technology

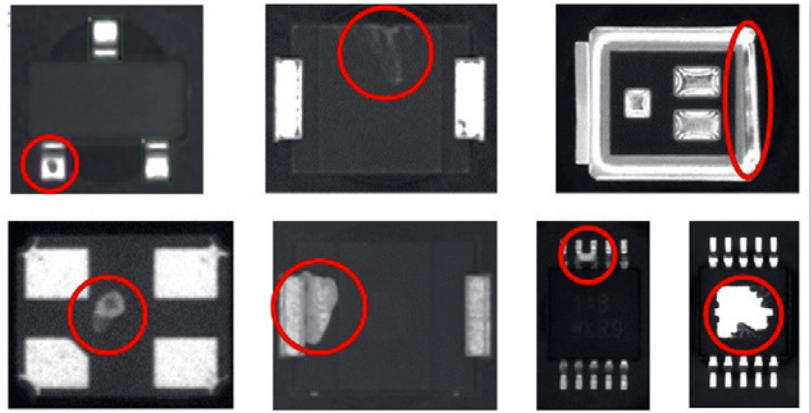
By Dr. Eyal Weiss, Cybord Ltd.

In the ever-evolving landscape of electronics manufacturing, standards serve as guiding principles, adapting to the pulse of emerging technologies. This white paper embarks on an exploration of IPC-A-610, focused on the quality of assembled PCBs, not merely as a compliance framework but as a dynamic entity poised for evolution.

Our focus zeroes in on electronic components. This is because existing practices predominantly utilize technology to inspect the assembly process, often sidelining the examination of individual electronic components. As a result, these crucial components often find themselves excluded from the majority of automated tests conducted along the manufacturing line.

We advocate for a user-centric approach, where immediate detection technology becomes the catalyst for redefining how IPC-A-610 integrates with the shop floor. This isn't a revolution; it's a transformation, a shift in the orchestration of compliance. As we engage in this dialogue, we pose a simple yet profound question: How does the user experience change with the infusion of real-time insights into IPC-A-610?

Amidst our contemplation, we introduce a novel technology—a visual inspection system based on



advanced AI that scrutinizes every component during assembly, ensuring a discreet yet comprehensive 100% compliance check. Join us on this understated journey, not just to follow standards but to gently mold them into a harmonious resonance with contemporary possibilities, ushering IPC-A-610 into the realm of Smart manufacturing.

White Paper Contents:

- Defects on component leads/terminations
- Bent or warped leads
- Corrosion and cleanliness
- Cleanliness: Foreign object debris (FOD)
- Loss of metallization
- Mounting upside down
- Incorrect or missing marking

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MilAero007 Highlights



Lockheed Martin's Newest Technology Demo for Space Connectivity Ready for Launch ▶

Lockheed Martin's newest technology demonstration, called the Tactical Satellite (Tac-Sat), is complete and ready for launch in 2025 aboard a Firefly Aerospace Alpha rocket.

NRL Completes Development of Robotics Capable of Servicing Satellites ▶

U.S. Naval Research Laboratory (NRL) Naval Center for Space Technology (NCST) in partnership with Defense Advanced Research Projects Agency (DARPA) successfully completed development of a spaceflight qualified robotics suite capable of servicing satellites in orbit.

Skunk Works Demonstrates Airborne Battle Management of AI-Controlled Aircraft ▶

Lockheed Martin Skunk Works, in partnership with Lockheed Martin's Demonstrations and Prototypes organization and the University of Iowa's Operator Performance Laboratory (OPL), showcased a crewed-uncrewed teaming mission where an airborne battle manager issued real-time commands to AI-controlled aircraft through a touchscreen pilot vehicle interface (PVI).

Deutsche Aircraft Selects Honeywell to Provide High Frequency Radio System for the D328eco ▶

Honeywell has been selected by Deutsche Aircraft, a German aircraft manufacturer, to supply its Primus HF-1050 high-frequency (HF) radio system for the recently debuted 40-seater D328eco turboprop.

NASA's Europa Clipper: Millions of Miles Down, Instruments Deploying ▶

Headed to Jupiter's moon Europa, the spacecraft is operating without a hitch and will reach Mars in just three months for a gravity assist.

U.S. Navy Awards Comtech \$50 Million SLM-5650B Modem Contract ▶

The U.S. Navy Information Warfare Systems Command awarded the Company a sole source contract for Comtech's U.S sovereign software-defined SLM-5650B satellite communications (SATCOM) modems, upgrade kits, firmware options and technical support. The contract has a four-year period of performance and is valued in excess of \$50.0 million. Funded orders received to date are valued at approximately \$2 million.

RTX's Raytheon Awarded U.S. Army Contract for Wireless Power Beaming Technology ▶

Raytheon has been awarded a contract from the U.S. Army to work on directed energy wireless power beaming capabilities that will distribute power across the battlefield, simplify logistics, and safeguard locations for U.S. troops.

Lockheed Martin and Anduril Join Forces to Successfully Detect and Track Drone Threats in Middle East ▶

Lockheed Martin has successfully integrated the Q-53 multi-mission radar (MMR) with Anduril's Lattice Command and Control (C2) environment during the U.S. Central Command Desert Guardian exercise held at Fort Drum earlier this month. Desert Guardian is part of a set of exercises aimed at filling key gaps in its ability to detect and track drone threats.

DESIGN TIPS #124:

ETCH COMPENSATION

What is minimum space and trace?
The answer depends on the starting copper weight.

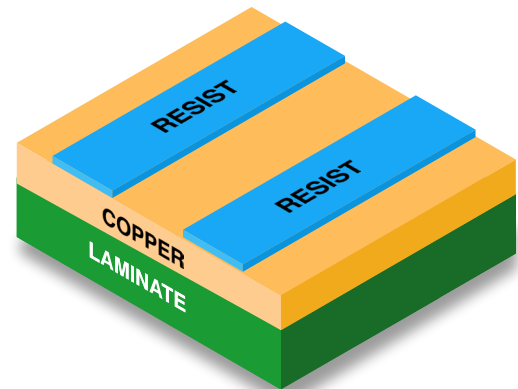
This is because we must do an etch comp on the traces in CAM to compensate for known etch loss. The space between traces after compensation will play a role in whether a board can be manufactured.

The lower the spacing width, the higher the cost. Designers don't always account for the proper starting copper weight after edge compensation.

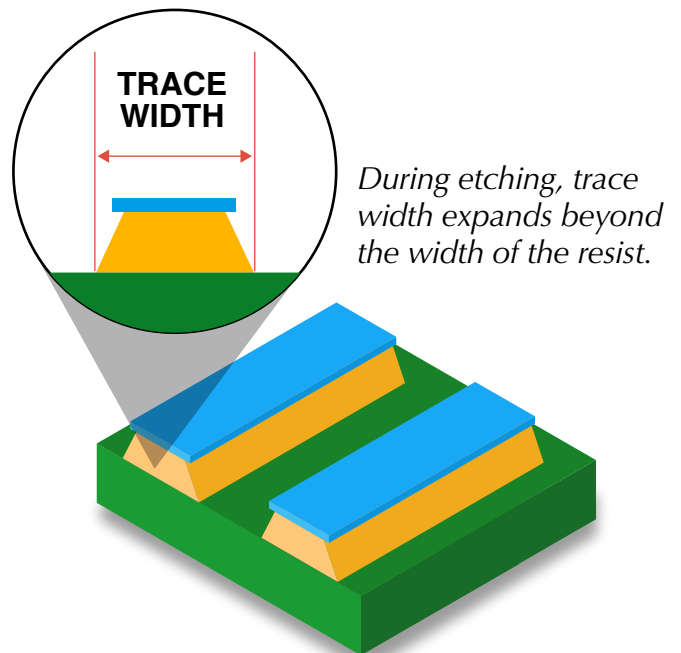
Design tips:

- For accurate starting copper weight, **add a half mil (.0005") to all copper features.**
- **Start with 3/8 or 1/4 oz. foil**, reducing etch comp and less likely to cause a spacing issue.
- **Boards that call for full body electrolytic gold are not comped** to avoid gold slivers occurring during the etching process.

Before etching



After etching



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Getting the Most from a Trade Show

Article by Dan Beaulieu

D.B. MANAGEMENT GROUP

Trade shows are the heartbeat of our industry. They bring together suppliers, customers, partners, and competitors all under one roof—a perfect storm of opportunities waiting to be seized. Yet, I’ve seen far too many people wander the floor aimlessly or hide in their booths, squandering the potential of these events. Attending a trade show isn’t just about showing up—it’s about showing up prepared, with purpose, and with a plan to extract maximum value from your time there. Here’s how you can make the most of your trade show experience, whether you’re attending the technical conference, walking the show floor, or both.

Set Clear Goals Before You Go

Before you even book your ticket, ask yourself, “Why am I attending this trade show?” Are you there to network? Scout for new suppliers? Learn about cutting-edge technology? Promote your company? The clearer your objectives, the more likely you are to achieve them. If you’re attending as part of a company team, sit down together and align your goals. Decide who will focus on what, be it customer meetings, competitor analysis, or attending conference sessions. Going in with a game plan ensures you don’t waste time once you’re on-site.



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NPI Technologies

Delivering
Breakthrough Operational
Improvement



I-Connect007	3520
Ideal-tek	3740
IDENTCO	2632
IKEUCHI USA	1900
Indium Corporation	1416
INGUN USA	1344
Innovative Microscopes LLC	1626
Inovaxe Corporation	915
Insulectro	4138
Integrated Process Systems, Inc.	4605
Intraratro Corporation	732
Inventec Performance Chemicals USA, LLC	1648
IPC	3514
IPC Education Foundation	3514

Research, Research, Research

Trade shows are a whirlwind of activity. Without preparation, you'll quickly get lost in the chaos. Here's what you need to do:

- **Study the exhibitor list:** Review the list of companies and identify which booths you want to visit. Prioritize the ones that align with your goals.
- **Review the conference agenda:** Technical conferences often run parallel to the show floor. If you're looking for insights or solutions to specific problems, these sessions can be gold mines of information. Highlight the ones that matter to you.
- **Set appointments in advance:** Don't rely on chance to meet key contacts. Reach out before the show to schedule meetings with suppliers, partners, or potential customers.

By walking in prepared, you'll maximize your efficiency and make every minute count.

The Technical Conference vs. the Show Floor

One of the most common mistakes I see is attendees treating the technical conference and the show floor as completely separate events. They're not. Each serves a unique purpose, but together, they offer a holistic view of the industry.

- **The technical conference:** This is where you dive deep, learning about emerging trends, new technologies, and innovative solutions. The speakers are often industry leaders, and the insights they share can spark ideas or solve problems you've been wrestling with. Bring a notebook (or tablet) and ask questions. The people in these sessions are typically more focused than the casual passersby on the show floor. Use the opportunity to connect with like-minded professionals.
- **The show floor:** The floor is about breadth rather than depth. It's a place to see what's out there, gather market intelligence, and get hands-on with new products. Many vendors offer live demos; take advantage of these. They provide insights you won't get from a brochure.

The key is to balance the two. Don't spend all your time in conference sessions and miss the action on the floor, or vice versa. Map out your schedule to get the best of both worlds.

Engage, Don't Just Observe

A trade show is not a spectator sport. You're there to participate. Here's how to engage effectively:

- **Ask questions:** When visiting a booth, don't just grab a brochure and walk away. Talk to the representatives. Ask about their products, their company, and how they might solve your specific challenges.
- **Actively network:** Introduce yourself to people. Use networking events, lunches, or even chance encounters in hallways to build connections. You never know who you might meet.
- **Join the conversations:** If you're attending a panel or session, contribute to the Q&A or post-session discussions. People will remember you if you engage thoughtfully.

Remember, the more effort you put into engaging with others, the more value you'll get in return.

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Maximize Your Time on the Floor

The show floor is massive, and time is limited. Here's how to make the most of it:

- **Divide and conquer:** If you're attending with colleagues, split up to cover more ground. Share notes at the end of each day.
- **Focus on priorities:** Don't get distracted by flashy displays that aren't relevant to your goals. Stick to your plan but leave a little room for unexpected discoveries.
- **Take notes:** You'll encounter a lot of information—products, technologies, and people. Write it down, take photos, or use an app to keep track. You'll thank you later.

Pro tip: Comfortable shoes are a must. You'll be walking miles. I like to track my steps. The most I walked at one CPCA show was 16,000 steps which is about nine miles.

Bring the Right People

Trade shows are team sports. The people you bring can make or break your experience. Here's who should be on your team:

- **Technical experts:** If you're scouting for solutions, bring someone who can ask the right technical questions.

- **Salespeople:** They're there to pitch, network, and generate leads.
- **Decision-makers:** If you're seriously considering a new partnership or investment, make sure someone with authority is present.

But don't overdo it; bringing too many people can lead to confusion and inefficiency.

Follow Up After the Show

This is where most people drop the ball. They leave the trade show with a bag full of business cards and brochures, and then... nothing. Don't let that be you.

- **Organize your contacts:** After the show, take the time to categorize your new connections. Who are potential customers? Who are suppliers? Who are valuable industry contacts?
- **Send follow-up emails:** A quick "It was great meeting you" email can go a long way in building relationships.
- **Share insights with your team:** If you attended sessions or gathered market intelligence, share it with your colleagues. The value of a trade show extends beyond the people who attended.

The follow-up is where you turn your trade show experience into tangible results.



Other Observations and Tips

- **Use social media:** Many trade shows have hashtags. Use them to share your experiences, connect with attendees, and stay updated on what's happening.
- **Be open to surprises:** Some of the best discoveries at trade shows are the ones you didn't plan for. Leave a little flexibility in your schedule for serendipity.
- **Take care of yourself:** Trade shows are exhausting. Stay hydrated, eat well, and get enough rest to keep your energy levels up.

Trade shows are what you make of them. They're not just about booths and brochures—they're about connections, learning, and opportunities. Whether you're walking

the floor, attending a technical conference, or networking over coffee, every interaction is a chance to grow your business and expand your horizons.

So, the next time you attend a trade show, don't just show up. Show up with purpose. Engage, learn, and leave with something that moves the needle for your company. That'll get you the biggest bang for your trade show buck. **SMT007**



Dan Beaulieu is an I-Connect007 columnist. To read his columns, [click here](#).

Faster Space Communication With Record-sensitive Receiver

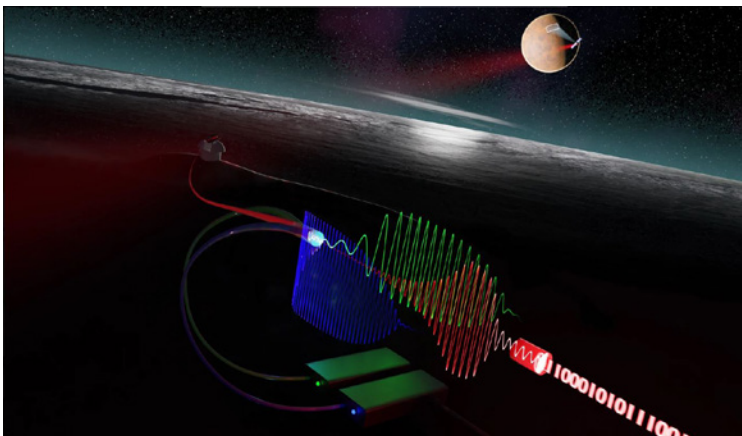
In space exploration, long-distance optical links can now be used to transmit images, films and data from space probes to Earth using light. But for the signals to reach all the way and not be disturbed along the way, hypersensitive receivers and noise-free amplifiers are required. Now, researchers at Chalmers University of Technology in Sweden have created a system that, with a silent amplifier and record-sensitive receiver, paves the way for faster and improved space communication.

The researchers' communication system uses an optical amplifier in the receiver that amplifies

the signal with the least possible noise so that its information can be recycled. Just like the glow of a flashlight, the light from the transmitter widens and weakens with distance. Without amplification, the signal is so weak after the space flight that it is drowned out by the electronic noise of the receiver. After twenty years of struggling with disturbing noise that impaired the signals, the research team at Chalmers was able to demonstrate a noise-free optical amplifier a few years ago.

Due to the limited resources and minimal space on board a space probe, it is important that the transmitter is as simple as possible. By allowing the receiver on Earth to generate two of the three light frequencies needed for noise-free amplification, and at the same time allowing the transmitter to generate only one frequency, the Chalmers researchers were able to implement the noise-free amplifier in an optical communication system for the first time. The results show an outstanding sensitivity, while complexity at the transmitter is modest.

(Source: Chalmers University of Technology)



Global Citizenship in Environmental Sustainability

Global Citizenship

by Tom Yang, CEE PCB

Today's businesses operate across borders to shape economies, communities, and the environment. With this reach comes responsibility. The concept of global citizenship has grown from a philanthropic ideal to a pressing necessity, urging businesses to think beyond profits to minimize their environmental footprint. Companies must enact change by adopting sustainable practices. Global citizenship in business can drive environmental sustainability, offering insights into balancing profit with responsibility, navigating diverse regulations, and building a culture that prioritizes the planet.

Profit-driven motives can coexist with environmental responsibility when companies view sustainability as a path to long-term resilience. The costs of sustainable initiatives such as green

or renewable energy may initially be high. However, when businesses consider long-term savings and the growing consumer preference for eco-friendly brands, these investments become strategic rather than ethical concerns.

For example, Unilever's Sustainable Living Plan focused on resource efficiency and eco-friendly products and subsequently the company reduced its carbon emissions and attracted consumers committed to sustainability. Many global companies are also adopting circular economy models, which focus on minimizing waste using renewable materials. This approach has lowered costs and improved brand image, making it a viable strategy for companies of all sizes.

A significant challenge for global businesses





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is environmental regulations that vary across the globe. In regions with strict environmental laws, such as the European Union, companies are required to meet high standards, whereas in other regions, regulations may be less stringent or non-existent.

To address these concerns, some companies adopt a “highest common denominator” approach, voluntarily upholding the strictest environmental standards across all locations. This can increase costs in the short term but demonstrates a commitment to environmental protection that resonates with eco-conscious consumers. For instance, IKEA has implemented consistent, sustainable practices globally. This not only sets an example for other businesses but also helps corporate actions align with global citizenship values.

Collaboration is essential to achieving meaningful sustainability goals. Partnerships among governments, NGOs, and corporations can foster global solutions to environmental challenges. For instance, the Paris Agreement set a shared, international vision and direction for tackling climate change. Businesses can support these global initiatives by aligning their goals with the broader objectives of reducing emis-

sions and promoting sustainable development.

Corporate partnerships, such as the Global Green Alliance, encourage collaboration among companies to develop and share sustainable technologies. By pooling resources and expertise, companies can innovate more efficiently and reduce costs associated with eco-friendly technologies. For example, the electronics industry has made strides in sustainable production by sharing research on recyclable materials and energy-efficient manufacturing. Additionally, companies can leverage these alliances to create industry-wide standards that drive change more effectively.

Studies show that consumers—especially Millennials and Gen Zs—are more likely to support brands that demonstrate environmental responsibility. Patagonia, known for its commitment to environmental activism, has capitalized on this trend. Patagonia’s dedication to sustainability—from using recycled materials to actively supporting conservation initiatives—has earned it a loyal customer base. Similarly, brands in various industries are rethinking product lifecycles, using recycled materials, and reducing packaging waste. These practices not only enhance brand

loyalty but also increase customer lifetime value, proving that sustainability can drive revenue growth.

Reducing carbon emissions is one of the most impactful ways companies can contribute to environmental sustainability. However, identifying the most effective areas for reduction requires a comprehensive understanding of the company’s entire operation. Energy usage, transportation, and supply chain management are the primary sources of emissions. One effective strategy is to



invest in energy-efficient infrastructure. Google, for example, has pledged to run its data centers on carbon-free energy by 2030.

Supply chain management offers additional opportunities for reducing emissions. Companies can partner with suppliers that share their sustainability goals or implement standards that encourage eco-friendly practices across the supply chain. Additionally, logistics optimization—such as choosing more fuel-efficient routes or using EV transportation—can significantly reduce a company’s carbon footprint.

Creating a corporate culture that values sustainability requires more than implementing eco-friendly policies; it must be part of the organization’s core values. Leadership must set the tone, and employee engagement is also important. When employees understand the impact of their actions and feel empowered to contribute to eco-friendly initiatives, sustainability becomes a shared responsibility. To achieve this, companies can offer training in sustainable practices, involve employees in eco-friendly projects, and reward efforts that contribute to environmental goals. For instance, Adobe has a Green Team program, where employees can participate in environmental projects and bring their sustainability ideas to life, thereby fostering a culture where sustainability is everyone’s responsibility, not just a corporate initiative.

Other companies that also lead by example include:

Levi Strauss & Co.

The clothing company has made strides in reducing water usage and chemicals in its manufacturing process, launching its “Water Less” initiative. Levi’s commitment to sustainable practices has improved its environmental impact and inspired similar practices in the fashion industry.

Apple

The company is working toward a zero-carbon footprint across its supply chain by 2030. By focusing on recycling, sustainable sourcing,



and renewable energy, Apple has set ambitious goals emphasizing its role as a global citizen in environmental sustainability.

The role of global citizenship in environmental sustainability is not only about moral responsibility but also about long-term survival and success. As businesses expand their reach across borders, they have the opportunity and responsibility to address environmental challenges. Balancing profit with sustainable practices, navigating international regulations, and embracing collaborations is part of this journey. By building a culture that values sustainability, identifying areas to reduce emissions, and demonstrating genuine commitment, companies can make a lasting, positive impact on the environment.

Those of us in electronics, especially those who fabricate PCBs, have a responsibility to support sustainability. CEE has invested nearly \$30 million over the past few years to ensure our factories are completely environmentally friendly. We do this because it is the right thing to do. We must protect our environment for future generations. **SMT007**



Tom Yang is CEO of CEE PCB. To read past columns, [click here](#).



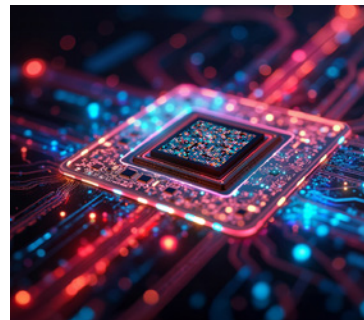
Standard of Excellence: Hiring for Quality Positions in Manufacturing, Engineering, and Management

In continuing my series on finding, signing, and keeping good people for your company, this month we discuss hiring good people for your quality department. Even when hiring was easier, hiring for the quality department has always been especially challenging. It takes a special kind of person: someone with attention to detail, someone ready to stand for his or her convictions, and someone who can stand up under pressure when the company needs to ship product and the quality manager refuses to because it is not up to par. The quality department is the very soul of any manufacturing company.

North American EMS Industry Up 14.7% in October 2024

“The October book-to-bill ratio for the North American EMS industry slightly trailed the long-term trend. Although orders have declined for two consecutive months, the year-to-date performance remains solid,” said Shawn DuBravac, Ph.D., IPC’s chief economist. “Shipments, which had been subdued earlier this year, have now increased for four consecutive months, suggesting improving momentum.”

The Knowledge Base: The Impact of Harsh Environments on Residue Tolerance



Electronic devices are ubiquitous, performing critical functions in a wide range of applications. Many of these devices operate in harsh environments

characterized by extremes in temperature, humidity, pollution, and chemical exposure.



The Training Connection Difference

Bert Horner, president of The Test Connection, has recently launched The Training Connection, a new company that addresses critical training needs in test engineering and development, with a focus on essential methodologies like design for test (DFT) and IPC standards.

IPC Introduces First Standard for In-mold Electronics

IPC announces the release of IPC-8401, Guidelines for In-Mold Electronics. This standard addresses in-mold electronics (IME) technology, providing industry consensus on guidelines for manufacturing processes, part structures, material selection, and production test methods to integrate printed electronics and components into 3D smart structures.

Closing the Loop: iNEMI Workshop Addresses Circularity Challenges



The electronics industry faces increasing pressure from consumers and regulators to implement more circular design principles in their products. While some companies lead the way, many grapple with significant knowledge gaps. These include a lack of clear definitions for “circular economy” in the context of electronics, insufficient data, and inadequate training to apply circular principles effectively across product lifecycles.

Incap's Christmas Jumper Day Raises Donations for Charity

Incap UK's Christmas Jumper Day was a wonderful opportunity to combine festive fun with charitable giving. Team members wore their favorite Christmas jumpers, raising £169.89 for a good cause. Incap UK matched the amount raised, doubling the total to £339.78. The funds will support important initiatives, spreading positivity during the holiday season.



Global Citizenship: What I've Learned About the American PCB Business

Navigating the complexities of the American PCB business has been an eye-opening experience. During my time in America, I have become more familiar with the American PCB business and doing business here.

AI Servers and EVs Drive China's PCB Industry to \$26.79bn in 2024

The Taiwan Printed Circuit Association (TPCA) and the Industrial Technology Research Institute (ITRI) recently released the 2024 China PCB Industry Dynamics Report. It reveals that China's PCB industry accounted for approximately 30.5% of the global market in 2023, with an output value of \$22.98 billion, ranking second worldwide.

Winners of IPC Hand Soldering World Championship at electronica 2024 Announced

IPC hosted its Hand Soldering World Championship in Munich, Germany, at electronica on 14-15 November 2024. Skilled contestants competed to build an electronics assembly in accordance with IPC-A-610 Class 3 criteria, and were judged on the functionality of the assembly, compliance with the assembly process and overall product quality.



For the latest news and information, visit [SMT007.com](https://www.smt007.com)

Find Industry-experienced Candidates at jobConnect007



For just \$975, your 200-word, full-column ad will appear in the Career Opportunities section of all three of our monthly magazines, reaching circuit board designers, fabricators, assemblers, OEMs, suppliers and the academic community.

In addition, your ad will:

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Career Opportunities



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Sales Coordinator

Come join the sales team at ASC Sunstone Circuits in Mulino, Oregon, as our Sales Coordinator! This position is responsible for ensuring the seamless processing, tracking, and delivery of customer orders while providing exceptional client communication and internal coordination. Some of the duties include:

- Order processing
- Order tracking and status updates
- Customer communication
- Internal coordination with sales, production, and shipping
- Administrative support

Education & Experience

A high school diploma or GED is required for this role. In addition to the education requirement, a minimum of two years of related experience in an administrative or support role, within a sales or customer service environment, is required. An equivalent combination of education, training, and experience may satisfy these requirements.

Knowledge, Skills, and Abilities

The ability to adjust to new situations, environments, and changing priorities, to effectively convey information and ideas through written, verbal, and non-verbal means; and proficiency in Microsoft Office Suite or related programs are essential.

Benefits

- 401(k) matching
- Dental insurance
- Employee assistance program
- Flexible spending account
- Health insurance
- Life insurance
- Paid time off
- Vision insurance

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PCB Manufacturing Technician

Join the Team at
Accurate Circuit Engineering!

Located in Santa Ana, California, Accurate Circuit Engineering (ACE) delivers high-quality PCB solutions with a focus on innovation and precision.

Role: Accurate Circuit Engineering is looking for detail-oriented PCB Manufacturing Technicians for all areas in PCB manufacturing. Responsibilities include operating manufacturing equipment, performing quality checks, and documenting production data.

Qualifications:

- High school diploma or equivalent; technical training preferred
- Experience in PCB manufacturing or electronics assembly a plus
- Strong attention to detail and ability to follow instructions
- Familiarity with PCB manufacturing and testing tools is advantageous

What ACE Offers:

- Competitive wages and benefits
- Career growth opportunities
- Supportive work environment with comprehensive training

To apply, send your resume and cover letter to sales@ace-pcb.com with the subject "PCB Manufacturing Technician Application."

Accurate Circuit Engineering is an equal-opportunity employer and values diversity in the workplace.

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Career Opportunities



American Standard Circuits

Creative Innovations In Flex, Digital & Microwave Circuits

CAD/CAM Engineer

Summary of Functions

The CAD/CAM engineer is responsible for reviewing customer supplied data and drawings, performing design rule checks and creating manufacturing data, programs, and tools required for the manufacture of PCB.

Essential Duties and Responsibilities

- Import customer data into various CAM systems.
- Perform design rule checks and edit data to comply with manufacturing guidelines.
- Create array configurations, route, and test programs, penalization and output data for production use.
- Work with process engineers to evaluate and provide strategy for advanced processing as needed.
- Itemize and correspond to design issues with customers.
- Other duties as assigned.

Organizational Relationship

Reports to the engineering manager. Coordinates activities with all departments, especially manufacturing.

Qualifications

- A college degree or 5 years' experience is required. Good communication skills and the ability to work well with people is essential.
- Printed circuit board manufacturing knowledge.
- Experience using CAM tooling software, Orbotech GenFlex®.

Physical Demands

Ability to communicate verbally with management and coworkers is crucial. Regular use of the telephone and e-mail for communication is essential. Sitting for extended periods is common. Hearing and vision within normal ranges is helpful for normal conversations, to receive ordinary information and to prepare documents.

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Europe Technical Sales Engineer

Taiyo is the world leader in solder mask products and inkjet technology, offering specialty dielectric inks and via filling inks for use with microvia and build-up technologies, as well as thermal-cure and UV-cure solder masks and inkjet and packaging inks.

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1. To promote, demonstrate, sell, and service Taiyo's products
2. Assist colleagues with quotes for new customers from a technical perspective
3. Serve as primary technical point of contact to customers providing both pre- and post-sales advice
4. Interact regularly with other Taiyo team members, such as: Product design, development, production, purchasing, quality, and senior company managers from Taiyo group of companies

ESSENTIAL DUTIES:

1. Maintain existing business and pursue new business to meet the sales goals
2. Build strong relationships with existing and new customers
3. Troubleshoot customer problems
4. Provide consultative sales solutions to customers technical issues
5. Write monthly reports
6. Conduct technical audits
7. Conduct product evaluations

QUALIFICATIONS / SKILLS:

1. College degree preferred, with solid knowledge of chemistry
2. Five years' technical sales experience, preferably in the PCB industry
3. Computer knowledge
4. Sales skills
5. Good interpersonal relationship skills
6. Bilingual (German/English) preferred

To apply, email: BobW@Taiyo-america.com with a subject line of "Application for Technical Sales Engineer".

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Career Opportunities



Sr. Test Engineer (STE-MD)

The Test Connection, Inc. is a test engineering firm. We are family owned and operated with solid growth goals and strategies. We have an established workforce with seasoned professionals who are committed to meeting the demands of high-quality, low-cost and fast delivery.

TTCI is an Equal Opportunity Employer. We offer careers that include skills-based compensation. We are always looking for talented, experienced test engineers, test technicians, quote technicians, electronics interns, and front office staff to further our customer-oriented mission.

- Candidate would specialize in the development of in-circuit test (ICT) sets for Keysight 3070 (formerly Agilent & HP), Teradyne/GenRad, and Flying Probe test systems.
- Strong candidates will have more than five years of experience with in-circuit test equipment. Some experience with flying probe test equipment is preferred. A candidate would develop, and debug on our test systems and install in-circuit test sets remotely online or at customer's manufacturing locations nationwide.
- Proficient working knowledge of Flash/ISP programming, MAC Address and Boundary Scan required. The candidate would also help support production testing implementing Engineering Change Orders and program enhancements, library model generation, perform testing and failure analysis of assembled boards, and other related tasks. An understanding of stand-alone boundary scan and flying probe desired.
- Some travel required. Positions are available in the Hunt Valley, Md., office.

Contact us today to learn about the rewarding careers we are offering. Please email resumes with a short message describing your relevant experience and any questions to careers@ttci.com. Please, no phone calls.

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Rewarding Careers

Take advantage of the opportunities we are offering for careers with a growing test engineering firm. We currently have several openings at every stage of our operation.

The Test Connection, Inc. is a test engineering firm. We are family owned and operated with solid growth goals and strategies. We have an established workforce with seasoned professionals who are committed to meeting the demands of high-quality, low-cost and fast delivery.

TTCI is an Equal Opportunity Employer. We offer careers that include skills-based compensation. We are always looking for talented, experienced test engineers, test technicians, quote technicians, electronics interns, and front office staff to further our customer-oriented mission.

Associate Electronics Technician/Engineer (ATE-MD)

TTCI is adding electronics technician/engineer to our team for production test support.

- Candidates would operate the test systems and inspect circuit card assemblies (CCA) and will work under the direction of engineering staff, following established procedures to accomplish assigned tasks.
- Test, troubleshoot, repair, and modify developmental and production electronics.
- Working knowledge of theories of electronics, electrical circuitry, engineering mathematics, electronic and electrical testing desired.
- Advancement opportunities available.
- Must be a US citizen or resident.

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Career Opportunities



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Premier Training & Certification

IPC Instructor Longmont, CO

This position is responsible for delivering effective electronics manufacturing training, including IPC certification, to adult students from the electronics manufacturing industry. IPC Instructors primarily train and certify operators, inspectors, engineers, and other trainers to one of six IPC certification programs: IPC-A-600, IPC-A-610, IPC/WHMA-A-620, IPC J-STD-001, IPC 7711/7721, and IPC-6012.

IPC instructors will primarily conduct training at our public training center in Longmont, Colo., or will travel directly to the customer's facility. It is highly preferred that the candidate be willing to travel 25–50% of the time. Several IPC certification courses can be taught remotely and require no travel or in-person training.

Required: A minimum of 5 years' experience in electronics manufacturing and familiarity with IPC standards. Candidate with current IPC CIS or CIT Trainer Specialist certifications are highly preferred.

Salary: Starting at \$30 per hour depending on experience

Benefits:

- 401k and 401k matching
- Dental and Vision Insurance
- Employee Assistance Program
- Flexible Spending Account
- Health Insurance
- Health Savings Account
- Life Insurance
- Paid Time Off

Schedule: Monday thru Friday, 8–5

Experience: Electronics Manufacturing: 5+ years (Required)

License/Certification: IPC Certification—Preferred, Not Required

Willingness to travel: 25% (Required)

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**Prototron
Circuits**

Sales Representatives

Prototron Circuits, a market-leading, quick-turn PCB manufacturer located in Tucson, AZ, is looking for sales representatives for the Utah/Colorado, and Northern California territories. With 35+ years of experience, our PCB manufacturing capabilities reach far beyond that of your typical fabricator.

Reasons you should work with Prototron:

- Solid reputation for on-time delivery (98+% on-time)
- Capacity for growth
- Excellent quality
- Production quality quick-turn services in as little as 24 hours
- 5-day standard lead time
- RF/microwave and special materials
- AS9100D
- MIL-PRF- 31032
- ITAR
- Global sourcing option (Taiwan)
- Engineering consultation, impedance modeling
- Completely customer focused team

Interested? Please contact Russ Adams at (206) 351-0281 or russa@prototron.com.

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Career Opportunities



Arlon EMD, located in Rancho Cucamonga, California, is currently interviewing candidates for open positions in:

- **Engineering**
- **Quality**
- **Various Manufacturing**

All interested candidates should contact Arlon's HR department at 909-987-9533 or email resumes to careers.ranch@arlonemd.com.

Arlon is a major manufacturer of specialty high-performance laminate and prepreg materials for use in a wide variety of printed circuit board applications. Arlon specializes in thermoset resin technology, including polyimide, high Tg multifunctional epoxy, and low loss thermoset laminate and prepreg systems. These resin systems are available on a variety of substrates, including woven glass and non-woven aramid. Typical applications for these materials include advanced commercial and military electronics such as avionics, semiconductor testing, heat sink bonding, High Density Interconnect (HDI) and microvia PCBs (i.e. in mobile communication products).

Our facility employs state of the art production equipment engineered to provide cost-effective and flexible manufacturing capacity allowing us to respond quickly to customer requirements while meeting the most stringent quality and tolerance demands. Our manufacturing site is ISO 9001: 2015 registered, and through rigorous quality control practices and commitment to continual improvement, we are dedicated to meeting and exceeding our customers' requirements.

For additional information please visit our website at www.arlonemd.com

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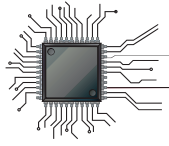
Are You Our Next Superstar?!

Insulectro, the largest national distributor of printed circuit board materials, is looking to add superstars to our dynamic technical and sales teams. We are always looking for good talent to enhance our service level to our customers and drive our purpose to enable our customers to build better boards faster. Our nationwide network provides many opportunities for a rewarding career within our company.

We are looking for talent with solid background in the PCB or PE industry and proven sales experience with a drive and attitude that match our company culture. This is a great opportunity to join an industry leader in the PCB and PE world and work with a terrific team driven to be vital in the design and manufacture of future circuits.

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Career Opportunities



MivaTek

Global

Field Service Technician

MivaTek Global is focused on providing a quality customer service experience to our current and future customers in the printed circuit board and microelectronic industries. We are looking for bright and talented people who share that mindset and are energized by hard work who are looking to be part of our continued growth.

Do you enjoy diagnosing machines and processes to determine how to solve our customers' challenges? Your 5 years working with direct imaging machinery, capital equipment, or PCBs will be leveraged as you support our customers in the field and from your home office. Each day is different, you may be:

- Installing a direct imaging machine
- Diagnosing customer issues from both your home office and customer site
- Upgrading a used machine
- Performing preventive maintenance
- Providing virtual and on-site training
- Updating documentation

Do you have 3 years' experience working with direct imaging or capital equipment? Enjoy travel? Want to make a difference to our customers? Send your resume to N.Hogan@MivaTek.Global for consideration.

More About Us

MivaTek Global is a distributor of Miva Technologies' imaging systems. We currently have 55 installations in the Americas and have machine installations in China, Singapore, Korea, and India.

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Opportunities are available in Canada, New England, California, and Chicago. If you love teaching people, choosing the classes and times you want to work, and basically being your own boss, this may be the career for you. EPTAC Corporation is the leading provider of electronics training and IPC certification and we are looking for instructors that have a passion for working with people to develop their skills and knowledge. If you have a background in electronics manufacturing and enthusiasm for education, drop us a line or send us your resume. We would love to chat with you. Ability to travel required. IPC-7711/7721 or IPC-A-620 CIT certification a big plus.

Qualifications and skills

- A love of teaching and enthusiasm to help others learn
- Background in electronics manufacturing
- Soldering and/or electronics/cable assembly experience
- IPC certification a plus, but will certify the right candidate

Benefits

- Ability to operate from home. No required in-office schedule
- Flexible schedule. Control your own schedule
- IRA retirement matching contributions after one year of service
- Training and certifications provided and maintained by EPTAC

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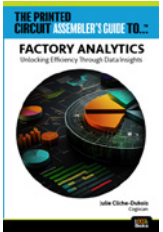
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“This book will prove valuable for those actively pursuing low-temperature solder conversion of their manufacturing processes.”

Kevin Byrd
Principal Engineer, Intel Corporation

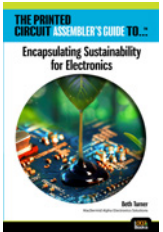
Look Inside

Factory Analytics: Unlocking Efficiency Through Data Insights

by Julie Cliche-Dubois, Cogiscan

Using and understanding factory analytics is the future for electronics manufacturers. In this fast-changing, deeply competitive, and margin-tight industry, factory analytics can be the key to unlocking untapped improvements to guarantee a thriving business. [Add this essential book to your library.](#)

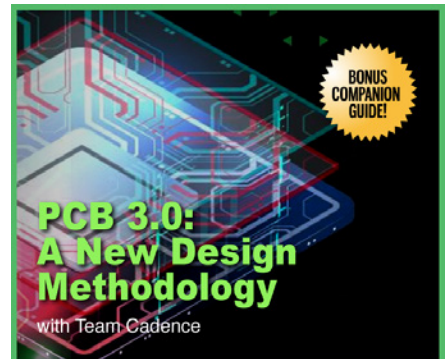


Encapsulating Sustainability for Electronics

by Beth Turner, MacDermid Alpha Electronics Solutions

This book discusses the growing demand for sustainable solutions in the market and highlights examples of bio-based resins and the demand from emerging technologies. [Learn about aspects such as their chemistry, application, and relevant test methods in different industries.](#)

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