

BEST-IN-CLASS Component Risk Mitigation Practices to Avert Procuring Counterfeits

An electronics industry perspective of the challenges of mitigating counterfeit parts risk

By Editorial Staff

Supply & Demand Chain Executive recently hosted a discussion among a select group of electronics industry veterans with extensive professional experience on the frontlines of the battle against counterfeit and suspect electronic parts. The roundtable came together at the initiative of Mark Northrup, director of advanced technical operations with IEC Electronics Corp., a contract electronics manufacturer based in Newark, N.Y. Northrup has more than 25 years of experience in the industry, has been helping lead the charge against counterfeits within IEC, and has written and presented on the topic before industry audiences. Participants included Clifton Aldridge's colleagues at Dynamic Research and Testing Laboratories (DRTL), LLC and representatives from Global IC Trading Group, a Laguna Hills, Calif.-based electronics distributor and a supplier to IEC, and IHS, a Denver-based provider of technology solutions for managing parts obsolescence and counterfeit parts risk.

Extent of the Threat

The discussion kicked off by looking at the extent of the challenge related to counterfeit and suspect parts in the electronics supply chain. Addressing the scope of the problem, Albuquerque-based Felipe Villegas, a senior component engineer with IEC Electronics, said that, in his experience, the number of incidents of counterfeits and suspect parts has been rising. "We're coming across a lot of counterfeits, and thank goodness we have a mitigation program to help keep counterfeits at bay," he commented. Clifton Aldridge indicated that at DRTL, he typically requires at a minimum a Destructive Physical Analysis (DPA) approach as part of the mitigation plan.

While many reasons have been cited for the increased occurrence of counterfeits (removal of trade barriers with countries where counterfeits are easily produced, increase in e-waste, easier access to markets through the Internet), Villegas added that the challenge of managing counterfeits

has become more complex because of changes in the electronics distribution industry, too. For example, he said that he is starting to see some franchised distributors selling broker parts, increasing the risk of a counterfeit coming into the company. "At receiving and inspection, when they see a franchised distributor sending a broker part with a certification from the broker, they don't recognize that, they just think that it's another legitimate manufacturer source," he explained.

Villegas cited a recent incident in which he was getting product in from a distributor that is franchised and independent. The part in question was obsolete and hard to find, but a franchised distributor he contacted said that one of their suppliers had it. He didn't question who the supplier was, and didn't feel like he had any reason to. When they received the parts in the back, he went back to take a look at them because he needed a photo of a "golden part," since he couldn't find a known good part. When he looked

at the box and the paperwork to make sure that everything was there, he saw that the paperwork had come from a broker. He said that he was amazed that the distributor hadn't informed him that they were going to get broker parts. Subsequently he went through a corrective action with the distributor to make sure that they identify from whom a part is coming. "They were calling a broker a 'supplier,'" he says. "You can't do that – you have to get the terminology straight so that we, the end users, know what we're getting."

The Link to Obsolescence

Brian Schirano, a subject matter expert with the Electronic Parts and Solutions Group at IHS, Inc., said that the battle against counterfeits has become more complicated as counterfeiters refine their own methodologies. "Counterfeiters are getting more sophisticated," he said. "They can take, for example, a reel of parts and drop in their counterfeits randomly. That's causing more and more people to go to 100 percent testing."

Schirano, who formerly worked in industry as a supply chain manager for electronic components, also links the rise of counterfeits to the challenge of obsolescence in the electronics supply chain. As parts reach their end-of-life and become obsolete, manufacturers must increasingly turn to the open market to find the components they need to support customers using products containing those parts – a particularly difficult challenge for products with long or repeatedly extended lifecycles.

A program for managing parts obsolescence can help alleviate this problem by allowing for longer lead times to design out or substitute for parts at risk of obsolescence, or for making lifetime buys or identifying reliable sources for obsolete parts. Schirano noted that there are a variety of technology solutions on the market to enable an effective obsolescence management program. IHS, for example, offers its IHS COMET, BOM Manager and PCNAlert solutions to help companies manage their bills of materials for availability, obsolescence, and environmental and regulatory compliance. These solutions also can provide access to notices of parts that are suspected to be counterfeits or that are at high risk of counterfeiting, with the notices coming from IHS partner ERAI.

Phil Tippens uses the IHS “BoM

Manager” tool at IEC Electronics to periodically upload customers’ BoMs to assess component life cycle status. By using a product lifecycle management tool such as the IHS “BoM Manager” obsolete parts and parts that are nearing end of life can be identified. For the latter, steps can be taken prior to part obsolescence to consider lifetime buys, locate alternate parts, and/or plan for a redesign. These proactive steps help reduce the risk of counterfeit parts when a component becomes obsolete.

Inspecting Suppliers and Parts

Inspection loomed large in the discussion as a tool to help mitigate counterfeits risk. Justin Whitlow, supply chain manager for IEC, described the onsite inspection process that the company employs with suppliers. “We go in depth through their quality processes, we walk around the floors, we ask questions pertaining to supplier selection, and we look at their counterfeit mitigation plan,” he said.

The process is guided by an inspection audit document that includes 33 questions about the supplier’s quality systems and 40 questions of a process nature. Quality questions, for example, range from “Does management have a genuine commitment to develop a quality improvement program that strives

for continuous improvement and zero-defect mentality?” to “Does the Supplier have a system for notifying Customers of potential Delivery Problems?” On the Process side, questions range from “Is there a part-specific or commodity-specific, documented procedure for Incoming Inspection with personnel trained and results documented?” and “Does the supplier use any substances on the banned or restricted list required by customer government?” Each question is scored, and suppliers are given a summary rating that ranges from “Excellence” (95 percent or higher on their summary score) to “Unacceptable” (below 60 percent).

Inspecting incoming parts also figured as a best practice, and the consensus among the discussion participants leaned toward 100 percent inspection. Paul Meyers, president of Global IC Trading Group, which offers inspection services, said his firm recommends 100 percent visual inspection, and Lori Leroy, a co-founder of Global IC, said 80 percent of suspect product the company finds is identified in the detailed visual or microscope inspection. “With the right processes and tools, you will get the majority at that stage,” Meyers said.

In general, Global IC breaks its suppliers out into six categories based on level of counterfeit risk and

Participants in the discussion around counterfeit parts included:

Clifton Aldridge, Laboratory Manager, DRTL, LLC

Lori Leroy, Co-founder, Global IC Trading Group

Paul Meyers, President, Global IC Trading Group

Mark Northrup, Director of Advanced Technical Operations, IEC Electronics Corp

Brian Schirano, SME - Electronic Parts and Solutions Group, IHS, Inc

Rory King, Director, Design & Supply Chain Solutions, IHS, Inc

Phil Tippens, Components Engineer, IEC Electronics Corporation

Felipe Villescás, Senior Component Engineer, IEC Electronics

Justin Whitlow, Supply Chain Manager, IEC Electronics Corp - Albuquerque

Supply & Demand Chain Executive thanks the participants in the discussion process for sharing their time and insights, and particularly thanks Mark Northrup with IEC for his initiative and assistance in coordinating with participants and setting up the discussion.

overlays a sampling plan over those six levels. “For parts coming from factory and franchised distributors, the number of X-rayed and decapped units will be less than for newer suppliers,” Meyers said.

Villescas added, “It’s real key to do 100 percent testing if budget permits, because at times you can encounter mixed lots.” IEC has had instances where they might sample an incoming batch and find 4-5 percent failures, but then they test 100 percent and find a much higher failure rate, indicating a mixed lot of legitimate and counterfeit/suspect parts.

Villescas described IEC’s standard inspection process as implemented by DRL starting out with visual inspection, marking permanency, physical dimension check and solderability. If they find anything suspicious, they can get a sense of whether they can proceed or stop. If everything looks good after the sampling, then they can move on to 100 percent inspection of the full lot. Phase II provides for 100 percent visual inspection on the remaining lot, running it through X-ray, doing a decapsulation on a sampling basis, then running through thermal cycling and C-mode Scanning Acoustic Microscopy (CSAM). Then they should be able to make a determination as to whether to move a lot into acceptance testing and qualification testing. They will terminate with another CSAM just to make sure that they there haven’t been any voids after the acceptance testing.

The Standards Question

The participants generally agreed that standards were a necessary – but not sufficient – tool in the fight against counterfeits. IEC’s Northrup noted that, in many respects, the standards now being applied to counterfeit and suspect parts are

treading over the same ground covered in the past by military standards devoted to part traceability and targeted at substandard parts.

“We’re reinventing the wheel by using the word ‘counterfeit’ versus just saying a substandard part that doesn’t meet the original manufacturer’s test requirements,” he said. “Counterfeits’ is a word that gets everyone in fear-mongering mode, but the military has had a part traceability program in place. If you used it, you’d be able to determine a lot of these parts are substandard.”

The AS5553 standard requires no laboratory auditing. The ISO 17025 is the main standard used by testing and calibration laboratories for certification of proficiency, method validation, and reporting accuracy.

Meyers said that Global IC has been a strong advocate for revising the 1010 standard of the Independent Distributors of Electronics Association (IDEA), which covers inspections, to mandate some destructive analysis, including X-Ray, X-ray fluorescence (XRF), decapsulation and Dynasolve. He also is looking forward to the publication of the AS6081 standard due from SAE International and aimed at providing guidelines for distributors around counterfeits mitigation.

Meanwhile, Global IC’s Leroy has been involved in the development of IDEA-QMS-9090, a quality management system written specifically for the Independent Distribution Industry. “IDEA-QMS-9090 will layer on top of ISO 9001, AS9120 and ANSI/ESD S20.20 certification, with specific components talking about supplier selection, inventory posting, customer provision and the inspection protocol,” she explained. “This will provide one more layer to ensure that your suppliers are doing the best job

that they can to mitigate your risk.” This document is expected by Oct. 1.

The Bottom Line

Northrup said that his No. 1 recommendation for any company is to form a centralized “SWAT” team that understands the tools, systems and processes available to attack this thorny problem. This team must be cross-functional, he said, with representatives from Quality to help the group understand the governing rules and documentation; from Engineering, with a background in electrical or troubleshooting or test engineering; and Sourcing, so that the company’s procurement policies incorporate risk mitigation elements.

Aldridge and Northrup highly influenced IEC Electronics’ decision to invest in building the necessary qualified staff in-house to perform mitigation testing at DRTL. “If you’re going to go to the aftermarket, you need to invest in some form of testing to protect yourself, because it’s going to be a lot less expensive than going through all the rework and recalls,” he said. Leroy noted that companies must be active participants in industry, participating in associations and standards-making bodies. “It’s very beneficial for us to be so actively involved in industry through IDEA,” she said. “We feel like we’re ahead of the game as far as the learning curve, and the information that we share within the organization with our fellow IDEA members is invaluable.”

Finally, Northrup said that companies need to adopt a strategy for managing obsolescence that allows them to design obsolete parts out of their products.

“If we continue to have lifecycle products that have obsolescence to them, we’re going to be on the Wild Wild West market trying to procure parts,” he concluded. ■