

# Risk in the Electronics Value Chain

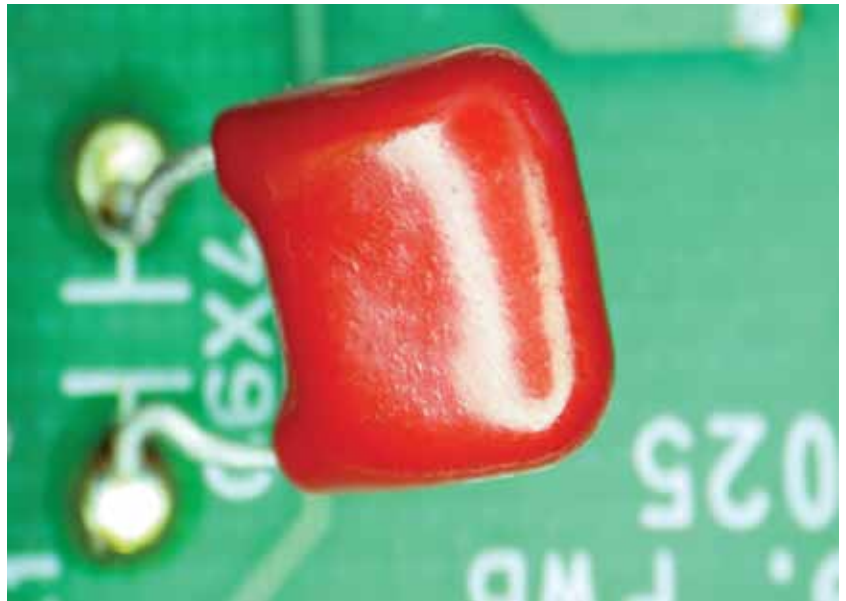
**A V-shaped recovery has companies scrambling and in need of strategies to manage everything from market demand and price volatility to material shortages and counterfeit parts**

*By Editorial Staff*

**T**he Great Recession of 2007-2009 produced an unprecedented impact on the electronics value chain. The sharp drop-off in demand drove weaker components suppliers out of business and hit the bottom lines – and staffing levels – at even the strongest industry suppliers and OEMs. Then the Great Recovery created new havoc as supply constraints on a broad range of components sent OEMs scrambling to meet newly resurgent demand.

This economic instability has compounded the intrinsic imbalance and variability already present in the electronics supply chain and its infamous bullwhip effect, spurred, for example, by technology innovation. To complicate matters, the influence of turbulent markets upon value chains has been exacerbated by the effects of sustainability and related environmental regulations that have imposed obligatory change to otherwise natural supply and demand patterns around critical chemical and materials.

Together, the problematic gyrations from economic duress and regulatory compliance have demonstrated the critical need for predictive analytics to manage component obsolescence, as well as their inherent limitations. Volatility imposed by these forces necessitates equally robust, near “real-time” capabilities to respond to unforeseen supplier and component issues, while also pointing to the need



for companies to get a better handle on tracking component applications and conditions of the markets they serve. Manufacturers across sectors should consider adopting information and insight strategies that strengthen proactive and reactive competencies from long-term strategic planning down to operational daily execution. By doing so, they can upgrade to tools needed to perform adequately in today's global marketplace, while mitigating growing threats from the likes of counterfeit components that pose considerable risk to brand, customer satisfaction and shareholder value.

## **Riding the Wave Down**

The fall and rise of the semiconductor industry over the past

three years are representative of the recession's profound impact on the electronics sector. The semiconductor industry, notoriously cyclical, is tied closely to the health of the overall global economy. But the impact of the past 36 months has been unparalleled in the history of the sector, according to Rick Pierson, senior analyst for semiconductors at the well-known industry analyst firm iSuppli and head of the Component Price Tracking (CPT) Service at the firm. “This was the most significant recession that the semiconductor industry has seen,” Pierson notes “A lot of suppliers ‘went dark’ and actually laid off skilled workers on the front end in the fabs. They were just trying to keep the lights on.”

The impact of the recession on semiconductor companies can be seen in the global bookings of North American-headquartered semiconductor equipment producers, as reported by SEMI, the global industry association serving the manufacturing supply chains for the microelectronic, display and photovoltaic industries. While the industry entered 2008 with a three-month average of billings above the \$1 billion mark, by December 2008 the industry was reporting billings of \$579 million. January 2009 saw a further astonishing drop to \$277 million, a 75 percent fall-off compared to January 2008. The market bottomed out at \$246 million two months later. Other industry sources point to fab utilization within the semiconductor industry, which fell from close to 90 percent in the third quarter of 2008 to just over 30 percent in Q1/2009.

The impact on the broader electronics value chain can be seen in the influx of product end-of-life (EOL) notices issued by component manufacturers in the sector, as tracked by IHS Inc., a leading provider of supply chain information and insight. IHS captures data on product lifecycle events for components across the sector, recording manufacturer-issued alerts regarding new product introduction, product change notification or product end-of-life. IHS records the manufacturer's individual reasons for each event as well as the impacted manufacturer parts, noting whether the lifecycle event is driven by demand-side economics (e.g., a drop-off in sales of the component), environmental compliance or sustainability (e.g., EU RoHS or REACH transitions), technology considerations (e.g., obsolete or new technology), organizational reasons (e.g., M&A, product rationalization), or supply-side economics (e.g., constraints on supply).

IHS insight-tracking EOL notices show that in the three months following Lehman Brothers' filing for Chapter 11 bankruptcy protection on September 15, 2008 – regarded as the spark that set off the financial sector implosion, broadening and deepening the recession – manufacturer end-of-life notices increased nearly 300 percent. This economic reaction from manufacturers spilled over into 2009, where continued weakness brought about a tsunami of end-of-life notices, with the number of EOLs increasing in the neighborhood of 1,000 percent. Overall, IHS data show that

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demand-side factors behind end-of-life notices averaged 17 percent of total EOLs from 2004 through 2008 but surged to 90 percent in 2009 as the drop-off in demand engendered by the recession rippled through the electronics supply chain.

### **The Age of Constraint**

And then, almost as quickly as the recession began in the electronics value chain, it came to an abrupt end. “When the recovery started, it was very dramatic,” says iSuppli's Pierson. He explains that the semiconductor industry reacted rapidly to the downturn by constricting capacity; larger companies in the sector shut down lines, while smaller players shut

their facilities permanently, oftentimes to be bought out by forward-thinking (and cash-rich) majors that were looking to grab market share when the (inevitable) uptick occurred.

Demand in the industry, based on the SEMI-reported billings in the semiconductor industry, had been picking up steadily since bottoming out in March 2009 and ticked up above the \$1 billion mark again in January 2010, but resurgent demand for components in the electronics supply chain created new problems, according to Pierson. Suppliers that had laid off skilled workers and closed down capacity found they were unable to bring capacity back online fast enough to meet orders. “Suppliers were just not prepared for the recovery, and there was this insatiable demand for these commodity-type components. Consequently, what we have now is a constrained environment since the first quarter of 2010,” Pierson explains.

The capacity crunch can be seen in the semiconductor industry's book-to-bill ratio, as reported by SEMI. “Book-to-bill” refers to the total orders booked in a given period against total billings for that period and represents a measure of demand versus supply in the industry. Against a 20-year average of 1.00, the figure fell as low as 0.47 in January 2009, but by January 2010 the ratio had surged back to 1.23 as orders rose rapidly. The ratio averaged 1.18 through the first eight months of 2010 before settling back to 1.03 in September, but Pierson believes that the capacity constraints in the industry will last through Q1 of 2011, despite the recent softening as additional capacity comes back online. “Right now everything that's built is going towards hard backlog, but over the next two or three quarters the supply chain will start accumulating inventory,” the analyst says.

Given the constraints on components

supply that have affected the electronics value chain over the past four quarters, lead times have been increasing across the industry, and suppliers have been devoting capacity to satisfy demand from their largest, most strategic customers, putting the remainder of their customers on allocation. Even the largest OEMs are not immune to parts shortages that impact their own suppliers: Japanese automaker Nissan Motors, for example, was forced in July to stop production lines at four of its domestic plants after a supplier was unable to deliver engine control units due to a shortage of key integrated circuits used in the units. Elsewhere, General Electric reported that supply constraints for electronic components used in its healthcare equipment cost the company \$50 million in sales in one quarter alone this year, according to a *Wall Street Journal* report.

### **The Lesson of the Recession**

The past three years have been a stark reminder of the impact of downside and upside volatility on the supply chain. But it also reinforces the need for an emphasis on supply chain flexibility in the face of parts constraints, whether caused by regulated materials, EOLs in a recession, capacity shortfalls in the upturn or any number of other reasons, according to Rory King, director of global product marketing with IHS.

“The recent turmoil in the economy has resulted in a highly constrained, high-anxiety supply chain. Things were lean to the point of being taught and brittle, with a great deal of skepticism built into any inklings of a recovery in demand,” King says. “Worse, the economic situation overshadowed material shortages imposed by regulations such as EU RoHS and EU REACH that caused both consumers and makers of components containing hazardous substances like lead or DEHP to redesign these out of their

product portfolios. The net effect is a self-manifesting downward slide in manufacturing sources for restricted substances, triggering facility closures, discontinued products or design changes to components using these materials.”

Undetected, product changes or discontinuances can each have serious ramifications on downstream customers. “Many OEMs are sitting there with entire bills of material (BOM) with literally thousands of parts which they have no idea were subject to unforeseen EOL or other supply chain disruptions,” King added. “One systems manufacturer we worked with was not aware

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that more than 35 percent of the components they used had experienced inherent material changes within the components themselves. Not only do situations like this impact the fundamental design characteristics of the components, but being out of sync with materials use can expose them to major risks in areas like price and availability or environmental compliance.”

### **A Future of Expecting the Unexpected**

Some companies are fortunate to have advanced component lifecycle management tools to forecast obsolescence, mitigate obsolescence

issues, and plan strategically to minimize future obsolescence impacts. IHS, for example, offers such advanced analytics, coupled with rich electronic component content, to provide its customers with leading indicators like predicted years to end-of-life (YTEOL) for each electronic component. Customers can use metrics like YTEOL in order to decide whether anticipated future component availability meets their needs or if they should explore alternate parts, manufacturers or designs to optimize and ensure continuity of their supply chain.

But King asserts that many companies still have less advanced obsolescence tools based solely on predictive forecasting – or worse – none at all. He suggests these are insufficient for the current market situation, and he recommends that companies consider, at a minimum, adopting solutions like the IHS alerting services that monitors customer BOM and notifies them of immediate lifecycle, supply chain or regulatory events as they occur. This, he says, allows companies to combine strong proactive planning and mitigation capabilities with the ability to respond to unexpected volatility that flies in the face of what he calls “naturally predictable variability.” “All members of the electronics value chain need to be more acutely aware of unpredictable shocks to the system that create immediate, unexpected component supply and demand discontinuities. Anything less than prompt adaptation to lifecycle and supply chain events means that companies are rolling the dice and likely exposing themselves to part shortages, growing lead times, higher prices or – worse – counterfeit parts.”

And indeed, counterfeits and inferior grade components are a real and present threat to the supply chain. This is apparent from mainstream media coverage, as well as the research

conducted by *Supply & Demand Chain Executive* magazine in 2009 to assess the scope and impact of these components in the supply chain. The research confirmed the widespread impact of these parts on products, operations, brand and safety, in addition to their rapid ascent to the C-suite executive radar among companies throughout the supply chain.

### **Thou Shall Avoid Supply Chain Risk**

Fakes and substandard parts have a particularly troubling impact on industries like aviation or medical devices where the potential loss of human life is real. This was captured quite vividly in the study, where one respondent noted how “counterfeits harm patients and pose a significant risk of death,” while another remarked how “counterfeiting jeopardizes our missions and soldiers’ safety.” Among the study findings, when asked about the gross frequency of counterfeits in their supply chains, the majority of respondents were either unsure (35 percent) or believed that 1-2 percent of the components purchased by their company were suspected counterfeits (28 percent).

These numbers couldn’t be closer to the truth facing manufacturers, according to Mark Snider, founder and president of ERAI, a privately held global information services organization based in Naples, Fla. “It’s common that 1 percent to 3 percent of parts found on bills of material we see coming from OEMs are counterfeit, substandard or high risk parts,” he remarks. “Just one counterfeit part incident poses risk ranging from catastrophic brand and financial damage to costly disruptions such as a halt in production or engineering work associated with a major redesign. When this same 1 to 3 percent is expressed in more absolute terms – real

parts numbering in the hundreds or thousands for most companies – it rightfully sends alarm bells ringing throughout the organization. This should be a real cause for concern for companies lacking formal efforts to mitigate, detect and resolve the threat of counterfeits.”

The increasing incidence of counterfeits throughout the supply chain, the serious threats they pose, and the high level of attention being devoted to the issue, point to the need to view counterfeiting as a strategic supply chain issue, not merely as a tactical part issue. And

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this, according to Snider, is exactly what leading defense contractor L-3 Communications is doing. “I’ve come across very few companies with the organizational engagement and commitment from the executive level, to mobilize the people, process and technology necessary in order to detect and mitigate dangers from potential counterfeit parts,” praised Snider. “L-3 Communications can be a role model for industry in leading the charge when it comes to the mitigation of supply chain risks and component obsolescence.”

L-3 Communications employs more than 63,000 employees and has grown very quickly into one of the largest defense companies in the

United States. In a company known for providing its business units with the latitude to operate autonomously, it has established executive level commitment and mobilized a central effort to combat component obsolescence and counterfeit risk. It has even established a set of guidelines stipulating that all component purchases from independent distributors shall run through the ERAI solution to assess potential risk from counterfeiting. L-3 compliments this with its use of IHS lifecycle management tools to manage component lifecycles and identify potential obsolescence risk.

“While the complexity of the electronics value chain cannot be understated, the issue of information and insight that companies should incorporate to combat today’s generation of market pressures is fairly simple to explain,” King adds. “Take the lessons learned from EU RoHS [restricting lead, cadmium and other substances] and apply these to new US legislation regulating so-called ‘conflict minerals’ like gold, tantalum or other minerals sourced from the Democratic Republic of the Congo. Whether large or small in nature, there should be a material impact to components that results in increased component EOL activity, which is a key indicator for material shortages that, in and of themselves, bring about rising lead times that indicate an imminent increase in marketplace counterfeit part activity. Companies leveraging advanced obsolescence management capabilities, supply chain alerting tools, price/lead time tracking services, and counterfeit detection and resolution solutions are poised to sense and respond each step of the way. This will be to their strategic advantage, while those that don’t will have tactical disadvantage and performance slips along the way. It’s as simple as that.” ■