

Component Obsolescence and its impact on electronic industries. Daniel J. Cahill, Program Manager at Tachus Technologies Inc. July 19th, 2009

Buyers have had to deal with the problem of obsolete parts for years, but the European Union's Restriction of Hazardous Substances (RoHS) law has added a new wrinkle to the issue.

RoHS bans the use of lead and five other substances from being used in equipment sold in Europe. Many suppliers have ceased making parts with lead and the other substances, effectively obsoleting the components. However, rather than issuing an end-of-life (EOL) notice for the parts informing buyers the leaded versions are no longer made, many suppliers issue product change notices (PCN).

While that may seem to be a matter of semantics, it isn't. Many non-leaded parts often can't be used in the same manufacturing processes as leaded parts. The solder temperature for a non-leaded part is higher than a leaded component. So when a manufacturer stops making a leaded part, the component is effectively obsoleted for many companies that used leaded parts.

However, without an EOL notice, buyers may not be aware a noncompliant part will no longer be available. Many OEMs still use noncompliant parts, including defense, aerospace and medical companies, which are exempt from RoHS.

Furthermore RoHS driven obsolescence is almost over in the industry as the European directive has been around since February 2003.

Bryan Brady, vice president and director of the defense aerospace business unit for Avnet Americas, says suppliers have hesitated to classify a product as end-of-life "because they don't want a bunch of returns and they don't want to inspire a lifetime buy cycle."

When a part goes end-of-life the supplier issues a notice telling buyers they have six months to place purchase orders and then the part will become obsolete after 12 months, says Brady.

Brady says suppliers convert the status of the noncompliant part to noncancellable, nonreturnable and attempt to bleed off the channel inventory. "They may even raise prices on the leaded version to try to move the customer bases to lead-free," he says. The product also disappears from the supplier's website.

"This is not sneaky. It's just a way suppliers are trying to mitigate overhang of inventory and move the customer base to the parts they are building," says Brady.

The problem impacts buyers at companies in industries that are exempt from RoHS or are building products strictly for the North American market which isn't governed by European environmental initiative.

The challenges that those buyers face are the same as all buyers who are responsible for sourcing other obsolete parts. Buyers must manage the end-of-life (EOL) and product change notices (PCNs) issued by companies and also find alternative source for the parts obsoleted by component manufacturers.

The job of such buyers is getting harder because the number of EOL notices and PCNs issued by suppliers increases every year in part because of RoHS and because product lifecycles are generally

getting shorter than they were in the past. Often the shorter the product lifecycle, the quicker components become obsolete.

“We see a lot of obsolescence right now. Our rate of publishing notices is increasing,” says Cliff Frescura, CEO of PCNAlert, a company that provides software and services that help companies manage component obsolescence.

He says in 2000, 240,000 EOL notices were issued by suppliers. In 2005 that figure increased to 1.6 million and is forecast to reach several million in 2010.

An increase in the number of notices in itself is not necessarily an issue. The problem is a lot of buyers and engineers who need to be informed when a part goes obsolete never see the notice. The larger a company and the more sites it has, the greater the problem.

“The problem is when a supplier wants to notify customers about an EOL or PCN, they go by who bought the part over the last 24 months,” says Frescura. “Well, if an electronics manufacturing services (EMS) provider has shut down a facility or a contact person has moved to another location that creates a gap in communication,” he says.

He says another issue is a buyer at one site may get the notice, but “doesn't know what to do with it.” In a large company it may not be known which sites are using the part, he says.

Frescura says there needs to be a central point at an OEM or EMS company where all EOL notices go. “That point should have all the AVLs and bills of materials for the company's different sites so the notices can be filtered against the AVLs and BOMs,” says Frescura. Then the notices can be distributed to the sites that use the EOL part.

Once an EOL notice for a part is issued, buyers must find alternate sources for the part, make a lifetime buy or find an aftermarket suppliers to make the part or qualify a new part. Many companies in defense and aerospace industries don't like to substitute a new part because of the high cost to qualify a new component.

“Many times a company would rather pay more for even a custom solution to replace that obsolete part rather than to redesign or qualify a new product,” says Brady.

Brady says there are many options for buyers when a part goes obsolete. “There are multiple responses. The buyer can figure out how many of the soon-to be obsolete parts he needs to support his equipment and place an order. We may negotiate if the buyer wants us to hold the inventory for period of time. The buyer may say, 'we will buy 10,000 pieces but we want you to stock it and ship a certain quantity quarterly,’” says Brady. Avnet will determine the carrying cost and the cost of money and negotiate a price with the buyer.

Avnet and other distributors will often buy obsolete parts from aftermarket supplier Rochester Electronics, based in Newburyport, Mass.

“Typically we go to Rochester first when we are looking for obsolete parts,” says Brady. “If they don't have it then we look to see if we can buy die from the factories and we have relationships with other aftermarket manufacturers that will assemble it on a custom basis for us,” he says.

Rochester says its business is supplying parts “on the trailing edge of technology” and stocks several billion and manufactures over 15,000 different devices discontinued by the original supplier. Products are manufactured using the exact die, assembly piece parts, assembly contractor, test program, test hardware and test system as used by the original supplier during prime production.

In some cases parts have to be emulated. “Emulators will reverse engineer a part and emulate it in the form of an application-specific integrated circuit and provide a form, fit and function replacement,” says Brady.

Many buyers turn to independent distributors for obsolete parts. Independents often buy excess inventories from OEMs, EMS providers or other distributors. Many of those parts are obsolete.

Some independents have obsolete part programs that help buyers manage end-of- life buys. Case in point: Fusion Trade in Andover, Mass. “We have a program called predictable end-of-life inventory management,” says John Irving, executive vice president.

“When an EOL goes out and a buyer thinks it's time to make a last time buy we give them market information and advise them if they need to do that,” he says. Sometimes they can find the product from other sources.

If a company opts for a lifetime buy, Fusion “has a system in place where we can manage the company's demand against their actual usage,” says Irving. Sometimes a company will make a lifetime buy, but then discover it did not need as many parts as it thought.

“If a company expects to use 1,000 pieces per month for the next 12 month, we can monitor that. If we see in the last two months the company has used only 500 pieces, then there is a 1,000-piece excess. We can go out and resell that excess and give the company a healthy return.”

While buyers may make lifetime buys or source parts from aftermarket suppliers, they must also continue to fine tune their strategies for dealing with component obsolescence because the problem is not going away.

“Component obsolescence will always be with us,” says Brady. “It continues to be an area of interest for buyers as product lifecycles shrink.”

Component obsolescence is impacting the DoD and the defense subcontractor arena in a big way also. Electronic systems are now performing better than expected, helping to meet and exceed system availability parameters for the systems, MTTR and MTBF numbers in the field are generally much better than calculated using the MIL-HDBK-217. Quality and reliability is definitely on the up rise but COTS obsolescence is now prominently raising its ugly head ! Products roll over so fast that no two systems are alike by the time we get them deployed. COTS obsolescence is shutting down production efforts, requiring expensive research and testing of new products in order to get new systems deployed. For fielded systems, obsolescence is leading to unsupportable products, resulting in either spares buys in large quantities or tech refreshes in order to keep the system operational. The problem is getting so acute that

some DoD programs are beginning to see value in component obsolescence management and in brokering after-market agreements to continue sources of supply of key components. You might wonder: why not just put the new board in the system, test it, rewrite some code if necessary, and move on? Well, that's essentially what we do, but for mission critical systems it's not as simple or inexpensive process. Here's an example: A manufacturer use about 90 VMEbus single-board computers in one of the systems. These processor boards are truly general purpose—these use the exact same part number to perform about 30 different functions in the system. The company that sells these boards recently had a component obsolescence issue that forced them to redesign the product. They bent over backwards to make it form, fit, and function compatible with the previous version of the product. They tested it and found it to work as expected, but they could not guarantee that the change wouldn't affect the applications. So the new version was tested too, and it worked just fine – over 72 hours of continuous operation, without a single hiccup. It did great performing one of the 30 different functions it's supposed to perform. One THINKS it will do the job both in new production units of the system and as a replacement in older systems. One THINKS it will do just fine performing all 30 different functions it's required to perform in the system. One THINKS it will be okay to mix in newer versions of the product with the older versions in systems that are already out there. But, the term “mission critical” has a profound impact on CURRENT technology insertion strategy. Fielded versions of this system are going on aircraft carriers and amphibious assault ships, so thinking that it will work just won't do. If we are wrong, soldiers and civilians could die, so we've got to KNOW that it will work. How can we use the new board and know it will work? Figuring that 72 hours of testing times 29 more functions will get to the point where it is known that the product will work correctly for all of our functions (in a test lab). Next, the product is taken to sea and some live-fire testing on the system is conducted to ensure it will work in its intended environment. The defense manufacturer needs to know if old boards and new boards can be mixed in the systems in every conceivable configuration. Once ever reasonable subset of the 290 possible configurations is tested, it shall be ready for some more live-fire testing. If all goes well, software modifications shall not be necessary and the change can be approved. Then there's the matter of actually *implementing* the change, which is another issue altogether. So, what's my point in all this? The point is that COTS obsolescence is a big problem in our military systems today, and it is paramount to encourage prime contractors to select their COTS vendors with an eye on life-cycle support issues. The DoD seeks vendors with a proactive approach to obsolescence management using proven obsolescence tools. It is highly recommended to look for vendors willing to enter into after-market agreements with sunset supply bases.

There are some valuable resources out there for companies that struggle with component obsolescence and product “engaming”. It is well known that customers tend to be attracted to high reliability, functional and less complex older product; this is particularly true in the retail sector. When component obsolescence strikes, spares and replacement product dry up.

Rochester Electronics is a well known provider of obsolete component replacements. Another valuable resource is the DCMA approved GIDEP resource (Government Industry Data Exchange Program) which is primarily used by defense sector but used by all industries to share testing, qualification and obsolescent component data. Companies exchange components and sell excess inventory which is needed elsewhere.

Bibliography & Acknowledgements

<http://www.purchasing.com>

Preventing COTS Obsolescence by Steve Cecil, NAVSEA Crane

Glossary

COTS Common Off The Shelf (Parts)

EOL End-Of-Life

DCMA Defense Contract Management Agency

GIDEP Government Industry Data Exchange Program

MTBF Mean Time Between Failures

MTTR Mean Time To Repair

PCN Product Change Notification

RoHS Reduction of Hazardous Substances

Appendices

Various papers on component obsolescence