Component obsolescence worsens in defence

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Defence companies are facing growing problems, such as counterfeit parts, with component obsolescence in the wake of RoHS.

Thirty years ago, the military-industrial complex practically owned the electronics component business. Big contracts for weapons programmes helped fund many of the top names in semiconductors, including Intel. Even at the end of the 1980s, Intel was still designing processors, such as the i960, that were aimed squarely at military users.

But, ten years prior to that, the personal computer had begun to change the world: more and more of the market for electronics shifted to the fickle consumer sector. Once the consumer market dominated the business - according to the Semiconductor Industry Association PCs and cellphones now absorb 60 per cent of the world's chips - interest from the big suppliers slipped away.

The problem is that few consumer electronics products are made and supported for more than two or three years, let alone the 20 or 30 years that military programmes need. So, military customers are faced with the problem of buying components long after their suppliers have lost interest in making them.

Gareth Williams, director of Plextek's digital engineering group, says: "It is a constant worry for them. And because their volumes are so low they are always going to struggle."

The problem for the defence sector has worsened over the past few years, with fewer manufacturers being interested in making parts for the more stringent demands of those programmes. "A lot of manufacturers are switching their product lines to commercial, so many of the high-reliability parts are disappearing," claims Nigel Wallis, chairman of the UK-based Component Obsolescence Group (COG) and project business development manager at Active Electronics.

One possibility is to move to what the defence sector calls COTS - commercial off-the-shelf products that are not designed with the military in mind.

"It is a trend that we have seen across the board, with the exception of some of the life-critical applications," says Ros Kruger, European marketing director for military and aerospace at component distributor TTi.

Wallis says there is a reluctance to move to COTS among military users because of worries over reliability "because the parts are not proven over the long term".

RoHS regulations and fake components

The RoHS legislation that banned lead and other heavy metals from use in most components plays a part in the concerns over COTS as well as helping to take parts off the market. Rather than continuing to make the older parts that contain lead, a number of manufacturers have shifted production entirely to the lead-free versions. But reliability issues encountered in the world of consumer products, such as 'tin whiskers' shorting out contacts, have worried engineers in the defence sector.

As manufacturers wind down production, the fraudsters move in, offering counterfeit parts to companies desperate for replacements or continuing supplies for production *E&T*, 6 July 2009). "Any shortage will lead to that," says Wallis. "And it is dangerous, especially if those parts go into systems such as flight control. The parts that don't at all aren't dangerous, as they will spotted at goods inward. The dangerous parts are the ones that work a bit. They frighten me because some of them can get through most testing but fail in the field."

Although fakes have yet to be identified as causes of critical field failures, Wallis says manufacturers have had to recall product to replace counterfeit parts that made it through test.

The component makers have not been that helpful to users with long product lifecycles, often announcing the end of production with a simple last-time-buy announcement, although some with a greater focus on long-life markets such as automotive have improved the quality of information in recent years such as guarantees on the minimum period over which a part will be made.

When the end-of-life email comes through, it is up to the user to work out how many they will need to support their products. And if they miss the deadline, work out ways to obtain the parts, often through the grey market, although this is the primary source of counterfeits. Some of that burden can be outsourced. Active, for example, will take a bill of materials and procure parts or recommend

alternatives. Some franchised distributors monitor the supply situation to give users advance warning.

Obsolesence plan

Kruger says: "We generally get six months to a year's notice of end-of-life product. And usually we get another six months to have a product shipped to us. We look at a customer's situation and approach them to ask: 'Would you like us to buy the stock for you?'"

Even a last-time buy is problematic, because users worry about the freshness of the product itself. "Many companies have date-code restrictions: they won't use components that are more than two years old."

The answer, as long as the manufacturers agree - and some are more cooperative than others - is to have the silicon stored under an inert, nitrogen atmosphere in wafer or die banks so that the circuit do not degrade and are only packaged, and date-stamped, when needed. "As long as they handle that correctly, they can do that for 20 years," claims Kruger.

To help manage the situation at design time - and avoid incorporating parts that are likely to disappear quickly - the bigger defence contractors have built databases to help score components in terms of their obsolescence risk.

"There is a percentage risk associated with each component in the database," says Kruger. The databases can also help engineers make decisions that focus purchases on those where they can buy higher volumes over time. It often works out cheaper and safer as manufacturers are far more likely to kill off components that do not sell well.

"COG is helping to define some of the processes and helping with various workshops to get the defence and military customers to understand the problems and tools that other companies can use," Kruger adds. "They are pushing the manufacturers to do this kind of work for them as well. "

Wallis emphasises the human element in this: "A tool can only go so far." Any obsolescence plan means being aware of what can go wrong three, five or ten years down the line and planning for it.

Comments