

## Counterfeit ICs are a real problem for the military

### Q & A with John Stannard, President and Cofounder, QP Semiconductor



#### EDITOR'S FOREWORD

*QP Semiconductor is one of the few semiconductor companies in Silicon Valley embracing the military with open arms. Where many IC suppliers have been running from the DoD's requirements for MIL-SPEC devices since the mid-1990s, QP is building their business around high-rel devices. While the company is new to me, they're not new to the defense supplier base. In fact, during my interview with John, I learned that many of his executives are from former valley companies – and they have vast experience in dealing with such military specifications such as MIL-STD-883 or MIL-PRF-38535, the QML spec. John provides our executive roundtable with the refreshing view that only a component supplier can offer. Even though QP Semiconductor offers full MIL-SPEC devices, they are still COTS devices because there is no government funding provided for development or production – it's all done on QP's nickel. – Chris Ciuffo*

**MIL EMBEDDED:** Please define the term COTS.

**STANNARD:** COTS to us means Commercial-Off-The-Shelf. That's standard, commercial devices with no additional customization procured through commercial channels. From a components standpoint, *standard products* can be purchased through distribution as well as from the manufacturer.

**MIL EMBEDDED:** I'm wondering if your answer to this question will be different from some of our other roundtable executives, simply because you are a component supplier. What are the characteristics of COTS, and what constitutes a COTS company?

**STANNARD:** COTS parts are state-of-the-art commercial devices that, initially, are less expensive than MIL-SPEC devices. Virtually every manufacturer is a COTS company. Any company that offers *catalog* standard products via multiple market channels (direct sales, distribution, reps, etc.) is a COTS company. These are products designed for commercial markets, where the buyer is both the qualifying activity, where the product is what they want, and the procuring activity.

**MIL EMBEDDED:** How has COTS changed over the past 10 years?

**STANNARD:** Some COTS devices are no longer available in the market. Additionally we believe that the ever-shortening parts life cycle has come as a real surprise to users. The COTS suppliers respond to rapidly changing commercial markets, where their customers' product life-cycle is short, upgrades occur rapidly

### The good, the bad, and the ugly?

**The good:** Provide same state-of-the-art technology to military OEMs that commercial OEMs get while being cost-effective, and mil OEMs procure advanced technologies right along with their commercial counterparts so they obtain low cost commercial devices which are readily available at the beginning of a program.

**The bad:** Many military semiconductor manufacturers are closing operations so mil OEMs are faced with *up-screening* standard parts which both adds cost and removes them from being low cost *standard commercial* parts. Also some IDMs [Integrated Device Manufacturers] refuse to sell parts to be up-screened (they still hold the ultimate liability). And due to the short life cycle of commercial products, some devices are exhausted before the end of a program (sometimes before they start!), which may force a costly redesign and costly equal.

**The ugly:** Not shelf stable; moisture problems; bromide/fire suppressant problems; and unscrupulous vendors. – John Stannard

and time to-market is very short. These items force changes in the availability of COTS much faster than just the funding cycle of normal military systems, much less the design to production cycles.

COTS parts support products with shorter actual use lifetimes as well, where the fielded product is replaced prior to wear out by *Featureout*. That's where new features are desired so the product is replaced every two years. Or the lifetime of another portion of the system governs the replacement cycle. For example, replacement cell phone batteries aren't purchased because a new phone is available and is less costly than the battery alone.

**MIL EMBEDDED:** Has COTS become accepted within the military? Why or why not?

**STANNARD:** Yes, COTS now makes up something like 60 percent to 70 percent of the total shipments of semiconductor devices to military applications. There has been some controversy as to the acceptance; however, COTS is a viable solution for certain military programs and will continue to be acquired and deployed.

**MIL EMBEDDED:** *Why do you think there is such a problem with counterfeit devices?*

**STANNARD:** There exists a problem with counterfeit for the oldest reasons in the book: supply and demand combined with greed. Commercial devices, which sell for a modest price, say \$1 to \$2, can be remarked, and sometimes repackaged, to look like Mil-Spec, hermetic parts and sold for tens of dollars, thus providing adequate incentive for counterfeit artists to *knock-off* the more popular part numbers. Additionally buyers are anxious to get a good deal and so they don't always check the credentials of the vendor. Or they're desperate for a source for hard-to-get materials.

**MIL EMBEDDED:** *What do you think can or should be done about it?*

**STANNARD:** Well, one thing that should definitely not be done is to make more stringent test requirements for Mil-Spec parts as has been proposed. This will only provide a larger profit margin for the copycats and will even give them more incentive to make the parts look more and more like the originals. Today it is often possible to spot a counterfeit just looking at the inferior markings or other package details. Like it is easy to spot the cheap Rolex copy (priced < \$20), but the good copy (priced around \$100) is much harder. We'd suggest making sure the vendor is a legitimate supplier with excellent credentials and *bona-fides*.

Support the JEDEC G-12/JC-13 task group to develop supportable traceability for materials. The aviation community is having the same problems with mechanical hardware, and traceability is required for that the same as must be required for microelectronics. One of the reasons the normal COTS market is less sensitive is that the high-volume commercial users buy the product through a known chain, use the product quickly, and detect problems very quickly. This is not true in the military world where it's not unknown for product built in the 1980s to be found and used via the broker market.

**MIL EMBEDDED:** *Please comment on managing technology (COTS or otherwise) over a long-life (> 10 years) military program.*

**STANNARD:** The long-term availability of the devices is a real problem; equipment manufacturers must be proactive to procure sufficient stores of devices to last the projected lifetime of the system. Too few spares and they run the risk of costly redesigns, and too many and they face large and continuing expenses associated with inventory management. Combine the long-term needs with the poor long-term storage prognosis of plastic COTS devices and the problem is further exacerbated.

Current federal regulations don't support the move to COTS because of limitations on years of inventory that can be supported for raw materials. This means equipment manufacturers would have to fund this from their own funds, and currently do not.

**MIL EMBEDDED:** *Do you know of any problems because COTS was used?*

**STANNARD:** COTS has worked fine in many applications. In commercial space, the first commercial vendors reportedly experienced difficulties using plastic, commercial parts in satellites, which may have contributed to the demise of the initial LEO satellite programs.

*John Stannard is president and cofounder of QP Semiconductor, which celebrated its 20th anniversary in 2005. Stannard is an industry veteran for more than 39 years. His career in the semiconductor field began at Fairchild Semiconductor in 1967, and he was an executive vice president at Microtest prior to starting up QP Semiconductor in 1985.*

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