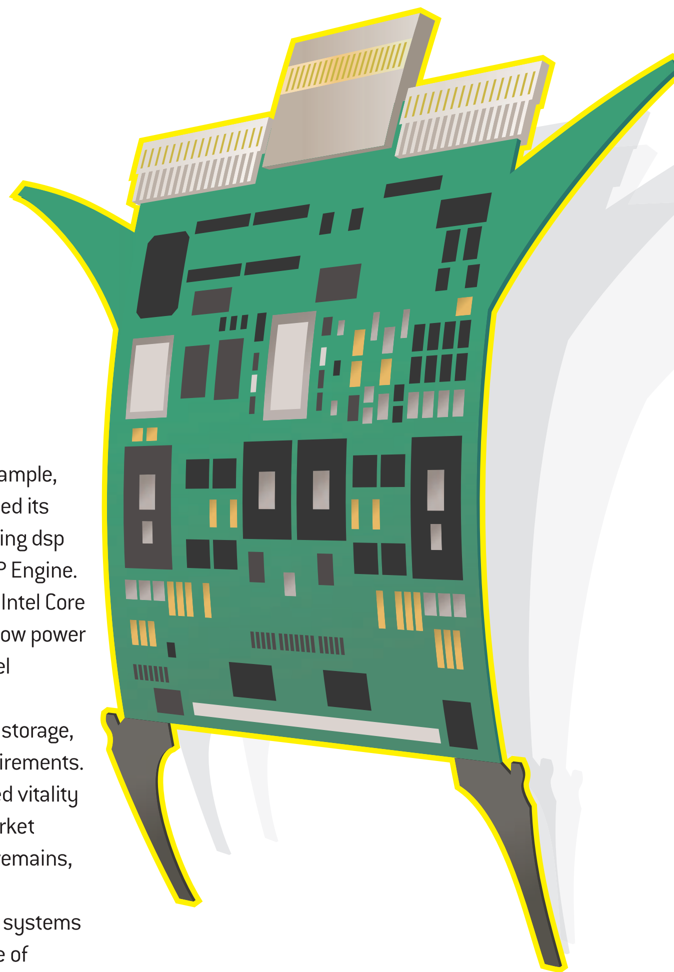
Far from dead



Despite appearances, VME is still alive and kicking.
By **Steve Edwards**.

When confronted with the question 'is VME dead?', what comes to mind is Mark Twain's famed response to his supposed demise – 'reports of its death are exaggerated'. VME, still the de facto open standard board architecture of choice for the embedded defence and aerospace market after 30 years, remains vital and healthy, both as a technology and as a 'culture' in the VITA Standards Organisation (VSO).

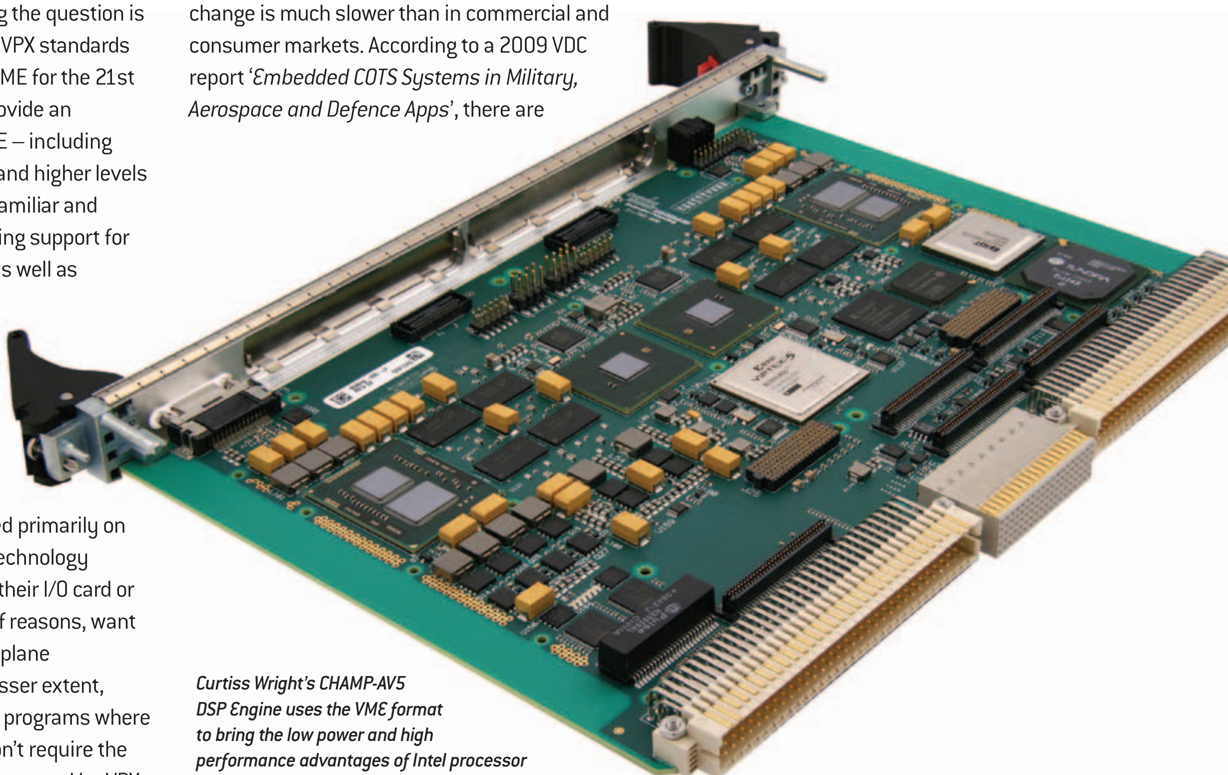
This positive prognosis for VME is true from two different perspectives. If you consider VME strictly as the legacy bus architecture IEEE-1014, first launched in 1980, and its derivatives, VME 64x and VME 2eSST, then we can expect VME to continue for at least another decade as the market for upgrades keeps demand for VME boards steady. The second way of viewing the question is to consider the new VPX and OpenVPX standards as the heirs to VME; in essence, 'VME for the 21st Century'. These new standards provide an evolutionary enhancement to VME – including greater bandwidth, more I/O pins and higher levels ruggedisation – and build on the familiar and proven VME ecosystem, maintaining support for the 6U form factor and 1in pitch, as well as enabling backward compatibility with traditional VME boards via support for VME's electrical signals.

Technology insertion

There continues to be a large market for traditional VME, focused primarily on legacy programs. Customers for technology insertion may desire to swap out their I/O card or processor card but, for a variety of reasons, want to maintain the existing VME backplane compatibility. There is also, to a lesser extent, continued interest in VME for new programs where the performance requirements don't require the gigahertz and higher data rates supported by VPX.

For this reason, vendors of VME cards continue to design and market new boards. For example, Curtiss-Wright Controls recently introduced its first 32nm Intel Core based Multiprocessing dsp engine, the VME 64x CHAMP-AV5 VME DSP Engine. The 6U board, which features a dual core Intel Core i7 processor based 6U board, brings the low power and high performance advantages of Intel processor technology to military signal processing applications with demanding storage, data logging and sensor processing requirements.

An essential aspect of VME's continued vitality is its importance in military systems. Market analyst VDC Research reports that 'VME remains, by far, the architecture of choice in military/aerospace applications'. Military systems typically have long life spans and the rate of change is much slower than in commercial and consumer markets. According to a 2009 VDC report '*Embedded COTS Systems in Military, Aerospace and Defence Apps*', there are



Curtiss Wright's CHAMP-AV5 DSP Engine uses the VME format to bring the low power and high performance advantages of Intel processor technology to demanding military signal processing applications

Building on VME's heritage, VITA 48 is the first open standard to define the use of top and bottom metal covers to protect boards from the dangers of ESD and the environment.

'vast numbers of VME boards and systems consumed in support of old equipment and platforms. The VME business remains the most stable of the embedded segments because it is based largely on consumption in legacy platforms that last 25 years or more'.

VDC estimates the market for COTS boards to be approximately $1billion, with some $446million in 2010 driven by VME and its derivatives.

A 21st Century VME

If you consider VPX as a continuation of VME, then the death of VME is far off. VDC says 'VPX ensures VME will continue to be relevant for next generation military/aeropace applications for the foreseeable future'.

On 16 June 2010, VITA, the VME trade association, announced that ANSI had ratified the OpenVPX System Specification (ANSI/VITA 65.0-2010). OpenVPX, the latest enhancement to the VPX standards, defines system level VPX interoperability for multivendor, multimodule, integrated system environments. It is expected to further speed the adoption of VPX as the board architecture of choice for defence and aerospace applications.

In fact, that adoption is proceeding apace. COTS vendors responded to the market's desire for a next generation VME by uniting under VSO to define an open standard capable of supporting the higher bandwidth components and applications – such as serial switch fabric based distributed computing – that traditional VME, with its older pin style connector, was unable to meet.

With the advent of high speed serial fabrics, the traditional parallel bus VME architecture proved insufficient for the needs of higher performance embedded systems. VPX (VITA 46) provides a next generation follow on to VME with high speed interconnects for harsh environments. While advancing the state of the technology, VPX provides backwards compatibility to the VMEbus through specialised bridges. Compared to VME, VPX provides higher bandwidth, more user I/O pins, improved ruggedness, and ease of use in the field.

Another advancement provided by VPX over traditional VME is its support for two level maintenance through VITA 48. VITA 48 is the first open standard to define the use of top and bottom metal covers to protect individual boards from the dangers of ESD and the environment when maintenance requires replacement in the field. In the past, the danger of harm to the modules during removal and insertion led to a system of chassis level sparing and replacement , rather than risking the handling of a single module.

Without a new open standard board architecture capable of meeting the demands of emerging new applications and able to anticipate future requirements for performance and thermal management, COTS customers would have had no choice but to return to the old approach of proprietary system designs, with all their associated disadvantages, such as higher cost and lifecycle management. One of the most important benefits of the VME community has been the availability of multiple vendors, providing competition to drive technology improvements and differentiation, while controlling costs. Already, there are nearly 100 OpenVPX products listed in the VITA product directory.

At Curtiss-Wright, most new design wins are for VPX, particularly in data intensive applications where throughput and high compute density are critical factors. One particular strength of VPX compared to traditional VME is its support for both 3U and 6U Eurocard module formats. In the past, there was no widely adopted 3U variant of VME, which caused some users to look elsewhere for small form factor alternatives. With 3U VPX, the VME community has a high performance means of addressing the expanding market for compact and lightweight solutions for applications sensitive to space, weight and power issues.

VME marches on

Whether you consider VME's future solely in regards to its traditional instantiation, or whether you view VPX as its heir, this most successful of all open standard bus architectures will continue to be available for many years to come, keeping legacy systems functioning, either with exact replacement modules or with new compatible designs that deliver improved functionality and performance without necessitating a change to the backplane.

For today's demanding applications – and for those to come – VPX builds on the unmatched legacy of VME. The same open architecture community approach that created a system for altruistically defining and expanding standards and developing the products that met the needs of VME customers continues to prove its productivity, effectiveness and vision with the progress and rapid acceptance of VME's progeny; VPX.

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