

GE
Intelligent Platforms



VPX Technology



imagination at work

Thank you, VME Hello, VPX

It's no exaggeration to say that the VMEbus has been one of the most successful computing architectures in history. VPX is intended to extend and build on that success.

Anyone who has worked in rugged, industrial or defense computing owes a debt to VME. But the latest applications are making demands that VME simply cannot meet, and that is the reason VPX* was developed by VITA (VMEbus International Trade Association).

VPX is a direct descendant of VME, and has the support of the majority of leading vendors and integrators who relied on its predecessor. The goal of VPX is to bring rugged industrial and defense computing

into the era of serial switched fabric backplanes while still preserving many of the features which made VME successful.

VPX is an open standard which utilizes the familiar 3U and 6U card sizes of VME. It offers true rugged capabilities, including conduction cooling and resistance to shock and vibration. At the same time it offers higher power budgets, more signal density and a far faster serial backplane.

*The original standard, VITA 46, has now become known as VPX.



Field applications are the driving force behind VPX

Sensor and signal processing applications require massive bandwidth and VPX delivers.

Mission Computers

Rugged systems are designed to survive and thrive in harsh environments. They stand up to challenges like temperature extremes, shock, vibration, EMI and G-forces. VPX offers computational speed and graphics capabilities which will make mission applications even more effective and real-time.

Situational Awareness

Until now, surveillance of large areas has been based on a confusing array of disparate video feeds, and the inter-relationships between cameras are not always obvious, so important contextual visual information can be easily overlooked.

Our subsystem presents 360°, high resolution, real-time video from up to sixteen cameras, and the virtual camera can be panned or zoomed instantaneously. The performance advantages of VPX allow an entire subsystem with these capabilities to be fit into an extremely compact area in a very rugged application environment.

Video Tracking & Target Detection

VPX enables the highest performance solutions in the smallest, rugged hardware packages with features that include:



Moving Target Detection

The Moving Target Detection (MTD) acquisition algorithm extracts objects from the scene which are moving independently in relation to the background.

Centroid Tracking

Centroid tracking is used for tracking bounded objects such as an aircraft, which can be fully contained within the track window.

Multiple Target Track (MTT)

MTT is used for tracking bounded objects such as aircraft or ground vehicles that are fully contained within the track window. The MTT gives good performance with small targets in high clutter.

Image Matching

Automatic Image Matching (AIM) allows images taken from different sensors at different times to be compared with each other. Image Matching could assist a UAV with navigation or target detection.

Fire Control

Fire-control systems require sophisticated high-performance embedded computers and sensors. GE VPX-based high-performance single board computers, multi-function software, sensors and switches provide high-performance capabilities to aid in greater control and accuracy of radar and fire-control for naval, ground and air-based systems.

The future of rugged COTS systems is here now

VPX is revolutionizing the world of rugged mil/aero systems by delivering blazing performance in the harshest environments.



AXIS Application Development Tools

Advanced Multiprocessor Integrated Software (AXIS) is a toolset designed to accelerate complex signal processing application development.

The AXIS architecture consists of three integrated elements:

- Interprocessor Communications
- Multiprocessor Productivity Tools
- DSP Libraries

For more information visit:

www.ge-ip.com/axisdemo

New Connectors

At the heart of the VPX standard are new high-bandwidth connectors. They deliver highly controlled impedance, minimal insertion loss and less than 3% crosstalk at transfer rates up to 6.25 Gbits/second. Independent tests confirmed the ruggedness of the VPX connector, showing that it performed much like the existing VMEbus connector. VPX also provides a significantly greater number of user I/O pins than are available from the VME64 or VXS standards.

Power Budget

While a VMEbus slot offers 90 watts at 5 volts, VPX allows for up to 115 watts at the same voltage, 384 watts at 12 volts or 768 watts at 48 volts. The issue of cooling has been addressed, and 6U VPX calls for a conduction-cooled envelope compliant with IEEE-1101.2, which is compatible with existing enclosures.

REDI

Ruggedized Enhanced Design Implementation (REDI) is a VITA standard for the design of forced air, conduction-and liquid-cooling, and spray cooling. REDI also makes important provisions that allow for improved field maintenance. A feature of VPX-REDI is its standardization of Two Level Maintenance and the provision for placing covers over

single board computers to protect them during handling and from ESD damage.

Field Maintenance

The military's goal has been to move more repairs into the field. To this end, the new VPX connector features ESD protection via a grounding strip. In addition, board covers provide protection from environmental factors. The combination makes field maintenance a practicable approach.

GE Intelligent Platforms & VPX

GE Intelligent Platforms participated in the VITA 46 working group and was among the first to bring VPX products to market. The company now has a range of VPX solutions available, ranging from subsystems to single board computers, fabric switches, storage modules and graphics processors.





VPX Products

Product Type	6U Size	3U Size
Rugged System		MAGIC1 compact 2-slot & 6-, 9-slot VPX systems
Single Board Computer Intel-based	VPXcel6 SBC620	VPXcel3 SBC320
		VPXcel3 SBC340
		VPXcel3 SBC341
Single Board Computer PPC-based	VPXtreme6 SBC610	VPXtreme3 SBC310 VPXtreme3 SBC330
Graphics Controller		GRA110 rugged GPU DVI 1.0 digital video module
Solid State Storage		SDD910 SATA disk drive module
Multiprocessor	DSP 230	
PCI Express Switch		PEX430 4-lane PCI Express switch
Gigabit Ethernet Switch		GBX410 12-port fully managed switch
Mezzanine Card	PEX440	PEX430

VPX subsystems and chassis

VPX rugged computers combine the processing power of Intel®- and PowerPC®-based microprocessors with powerful graphics processors connected together with 16-lane PCI Express®. They are capable of driving demanding computing and display applications.

For example, a graphics processing computing node can be based on a dual channel NVIDIA® G73 graphics processing

unit, as featured on the NVIDIA GeForce™ 7600GT, incorporating 256 MBytes of GDDR3 SDRAM arranged in two banks.

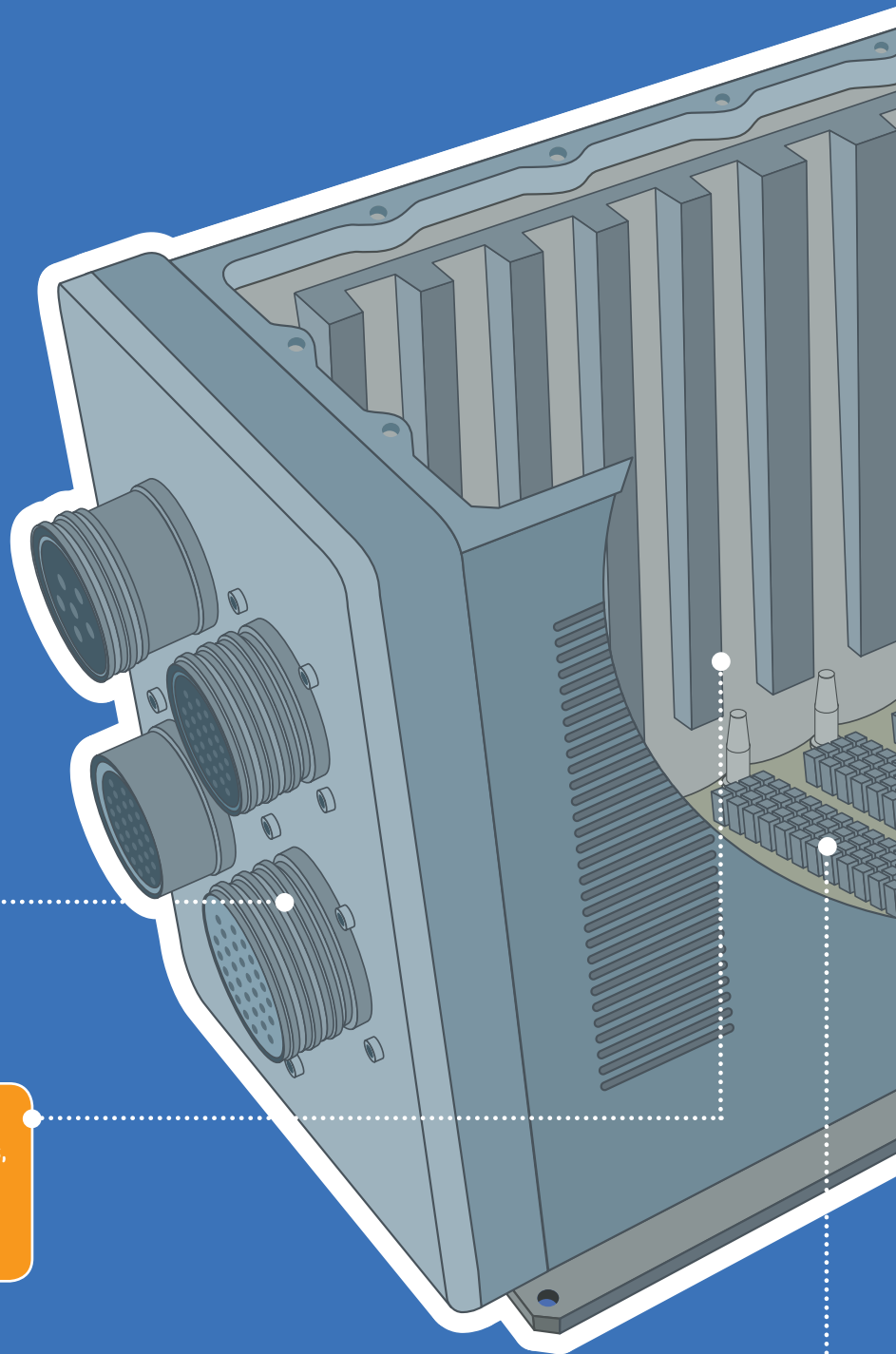
The interface between GPU and CPU is 16-lane PCI Express, allowing maximum bandwidth between the two processors. Storage is provided by a solid state disk drive, which boasts a capacity of up to 64 GBytes, sustained read performance of 45 MBytes/second, and a purge facility to allow data on the drive to be securely deleted in an emergency.

VPX-based subsystems can be packaged in a baseplate-cooled, fan-cooled, liquid-cooled, or spray-cooled chassis capable of operating in the harsh environments that characterize many military and aerospace applications.

OpenVPX is a subsystem specification for VPX that provides a defined framework for interoperability between OpenVPX products. OpenVPX leverages existing VPX dot specs for compatible OpenVPX profiles for modules, backplanes and development chassis.

VPX Systems

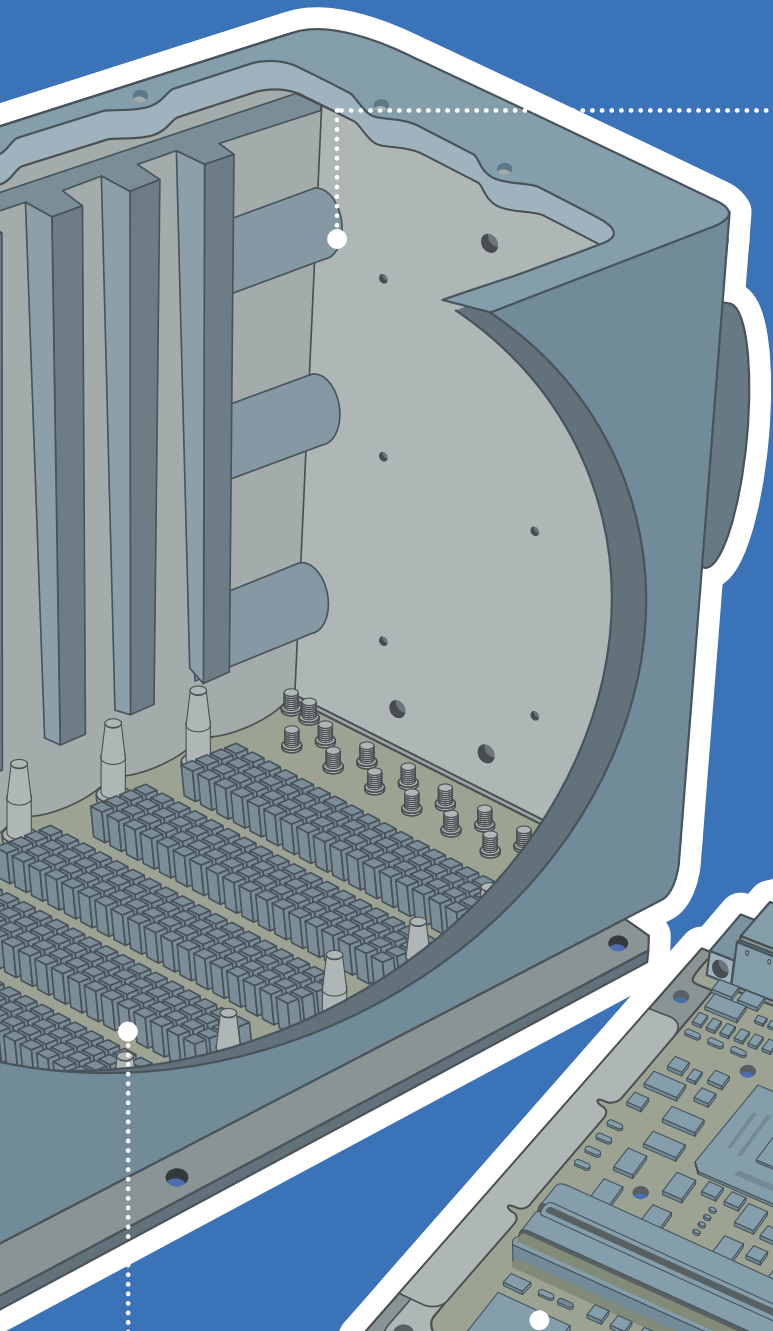
Build your system for your application, based on our extensive selection of VPX enclosures and boards. We have decades of experience working with customers to create the optimum solution, which in many cases may involve custom versions of existing products. To speed application development, we also offer engineering development units which closely match the expected final system configuration. We offer extensive in-house testing and validation capabilities such as thermal modeling, shock and vibration testing, functional testing, thermal cycling, qualification and MIL-STD certifications.



→ VPX supports high-performance fabric technology including star, ring, mesh and daisy chain.

→ GE Intelligent Platforms provides a wide array of VPX products including chassis, switch cards, graphics cards, processor and storage boards, and a range of I/O cards with inputs for a variety of sensors and displays.

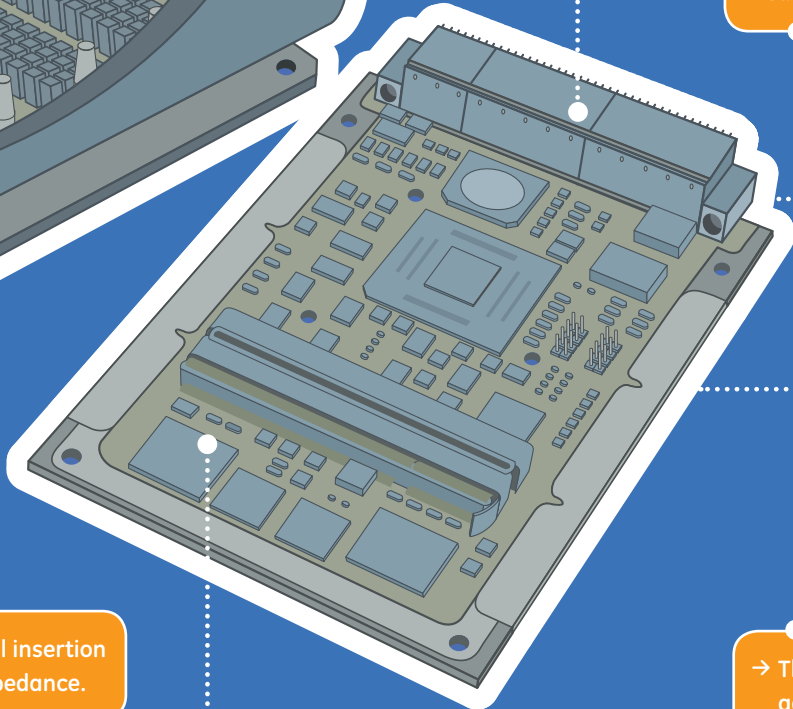
→ VPX defines connectors, power delivery, backplane dimensions, non-volatile memory, system reference clock, system management, memory and other elements.



→ VPX Ruggedized Enhanced Design Implementation (REDI) specification covers thermal cooling technology including conduction cooling, forced air cooling, spray cooling, and liquid cooling techniques.

→ High bandwidth MultiGig RT2 Connector is designed specifically for VPX boards.

→ VPX specifies alignment/keying blocks to prevent pin stubbing and provide card keying and a safety ground.



→ VPX slots allow minimal insertion loss and controlled impedance.

→ VPX permits higher power than similar Eurocard formats.

→ The VPX REDI specification addresses cooling techniques for VPX boards including the use of covers for both sides of a board.



GE Intelligent Platforms Contact Information

Americas: **1 800 433 2682** or **1 434 978 5100**

Global regional phone numbers are listed by location on our web site at www.ge-ip.com/contact

www.ge-ip.com/vpx