VPX™ Standard of Excellence
Its Successes, and Future Direction

Press Briefing
Presented by VITA’s VPX Marketing Alliance

November 2, 2010
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<td>VITA/VPX Update and the next 12 months</td>
<td>Neil Peterson</td>
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<td>VPX Application successes, positioning profiles</td>
<td>Rodger Hosking</td>
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<td>17:00</td>
<td>High level survey findings — customer direction of VPX</td>
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<td>VITA</td>
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<td>Q&amp;A Panel — focused on VPX/OpenVPX</td>
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Event Sponsors

- Amphenol
- BittWare
- Concurrent Technologies
- Curtiss-Wright Controls
- Elma Electronic
- Emerson Network Power - Embedded Computing
- Extreme Engineering Solutions (X-ES)
- GE Intelligent Platforms
- Kontron
- Mercury Computer Systems
- Meritec / Joy Signal Technology
- PCI-Systems
- Pentek
- SIE Computing Solutions
- Themis Computer
- Tyco Electronics
- Xembedded
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VITA/VPX Update and the next 12 months

Neil Peterson
Chair of VPX Marketing Alliance
The VPX Marketing Alliance is focused on the advancement of the VPX family of technology. This includes VPX, VPX REDI, OpenVPX and other related activities on the VPX roadmap.

Our objectives for the next 12 months are:

- **Build awareness about VPX technology and the VPX ecosystem**
  - The leading technology approach for interoperability and performance
  - Clear definition of the benefits
  - Make it easy to understand

- **Build awareness of the member companies and their VPX products**
  - Drive industry leadership of our members
  - Make our member companies names known
What is VPX Technology?

- A board form-factor standard for next generation critical embedded systems
  - Highly scalable, highly flexible
  - Dense, compact, rugged form factor, 3U and 6U format
  - Abundant backplane I/O
  - Up to 4 ports of 4x switched fabric per slot, ready for PCIe, Serial RapidIO, Ethernet
  - All connectors are rated for signaling rates up to 6.25Gbps
  - Accepts 2 PMC or XMC (Fabric) mezzanines
  - ESD protected connector for ease of maintenance

VPX™

- Defines cooling schemes
- Introduces 2-level maintenance

OpenVPX™

- Architectural Framework for VPX
- Leverages the individual VPX standards to create better interoperability.

Wide applicability in Critical Embedded Systems:
- MIL/Aero
- Homeland security
- Telecom
- Transportation

More at www.vita.com/vpx
VME Technology Roadmap

VMEbus Technology

320+ MBps

Gigabit Ethernet on P0

3 to 30 Gbps

VME 2eSST

320+ MBps

VXS on P0

3 to 30 Gbps

VME64x

80 MBps

VME64

80 MBps

VME32

40 MBps

VITA, VMEbus Technology, VXS, VPX are trademarks of VITA
VPX Roadmap

- VPX
- OpenVPX
- VPX REDI
- VITA 46
- VITA 48
- VITA 54
- VITA 65
- VITA 66
- VITA 67
- VITA 68
- VITA 60

- Power supply standard: VITA 62
- Compliance channel standard: VITA 68
- Interchangeable Connectors: VITA 60
- Connectivity: Fiber optics: VITA 66
- Analog/RF: VITA 67
- Smaller Form Factors
• VPX is a family of living specifications.
• VPX will change over time as industry requirements dictate:
  – Adopts profiles for certain applications and functionality
  – Profiles may become inactive and will be removed
  – New requirements will dictate that new profiles and capabilities be added
• We are working on many new enhancements. And the specification will continue to mature over the next few years as vendors release products and customers select to use them in their new programs.
• We do expect to see new requirements and VPX will respond
  – Small form factor is a good example.
In the 12 months that the VPX Marketing Alliance has been active we have gained 33 member companies who are all developing products.

On the VPX web site – [www.vita.com/vpx](http://www.vita.com/vpx) there are currently 175 listed VPX products and the number continues to grow.

VITA Industry survey recently completed by the VPX Marketing Alliance.
- April 23 through July 31, 2010.
- 234 respondents started the survey.

Objectives of the survey”
- To conduct ongoing research that lets us measure the pulse of the demand for VPX.
- To discover more about the demand side of market for VPX.
  - The level of awareness of VPX before and after VPX Marketing Alliance activities.
  - The level of technical understanding of VITA technologies.
  - What information potential users may be missing.
  - Who might be potential users of VPX.
  - If the messaging is clear; do people understand or are they confused by our nomenclature?
VPX REDI Reaches ANSI/VITA Ratification

- **ANSI/VITA 48.0-2010: Ruggedized Enhanced Design Implementation Mechanical Base Specification**
  - Defines a mechanical implementation for plug-in units. Two types of plug-in units are defined: Type 1 and Type 2. Both take advantage of increased slot pitch to provide enhanced thermal performance and increased structural durability. Only Type 1 units support Level 2 maintenance.

- **ANSI/VITA 48.1-2010: Mechanical Specification for Microcomputers Using Air Cooling Applied to VPX**
  - Defines the mechanical requirements that are needed to insure the mechanical interchangeability of air cooled 3U and 6U plug-in units and define the features required to achieve 2 Level Maintenance compatibly.

- **ANSI/VITA 48.2-2010: Mechanical Specification for Microcomputers Using Conduction Cooling Applied to VPX**
  - Defines the mechanical requirements that are needed to ensure the mechanical interchangeability of conduction cooled 3U and 6U plug-in units and defines the features required to achieve 2 Level Maintenance compatibility.

- **ANSI/VITA 48.5-2010: Mechanical Specification Using Air Flow-through Cooling Applied to VPX**
  - Establishes the design requirements for an air-flow-through cooled plug-in unit with a 6U form factor using a compact core heat exchanger located within the central heat sink of the unit.

These specifications provide a mechanical foundation for rugged VPX systems.
VPX Application successes, positioning profiles

Rodger Hosking
Pentek
VPX Applications: UAV CommINT Transceiver

- System receiver scans for spectral activity, acquires signals, performs signal classification, demodulation and decoding
- Received information is encrypted and then delivered over a secure link to a satellite system where it is relayed to an analysis station
- Key Features
  - Low power
  - Small size
  - Ruggedized environment

<table>
<thead>
<tr>
<th>Module &amp; Function</th>
<th>Slot Profiles</th>
<th>Module Profiles</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPU, Software Radio, FPGA</td>
<td>SLT3-PAY-1F2F2U-25.2.2</td>
<td>MOD3-PAY-1F2F2U-27.2.2-1</td>
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<tr>
<td>Switch</td>
<td>SLT3-SWH-6F6U-25.4.1</td>
<td>MOD3-SWH-6F6U-27.4.1-6</td>
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</tbody>
</table>
• Recording of two analog IF channels
• 10 kHz to 40 MHz signal bandwidth
• 1 TB real time storage, RAID 5 disks
• Cockpit computer controls operation through graphical user interface
• Key Features
  • Storage redundancy
  • Vibration tolerant
  • ATR form factor
  • Flight safety certified

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<tr>
<td>CPU, Digital Receivers, RAID controllers, solid state drives</td>
<td>SLT3-PAY-1F2F2U-25.2.2</td>
<td>MOD3-PAY-1F2F2U-27.2.2-4</td>
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<td>Data Switch</td>
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<td>MOD3-SWH-8F-27.4.2-2</td>
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<tr>
<td>Control Switch</td>
<td>SLT3-SWH-2F24U-25.4.3</td>
<td>MOD3-SWH-2F24U-27.4.3-1</td>
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VPX Applications:
Vehicle Anti-IED Device

- System scans for cellular phone signals within 1 km radius of vehicle
- Adaptively transmits high power jamming signal at transmission frequency
- Prevents successful reception of the IED destruct command call
- Key Features
  - Ruggedized system
  - Highly automated operation
  - Enclosed chassis with external fin cooling
  - Small size

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<tr>
<td>CPU</td>
<td>SLT3-PAY-2F-14.2.7</td>
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<td>Software Radio Transceiver</td>
<td>SLT3-PER-1F-14.3.2</td>
<td>MOD3-PER-1F-16.3.2-1</td>
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VPX Applications: Maritime Diversity Radio

- System handles signals from four antennas spaced equally fore to aft
- Performs baseband beamforming to improve directional sensitivity and steering
- Boosts signal-to-noise for both receive and transmit signals
- Extends useable communications range
- Key Features
  - Shock and vibration tolerant
  - Sealed conduction-cooled chassis
  - Flexible signal bandwidths
  - Redundancy

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<tr>
<td>CPU, Software Radio Transceivers</td>
<td>SLT6-PAY-4F2T-10.2.2</td>
<td>MOD6-PAY-4F2T-23.2.2-2</td>
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<td>Switch</td>
<td>SLT6-SWH-24F-10.4.3</td>
<td>MOD6-SWH-24F-23.4.3-2</td>
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</tbody>
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VPX Applications: Airborne Radar Countermeasure

- System receives active radar signals
- Downconverts signals to baseband
- Modifies range, bearing and cross-sectional characteristics for return signal
- Upconverts return countermeasure signal to IF for transmission
- Deceives or defeats enemy radar tracking systems

- Key Features
  - Extreme computational capability
  - Extreme environmental factors
  - Very low latency
  - Flight safety certified

### Module & Function

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<tr>
<td>CPU, DSP, FPGA and Software Radio Transceivers</td>
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High level survey findings — customer direction of VPX

Jerry Gipper
VITA Marketing
VITA Industry Survey

Sponsored by the VITA Marketing Alliance
Q1: Primary Industries

What is your primary industry?

- Aerospace/Defense: 57.3%
- Industrial: 12.0%
- Communications/Networking/Wireless: 10.3%
- Academia/Research: 8.1%
- Other: 4.3%
- Medical: 3.4%
- Consumer Electronics/Digital Home: 3.0%
- Automotive/Transportation: 1.7%
Q2: Job Function

What is your job function?

- Architect/System Engineer: 20.5%
- Hardware Engineer: 20.1%
- Sales or Marketing: 14.5%
- Software Engineer: 12.0%
- Corporate or Operations Management: 9.8%
- Engineering Management: 9.0%
- Other: 5.6%
- Program/Project Management: 5.1%
- Consultant/R&D: 2.6%
- Purchasing: 0.9%
Q4: Web-based Information Delivery

How do you value web-based methods of information delivery?

- Web sites - Vendors
- Websites - Portals (Google, Yahoo, MSN, etc.)
- Online publications
- Web sites - Industry alliance sites
- Webcasts with slides, audio, Q&A session
- User Forums
- Videos from/about vendors/products
- News feeds (RSS and media)
- Blogs
- Twitter, Facebook, LinkedIn
- Podcasts
Q7: Awareness of VITA Technology

How aware are you of these VITA Technologies?

- VMEbus
- VXI
- VPX
- VPX REDI
- OpenVPX
- PMC
- XMC
- FMC

Legend:
- Orange: Never heard of it
- Blue: Aware but never used
- Purple: Used in the past
- Red: Using it now
- Green: Plan to use
Q9: Obstacles to Implementing VPX

Do you see any of the following as being obstacles to implementing VPX?

- I do not understand it well enough
- There are no obstacles, I just don’t have a project requiring VPX
- Concern about the cost
- Confusion over VPX (VITA 46) and OpenVPX (VITA 85)
- My software strategy does not match
- The number of products available
- System performance doesn’t match my requirements
- Key features are missing (expand in comments)
What more would you like to learn about VPX, OpenVPX, or VPX REDI?

- More technical details: 60%
- More details on the differences between VPX, OpenVPX, and VPX REDI: 55%
- More about current applications using VPX: 50%
- More on available modules and their features: 45%
- More on the market projections for VPX: 40%
- More on the suppliers of VPX products: 30%
- Nothing more, I have all I need: 5%
Q18: Future Efforts of VSO

VITA is committed to continued development of OpenVPX-related standards. In which of the following areas would you like to see further development of standards:

- Optical backplane architectures
- Serial switch fabric implementations
- System management
- Advanced cooling techniques
- Signal integrity compliance test definition
- Standardization at the box level
- Mezzanine form factors
- New module formats (larger than 6U, smaller than 3U)
- Nothing else
VME Single Board Computers
Segmented by VME Architecture, 2009 & 2012

2009 Total: US$ 376.5 Million
2012 Total: US$ 515.7 Million

Source: VDC Research’s *Embedded Hardware & Systems: 2010 Market Intelligence Service*, July 2010
Completing the Picture

Ecosystem

- 33 Strong and Growing

Products

- Hundreds and Growing

Design Wins

- Happening Now!

Backplane
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Q&A Panel

Moderator: Neil Peterson

Bob Sullivan – Curtiss-Wright Controls Electronic Systems
Pete Jha – Curtiss-Wright Controls Embedded Computing
Michael Munroe – Elma Electronic
Shaun McQuaid – Mercury Computer Systems
Dennis Smith – Themis Computer
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Its Successes, and Future Direction

Thank You

November 2, 2010
The Next Level of VPX Standards is Here

OpenVPX™, the next-generation interoperability standard for system-level defense and aerospace applications, is now available with more than 150 products.

This new systems specification leverages the work of the individual VPX standards to reduce customization, testing, cost and risk. It defines an architecture that manages and constrains module and backplane designs, defines pin outs, and sets interoperability compliance while maintaining full compliance with VPX. And it is ideal for rugged applications that require smaller packages, as well as high I/O and connectivity densities.

Connect with your preferred vendor to find out more about the benefits and capabilities of OpenVPX.

Find out more at www.vita.com/vpx or visit the VITA product directory at www.vita.com.

OpenVPX is a trademark of VITA.
VITA
Open Standards, Open Markets