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# OpenVPX / MicroTCA.2/MicroTCA.3 Comparison

## Comparison

| Parameter | OpenVPX (ANSI/VITA65)<br>VITA 47/48 (EAC6 and ECC4 Environment) | VITA 47/48 (EAC6 and ECC4 Environment)<br>MicroTCA.2/MicroTCA.3 |
|---|---|---|
| **Serial topology (fabrics) on backplane** | Gigabit Ethernet; PCI-Express Gen 3; 10GigE; 40GigE; SRIO<br>—no support for SAS/SATAs | Gigabit Ethernet (GigE); PCI-Express Gen 3; 10GigE; 40GigE; SRIO; SAS/SATA. Simultaneous support for two or more fabrics. |
| **Redundancy** | None standard, can be added into designs | High levels of redundancy across the Power modules, Fabrics (GigE, 10GigE, 40GbE, SAS, SRIO), clocks and fans (for air cooled options). |
| **Bandwidth (PCI-Express)** | 8 to 16 Gen 3 lanes per slot, 63-126 Gbps | 8 to 16 Gen 3 lanes per slot, 63-126 Gbps |
| **Max data rate, # pairs** | 3U: 112 signal pairs with P0 - P2<br>6U: 336 signal pairs with P0 - P6<br>(Module area dependent)<br>10 Gbps per signal pair | Single-width: 4/8 Lanes<br>Double-width: 4/8 Lanes (with the right backplane16 lanes)<br>Single Module (3U equiv.): 199 signal pairs (Tongue 1:40 signal pairs, Tongues 2-4: 159 signal pairs).<br>10 Gbps per signal pair<br>Double module (6U equiv.) does not add additional signal pairs |
| **Hardware platform management (HPM)** | Under development; not mandatory per VITA 46-11 specification (not approved). | Mature robust HPM.<br>Inherent standard feature due ATCA heritage. |
| **Board size** | Six sizes defined (inches): 3U/6U modules: 3.9/7.9 x 6.3, Area (24.57,49.77 in^2)<br>0.8 pitch (optional 0.85/1.0 VITA 48) | Six sizes defined (inches): Single/Double modules 2.9/5.9 x 7.2, Area (20.88, 42.48 in^2) Compact/Mid/Full: 0.6/0.8/1.2” pitch |
| **Connector system** | Multi-wafer dual edge finger<br>BP connector: 50 micro-inches Au<br>Edge pad: 50 micro-inches hard Au over 150 micro-inch Ni; hardness: 130 knoops; roughness not specified Two incompatible vendors (Tyco and Amphenol) | Multi-tongue edge finger<br>BP connector: 50 microinches Au Edge pad: 50 micro-inches hard Au over 100 microinch Ni; hardness: 130-180 knoops; roughness: 0.2 Ra max.<br>Multi-vendor, open-source connector |

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| **Temperature, non-op** | MIL CC4/FC4 | VITA 47 CC1 – CC4 (-55C to 85 C) |
| **Shock and vibration** | VITA 47 OS1/OS2 and V2/V3 levels | VITA 47 OS1/OS2 and V2/V3 levels, 50g's shock, 12 Grms random vibe (50-2kHz) |
| **Two-level maintenance** | Yes, w/optional metal covers; ESD to 15 kV human model | Standard on all modules.<br>ESD to 15 kV human model |
| **Software Compatibility** | Supports mainly VX Works which has a high cost for the software and drivers. | Supports mainly open, free Operating Systems and drivers natively. Linux and Windows OS most common with support for other Operating Systems such as VxWorks. This allows for low cost open solutions. Cost is either free for OS and all associated drivers. |
| **Cross vendor Interoperability** | Custom backplanes required due to user defined pin-outs. Asynchronous operation, cards matched to spot on backplane. Plug and play not currently achievable for complex systems without design control. | Backplane based on true open standard enabling plug and play across vendors and guaranteed interoperability. |
| **Security Features** | Used in secure military applications | Used in secure military applications. |
| **Phase Coherent Operations** | Need to use specify timing and sync pins and protocol, available but not standard | Advanced Clock distribution built into the standard. |

| Conclusion | | |
|---|---|---|
| **uTCA (~3U & Multiples)** | Main Pros<br>Standards based Rugged mil-centric products Fully interoperable which offers overall lower life cycle cost associated with obsolescence and Tech Insertion. High performance, with Intelligent Platform Management Interface (IPMI), more stable host interface and system level switching, very rugged & less expensive. Highly redundant with no single points of failure.<br><br>Standard AMC carriers exist to host XMC, FMC & PMC modules. This allows flexibility for end user to leverage both VPX and AMC ecosystems. | Cons<br>Would need to rely on commercial base of mezzanine cards (XMC, AMC, FMC, PMC's) to fill out portfolio of capabilities.<br><br>Should encourage vendors to build to this standard to fill out catalog of options. |
| **OpenVPX (3U & 6U)** | High performance, ruggedization specified at card level, military supported vendors. Backward compatibility for VME protocol and PMC/XMC | Timing & sync standards to need be added to the OpenVPX backplane wiring and card specifications (similar to PXI timing and synchronization standards), need to limit and manage the number of backplane data transfer options on cards to achieve cross-vendor interoperability.<br><br>What OpenVPX needs is a specification that defines the minimum set of pins for a various set of fabrics, power, grounds. Also Management signals and software which has been approved by PICMG as of January 2014 needs to be rolled into the systems. Standardization of a centralized switching module that supports multiple fabrics and management signals to match the MCH on MicroTCA. |