



The current definition of CompactPCI Express has some notable changes from the previous PCI-only version of CompactPCI (PICMG 2.0). Among the biggest changes are:

- Four new slot definitions
- Two new connector types
- High-speed differential ZD connector
- UPM power blade type connector

In addition, the system may need a PCI Express switch either via a dedicated switch card or integrated onto the backplane. A key part of the specification is some flexibility in features that allows suppliers to make cost/performance trade-offs while still maintaining compatibility. Initial chassis will be a mix with a limited number of higher bandwidth CompactPCI Express slots. The peripheral slot type 2, discussed later, will maintain compatibility with both existing 32/33 boards and newer PCI Express boards in the same slot.

### Legacy peripheral slot

The first slot type supports the typical 32/33 CompactPCI board utilizing only J1 (see Figure 3) and the 64-bit extensions and rear I/O provided by the optional J2 connector (see Figure 4).

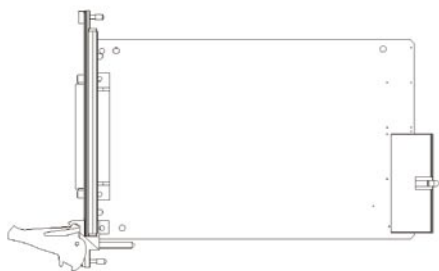


Figure 3

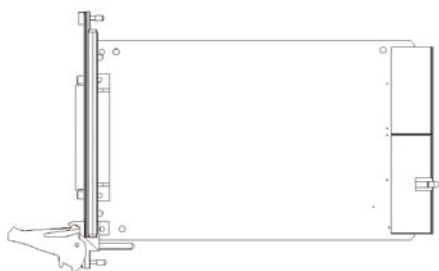


Figure 4

### System slot and peripheral slot type 1

The system slot and peripheral slot type 1 as shown in Figure 5 are designed to support CPU boards. The difference is that the system slot has additional PCI Express sideband signals required to support the system controller slot. Each slot provides two high-speed ZD connectors: the UPM power connector and a smaller HM connector. The four PCI Express links from the system slot can be combined into two links, providing a maximum of a x8 and a x16 link to the backplane. The slot type 1 can be used where multiple CPU boards are needed in a system.

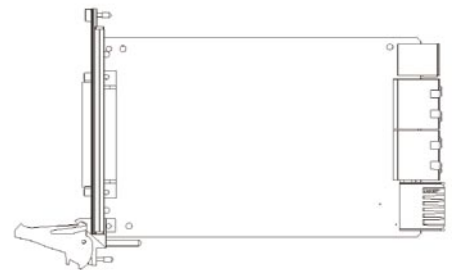


Figure 5

### Peripheral slot type 2 and hybrid slot

The peripheral slot type 2, shown in Figure 6, has a ZD connector that provides up to a x8 PCI Express link and a mini-HM connector for rear I/O and power. The mini-HM connector's mechanical keying arrangement prevents the insertion of incompatible boards into the slot. Additionally, a backplane hybrid slot is defined that accommodates either a new slot type 2 or legacy 32/33 CompactPCI board.

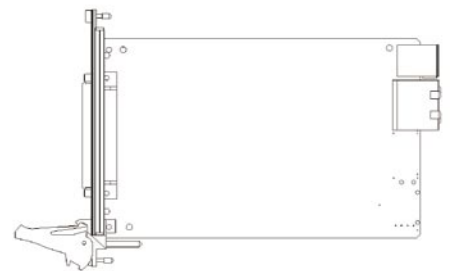


Figure 6

### 3U CompactPCI Express backplane

Figure 7 illustrates the possible backplane connector configurations supported in a 3U CompactPCI Express system. From left to right Figure 7 shows the following 3U CompactPCI Express backplane configurations:

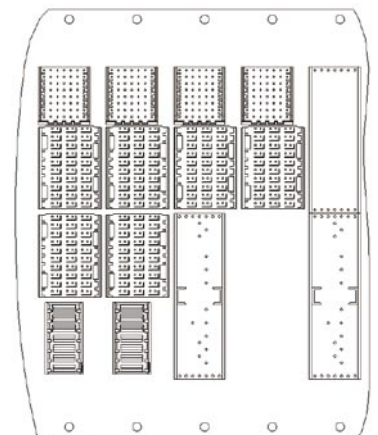


Figure 7

- System slot
- Peripheral slot type 1
- Hybrid slot
- Peripheral slot type 2
- Legacy 32 bit/33 MHz with 64 bit connector

As you can see, these new slot types maximize flexibility in their implementation, while providing baseline compatibility. A legacy 32/33 board will plug into either a hybrid slot, or a legacy slot and a newer CompactPCI Express-based board will plug into the peripheral slot type 1 or peripheral slot type 2.

### Other PCI Express industry specifications

- PCI Express/Advanced Switching for AdvancedTCA Systems (PICMG 3.4 –

Developed in 2003, this specification defines the PCI Express signals, guidelines, and rules for implementing PCI Express card usage in an AdvancedTCA platform.

- AMC.0/AMC.1 – The AMC.1 specification is nearing release and builds upon the AMC.0 specification by defining the implementation of PCI Express and Advanced Switching on an AMC.0 Module and On-Carrier device.
- XMC Express/VITA 42 – The goal of these two specification groups is to create a unified PCI Express imple-

mentation standard for PMC/PrPMC mezzanine cards used in CompactPCI and VME systems.

- **COM Express** – This is a PICMG industry specification for Computer-On-Modules that replaces the PCI bus with PCI Express. This new standard leverages off the ETX and Plug-N-Run G3 mechanical specifications, but for the most part is a legacy-free implementation of PCI Express in this embedded form factor.

### **Summary**

You might say that PCI Express is *the next big thing* in embedded systems. PCI Express specifications are being developed and introduced for a wide variety of processor boards used in various system form factors. The rate of introduction of PCI Express enabled processor boards will increase throughout 2005. The good news is that these new industry standards are designed to maximize a seamless transition to PCI Express technology in embedded computing systems.

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***The CompactPCI Express technical subcommittee** consists of 43 companies that develop and integrate CompactPCI systems and/or components.*

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