New PICMG 2.30 standard enables enhanced functionality of CompactPCI systems for defense applications

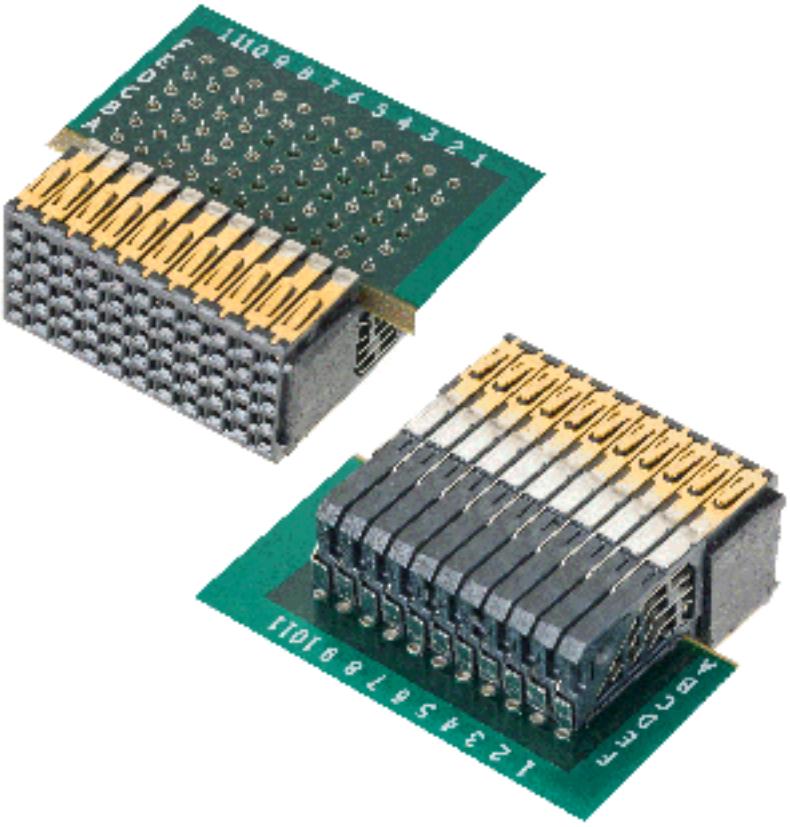
Jim Vana, Applications Engineering Specialist, 3M Electronic Solutions Division

Recent advancements in military technology have produced some awe-inspiring, highly sophisticated combat and reconnaissance equipment. In the U.S., such advances are expected to continue at a steady clip as robust defense spending drives the development of next-generation equipment.

However, defense market analysts predict that retrofitting older equipment with new technology will become an increasingly critical need for the U.S. Department of Defense as it strives to maintain technological advantage while maximizing its investment in legacy equipment. Those retrofits will likely continue to include upgrading critical embedded electronic systems on deployed aircraft, sea vessels and ground vehicles.

A new standard from the PCI Industrial Computer Manufacturers Group (PICMG) provides designers of CompactPCI systems with the ability to enhance system functionality yet preserve interoperability with existing CompactPCI standards.

PICMG officially adopted the 2.30 standard, also called CompactPCI PlusIO, in November 2009 to allow the use of advanced serialized buses. The new standard defines the use of previously reserved rear I/O pins for the 32-bit CompactPCI system slot for high-speed, point-to-point serial signals, such as PCI Express, SAS/SATA, USB and Gigabit Ethernet. The 2.30 standard is based on the PICMG 2.0 CompactPCI core specification and therefore enables backward compatibility. Legacy cards and newer, advanced serial cards can be plugged into a compatible system slot, allowing for incremental upgrades.



Central to the new standard is the introduction of a new, shielded 2mm Hard Metric socket connector. PICMG 2.30 specifies the use of the 3M Ultra Hard Metric (UHM) Socket Connector in place of the current unshielded J2 connector on the daughter card. In addition to improved shielding, the UHM socket connector is designed to be intermateable with standard CompactPCI headers and compatible with the standard CompactPCI PCB footprint – design features critical to maintaining backward compatibility.

As a result, the PICMG 2.30 standard and its specified socket connector enable a simplified upgrade path. Replacing the unshielded CompactPCI socket connector with the shielded UHM socket connector can result in improved transmission speeds as high as 5 Gbps as prescribed by the standard.
3M's UHM socket connectors can also enhance the functionality of VME 64x backplanes where 2 mm Hard Metric connectors per IEC 61076-4-101 have been specified for the P0 connector. VME 64x architecture is commonly used for military and ruggedized applications. In VME 64x, designers can also utilize the UHM socket connector for the J0 connector on system cards in these applications to enhance performance by adding high-speed, point-to-point serial signal capability while maintaining backward compatibility.

Innovative internal shielding design integral to the UHM socket connector enables the transmission of high-speed signals. This shielding approach is key to reducing signal crosstalk when compared to standard unshielded CompactPCI connectors. The internal shielding can also help increase signal density by allowing the designer to reduce the number of ground pins typically used in standard unshielded 2mm HM connector systems, depending on signal isolation requirements.

Certainly, improving technology in legacy military equipment often requires completely removing old systems and replacing them with new designs. However,

in cases where an existing CompactPCI system is adequate, but new capabilities need to be added, the PICMG 2.30 standard and the UHM socket connector allow for rapid, cost-effective upgrading.

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