



Contribution ID: 30

Type: Poster

Extensions for the Rear Side of MicroTCA.4 Systems

Tuesday, 23 September 2014 17:10 (1 minute)

For special needs at the European XFEL invented an RF-Backplane. It is an optional extension for the 9U crates in the MicroTCA.4 standard. The passive RTM backplane is suited for interconnection of high-precision RF and CLK signals for μ RTM and the new extended RTMs. It improves cable management and system reliability and offers more space for electronics. Furthermore with this backplane come also new RTM Power Modules, which deliver managed low-noise bipolar analog voltages. To manage this backplane a new MCH-RTM Backplane Management was developed, which has a direct connection to the front MCH.

Summary

For increasing the operating reliability of the MicroTCA.4 system and furthermore the maintainability, reduce the cabling and the performance limitation due to external components, a new concept for extending the MicroTCA.4 standard was constructed. This MicroTCA RF-Backplane for μ RTMs is an option for the 9U crate and is located behind the AMC backplane. All μ RTMs working with the RF-Backplane comply with the MicroTCA.4 specification. The passive RF-Backplane comes together with a dedicated shield board, which protects sensitive signals against electromagnetic interference induced by the AMC backplane. Furthermore the interconnection of high-precision RF and CLK signals together with the delivered high-performance managed analog power supply makes the backplane flexible for different applications.

The MCH-RTM Backplane Management Module (MCH-RTM-BM) allows the support for up to 12 μ RTMs, 3 new extended RTMs (eRTMs) and 2 new redundant Rear Power Modules (RTM-PM). The Management Module, the eRTMs and the RTM-PMs are located behind the MCHs and PMs of the front AMC backplane. In addition with this RF-Backplane and the MCH-RTM-BM the system can operate in cost-efficient configuration scenarios, where no RTM-PMs are plugged in and only a limited amount of power is needed for the rear side. For these scenarios the MCH-RTM-BM is working together with the already existing NAT-MCH-PHYS. In addition the MCH-RTM-BM is connected to the eRTMs via LVDS links. These links can be user defined and are managed with a User Logic on the Backplane Management Module. For all this managed purpose the MCH-RTM-BM is directly connected via the zone 3 to the front MCH.

In many cases sensitive signal conditioning elements are installed on μ RTMs and there is a need to provide clean bipolar power supply to these μ RTMs. The RTM-PMs deliver managed low-noise separated analog bipolar power (+VV, -VV) for the μ RTMs and unipolar power for the eRTMs.

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Session Classification: First Poster Session

Track Classification: Systems