Evaluation of the extension of the MicroTCA.4 board connectivity to the rear side of crates.

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Abstract

The contribution summarizes recent activities in the extension of the MicroTCA.4 connectivity to the rear side of standard MicroTCA.4 crates. The need for such an extension started as a need for a cleaner and more isolated environment from digital areas present in the front side of the crate. Local-oscillator generation, clock generation and their distribution were moved into a MicroTCA.4 crate and they could benefit from the standard MicroTCA.4 board management layer and connectivity. For this reason an RTMbackplane manager which sits in the rear side of the management carrier hub was used as a bridge from the front side to the rear. The backplane manager provides power, management layer and PCIe connectivity to the rear. Special emphasis was put on the layout of the digital signals in the rear MicroRF-backplane in order to avoid the possibility of pollution of high sensitivity signals. Finally an example of practical usage of the new extension is presented.

MicroRF Backplane Concept



eRTM Modules

DeRTM-LOG1300





DeRTM-CLK

Purpose

- CLK, LO generation
- Used on 21 RF stations (42 crates) in the Eu-XFEL
- REF, LO, CLK distribution

Features

- 9 LO Outputs, 9 REF outputs, 9 Pilot Outputs, 22 diff. CLK outputs
- Active temperature control of the RF sections
- Integration into MTCA.4 framework
- **Purpose** Universal CLK generation
- Dual PLL, External CLK, Internal free-running CLK, CLK divider, CLK fan-out\
- Fractional-N based

Features

- 22 diff. CLK outputs Integration into MTCA.4 framework
- Possible mounting of external mezz.
- with external CLK generation

Purpose

- The MicroRF Backplane extends the connectivity of RTMs and introduces eRTMs (extended RTMs).
- The CLKs, LOs, REFs and Pilot Tone can now be distributed over the backplane
- It allows to make a better use of the available space in the crate

Features

- Extends the MTCA.4 board management to the rear
- Each RTM can be powered by rear power supplies
- 3 Additional slots for RF-related purposes (LO, CLK generation, signal generation etc.)
- Improves isolation between digital PICMG, AMC backplane and RF domain



LO/CLK generation module

Rear backplane manager





System Integration



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