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The Versatile Link Demontrator Board (VLDB)

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The Versatile Link Demonstrator Board (VLDB) is the evaluation kit for the Radiation Hard Optical Link ecosystem, which provides a 4.8 Gbps data transfer link for communication between front-end and back-end of the experiments. It gathers the Versatile Link main radiation hard custom ASICs: GBTx, GBT-SCA and VTRx/VTTx plus the FeastMP, a radiation hard in-house designed DCDC. This board is the first allowing system-level tests with a complete interconnection of the constitutive components.
The VLDB board as well as a system test example using multiple interconnected VLDBs will be presented in this poster.

Summary

The Versatile Link Demonstrator Board (VLDB) is the evaluation kit for the Radiation Hard Optical Link ecosystem, which provides a 4.8 Gbps data transfer link for communication between front-end (FE) and back-end (BE) of the experiments. It gathers the Versatile Link main radiation hard custom ASICs: GBTx (ASIC dedicated to serialization, deserialization and data and clock recovery), GBT-SCA (Slow Control Adaptor ASIC dedicated to FE control and status monitoring) and VTRx/VTTx (optical transceiver/dual transmitter) plus the FeastMP, a radiation hard in-house designed DCDC. It manages timing signal, trigger, status monitoring, readout data and slow control of the
This board is the first design allowing system-level tests of the Link with a complete interconnection of the constitutive components. HDMI connectors allow to test communication with experiments Front-End electronics (up to 20 Front End Asics can be connected via elink/HDMI to the same GBTx) and to try multiple interconnection schemes between several VLDBs playing all the roles foreseen by the various use cases. It is a unique tool for initial characterization of the full Radiation Hard Optical Link ecosystem (in particular focussing on the quality of recovered clock delivered to the Front-End electronics, latency of delivered triggers or data link characterization). It is also the ideal guinea-pig to test software and firmware implementation at Back-End level and to control complex systems based on multi-GBT implementations. It will also be used for preliminary on-site system tests (underground, next to the LHC detectors) and for full radiation tests in several radiation facilities. Finally, it will be an excellent reference for future board designs using these components.
The VLDB board as well as a system test example using multiple interconnected VLDBs and external modules using several protocols like JTAG, SPI and I2C will be presented in this poster.

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