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The Gigabit Link interface Board (GLIB), a flexible system for the evaluation and use of GBT-based optical links

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The Gigabit Link Interface Board (GLIB) is an evaluation platform and an easy entry point for users of high speed optical links in high energy physics experiments. Its intended use ranges from optical link evaluation in the laboratory, to control triggering and data acquisition from remote modules in beam or irradiation tests. The GLIB is a double width Advanced Mezzanine Card (AMC) conceived to serve a small and simple system residing either inside a μTCA crate, or on a bench with an optional link to a PC.
Each GLIB card can process data to/from four SFP+ transceiver modules, each operating at bi-directional data rates of up to 6.5Gbps since it is based on on a high-performance Virtex-6 FPGA with twenty 6.5Gbps transceivers. This performance matches comfortably the specifications of the GBT/Versatile Link project with its targeted data rate of 4.8Gbps. In its simplest form, one GLIB board thus interfaces with up to four GBT channels. When in a μTCA environment, it provides a Gigabit Ethernet link for the controller of the module as well as PCI Express 4x GEN2 for data readout. Alternatively, instead of PCI Express, it can provide low and fixed latency custom 1.6/3.2/6.4Gbps DAQ links based on the LHC clock frequency. When in stand-alone operation, the system can interface with a PC through a Gigabit Ethernet RJ45 socket and/or a PCIe 4x GEN2 adapter board. The GLIB I/O capability can be further enhanced with two FPGA Mezzanine Cards (FMC). Each FMC can carry up to 160 user-specific I/Os (that can be configured both as single-ended or differential pairs) as well as 2 differential clock inputs and 2 differential clock outputs. This gives users the flexibility to adapt the GLIB interface to their system, by for instance adding connectivity to the TTC network at the backend, or connecting to e-links at the frontend. Additionally, one of the two FMCs also provides four optional 6.5Gbps transceiver lines.
This paper presents the architecture of the GLIB, its features as well as examples of its use in different setups. The variety of optical and electrical interfaces on the board coupled with its flexible firmware, mean that this board can be easily adapted for use on non-LHC applications. A first prototype of the GLIB is expected to be available in early 2011.

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