GLIB update

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CONCEPT

Gigabit Link Interface Board (GLIB)

- An evaluation platform for users of high speed optical links
- AMC card for bench-top operation or use in a µTCA crate
- Expandable via FMC two mezzanine slots

GLIB applications

- Optical link evaluation in the laboratory
- Control, triggering and data acquisition from remote modules in beam or irradiation tests

GLIB project homepage: https://espace.cern.ch/project-GBLIB/public



IMPLEMENTATION

- Mid size, double width Advanced Mezzanine Card (AMC)
- 4 slots for SFP+ transceiver modules on-board
- Xilinx Virtex-6 FPGA (20 GTX)
- 2 FPGA Mezzanine Card (FMC) slots for I/O expansion
- Gigabit Ethernet link to PC for desktop operation



ARCHITECTURE



FIRMWARE



NOTE: only the system core and few examples of user logic will be provided

Demonstration of GBT communication

- between a GLIB and the GBT evaluation board (GBTX ASIC)

- between two GLIB cards with unrelated clocks

GBT FPGA HDL core improvements

- Minimized the latency (20-bit MGT interface instead of 40)
- Adapted the HDL core to Virtex-6 features for deterministic operation

Successful implementation of GLIB PC interface

- Gigabit Ethernet in Stand alone mode and in a μTCA crate

> Successful integration of FMC modules for I/O expansion

> Firmware architecture for facilitating user development

- Separated system/user parts
- All complexity interfacing/controlling on-board circuitry transparent for user

Control software available

- Text-based (Python scripting) or GUI interface on Windows or Linux

> Delivery to beta users

- GLIB HW/FW/SW/doc to CMS, ATLAS & ALICE
- Continuous support given

THE GLIB ECOSYSTEM

TTC FMC



Versatile Link FMC



AMC-PCIe CABLE ADAPTER





GLIB for GEM OFF-DETECTOR ELECTRONICS (preliminary setup)



A possible off detector partition

1 AMC/GLIB = one phi column ie. 10°/3 GE21 (2links), GE11 (2 links + 4 neighbours)

 $1 \mu TCA$ crate = 30° degrees in phi (1 or 2 AMC boards to receive RE3 and 4 data.

12 uTCA crates = 360°

24 uTCA crates for both endcaps

Scheme currently under investigation. Not yet fixed.

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GLIB for GEM OFF-DETECTOR ELECTRONICS (preliminary setup in 2D)







Although only 2-year old project, the GLIB is in an advanced stage

Prototypes have already been delivered to beta users: CMS, ATLAS, ALICE

Big interest from the community: requests for boards from various institutes

First production batch before end 2012: Number of boards based on user demand

Important spin-offs: TTC FMC, significant improvements of GBT-FPGA HDL core