

## An general high performance xTCA compliant and FPGA based Data Processing Unit for trigger and data acquisition and trigger applications

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This talk will be about an new version of high performance xTCA compliant and FPGA based Data Processing Unit for trigger and data acquisition applications like in PANDA, PXD/BelleII upgrade and CMS trigger. The Unit consists of 4 Advanced Mezzanine Cards (AMC, called xFP card), 1 AMC carrier ATCA board(ACAB) and 1 Rear Transition I/O Board(RTM). The ACAB board features 1 Xilinx Ultrascale XCKU060 FPGA chip, 16GBytes DDR4 memory, 5 ports Gigabit Ethernet Switch and 1 10G Ethernet port for data processing, buffering and switching. Gigabit Ethernet Switch is designed switching four xFP cards and ACAB board Ethernet ports to ATCA Backplane fabric port.

And the xFP board features 1 xilinx Virtex-5 FX70T FPGA chips and 4GBytes DDR2 memory for data processing. The connection between ACAB board and four xFP boards are by RocketIO port and other LVDS I/O pairs. 8 optical links by 4 xFP4(with two 6Gbps optical IO) cards provide an input bandwidth of 48Gbps and 16 optical link by 4 xFP3.1(with four 4Gbps optical IO) cards provide an highest input bandwidth of 64Gbps. Optical links can either from panel of AMC card or from RTM card. A single ATCA shelf can host up to 14 boards interconnected via a full mesh backplane. Each board can directly connect to any other 13 boards point-to-point via 10G RocketIO link. A prototype unit will be shown and some functions tests will be reported and discussed.

Key words: xTCA, AMC, ACAB, RTM, RocketIO, DDR4

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