CuEval2 Report

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Introduction

- Belle DAQ system
Introduction (cont)

- Current Readout subsystem uses FASTBUS as system bus.

- Weakness of FASTBUS
  - Slow trigger rate: 100-250Hz
  - Bandwidth: around 10MB/s
  - CPU have to control whole transfer procedure.
COPPER readout subsystem
- fast trigger rate: 10k-40kHz
- Bandwidth: 125MB/s (33MHz, 32bit PCI bus)
- Using DMA mode directly transfer data to memory without CPU control
- There are lots of PCI modules we can choose (Radisys 6315 as embedded CPU platform)
COPPER II

VME-9U sized board

- 4 ADC/TDC slots
- 1 MB x 4 FIFO
- 32-bit local bus
- 3 PMC slots
- 32-bit 33MHz PCI bus
- Local-PCI bridge
- VME I/F

COmmon Pipelined Platform for Electronics Readout
COPPER II
CuEval system
CuEval board

- **CuEval I**
  - ▲ 16 local bus
  - ▼ serial FPGA setup
  - ✗ (need continuous data)

- **CuEval II**
  - ▲ 32 local bus
  - ▼ parallel FPGA setup
CuEval board concept

Pin Pong strategy

USB -> FPGA -> Local bus

USB -> FPGA -> MEM
CuEval2-Firmware (FPGA)

USB Empty → Fetch → USB Read → Switch

Send → USB Read

Event FIFO FULL → Switch

Counter clock

Switch memory when one is full, another is empty

Switch

Counter clock

Ram A → Mem Full

Ram B → Mem Full

Switch Control

MEM address

MEM address

USB Data → Switch

Ram Data

Switch

RAM Data

Switch

RAM Data

Event FIFO Data
CuEval2-Firmware (CPLD)

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Address Analyzer

Command Analyzer

Initialize

Reset

Parallel write

Clear FPGA Program

Disable Write

FPGA Write

Enable Write

FPGA Program

FPGA Init done

Local Data

FPGA Data
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Command

Address
CuEval-Test system (PC)
CuEval-Test system (PC)
Event FIFO readout (Linux)

Event FIFO

PCI

Interrupt
Event data

Event data queue

Process

Send data queue (Pin Pong)

Package data

Net

Test system

Ethernet or Terminal

Command

Status
Situation

- CuEval II board hardware design
  - on July 2004
- CuEval II board firmware design
  - FPGA update (this week)
  - CPLD update (3 bit-7 bit address)
- Test system software design (windows finished)
Situation (cont)

- Event data Readout software design (Linux)
  - Understand new device driver 😊😊
  - CPU readout 😊
  - DMA readout 😁