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GASPARD-HYDE-TRACE Workshop 2017 FASTER 23 January 2017

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Offline Analysis

Click on channel groups	to view channels	
Channel groups		
Channels 🔽		
	configure trunk	
General configuration		
All channel groups ON	All channel groups OFF	Restore default configuration
Fimed Acquisition		
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Start date	Running time	Stop date
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Event count	Instantaneous rate (evt/s)	Average rate (evt/s)
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Real Time Algorithms





RHB

Based on Root



Offline Analysis

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Real Time Algorithms





RHB

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MODULAR **ELECTRONIC**

STANDALONE SYSTEM

- 1 VITA 57 slot,
- 1 FPGA (C5 140 LE)
- 1 Gb/s Ethernet



MULTI-CHANNEL SYSTEM



- 2 VITA 57 slots,
- AMC.2 full size module,
- 3 FPGA(s) (C5 140 LE)
- 1 and 10 Gb/s Ethernet
- 10 MHz Clock synchronization

FPGA firmware loading by Ethernet



STANDALONE SYSTEM

MODULAR ELECTRONIC

MULTI-CHANNEL SYSTEM





- 4 FADC (125MHz@14bits) • ±1V, ±2V, ±5V, ±10V input range • ±1V input range
- 25 MHz Bandwidth



- 2 FADC (500MHz@12bits)
- 100 MHz Bandwidth
- DDC316 from TI
- 32 channels
- ±1V input adjustable Offset I-TO-V conversion front end
 - 3pC to 12 pC (full scale) • Integration time range from
 - 10us to 10 ms



- ISEG BPS-Serie 4W • ± 500 V to ± 6 KV
- 5 I/O ports • 200 MHz Bandwidth

• FMC project (CERN)

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• LVTTL

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Real Time Algorithms





RHB

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REAL TIME ALGORITHMS







HPGe detector, MOSAHR board, FASTER_ADC

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REAL TIME



Offline Analysis

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Real Time Algorithms





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Offline Analysis

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- Ubuntu 14.04 or 16.04 LTS 64 bits
- ADA and Python
- Software trigger (multiplicity or Boolean trigger)
- 400 000 ev/s (continuous mode) (max rate-> 2 10⁶ evts/s)
- Faster repository on LPC Server
 - sudo apt_get install fasterv2
- Update the software and the FIRWARE at the same time
- Offline analysis package
- List of available packages
 - fasterv2, fasterac, rhb,
 - faster-rhb-xxx-demo (xxx=qdc or adc or dlmcp or sampler)

SOFTWARE



Offline Analysis

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Real Time Algorithms





RHB

Based on Root





RHB (Root Histogram Builder)

- Based on the ROOT framework from CERN
- No line of code is needed
- Just declare the histograms, conditions, graphical cuts
- Communication with FASTER over the network
- Can be installed on Windows, Linux, MacOS
- Ubuntu 14.04 or 16.04 LTS 64 bits installation with apt-get



RHB

Based on Root



Offline Analysis

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Real Time Algorithms





RHB

Ubuntu repository

Based on Root

DOCUMENTATION



faster.in2p3.fr FASTER Fast Acquisition System for nuclEar Research MICRO CHANNEL PLATE DETECTOR TEST WITH FASTER USE-CASE ABOUT FASTER ABOUT RHB FIRST STEPS DOWNLOAD CONTACT US SITE MAP TEAM HOME You are here: Accueil . Use-case Use-Case FASTER USE-CASE Time flight and position In this section you will find typical use case in nuclear physic research using the FASTER measurement using a microsystem. Each use-case is divided in four parts: channel plate with resistive position readout · The device and its electronic, Charged particles identification · Data acquisition, using a "telescope" detector · Data analysis, Neutron energy measurement & Conclusion. n/y discrimination using a liquid scintillator For the moment, six FASTER use-cases are published. · Charged particles beam intensity Time of flight and position measurement using a micro-channel plate with resistive position monitoring readout. Hyper Pure Germanium · Charged particles identification using a "telescope" detector, spectroscopy · Neutron energy measurement & n/y discrimination using a liquid scintillator, High resolution position measurements using a micro- Charged particles beam intensity monitoring, channels plate with a delay line · High resolution gamma spectroscopy, readout · Micro channel plate localisation with delay line readout, Virtual nuclear physics experiment (Coming soon). Search If you use or have used FASTER and you want to write your own FASTER use-case, donwload Search this file. Search CIL

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CONCLUSION



FASTER is a digital modular acquisition system from the electronic front end to the histogram builder software developped at LPC.

FASTER is very easy to install, to use with great performances.

FASTER is able to perform the main nuclear functions with a set of hardware very reduced. **FASTER** is wireless ☺.

FASTER is designed to handle to medium size experiment (from one to few hundred channels).

FASTER is currently used in

- FRANCE : Paris-Sud University (5), Caen University (7), CIMAP (2), LPC-Caen (7), IPHC(2), CEA(5), IPNO(1), SUBATECH (2), GANIL(1)
- ROMANIA : INFN-HH (1)
- SPAIN : Granada University (1),
- SWITZERLAND : PSI (1), CERN (Isolde)(1),
- USA : CENPA (1), GONZANA University (1), MSU(2).
- RUSSIA : JNIR (2)

FASTER in few numbers

42 → Systems used (168 Mother-boards, 297 Daughter-boards)

16 \rightarrow Coming soon (March 2017)

CONCLUSION



FASTER has already been used with :

- Solid-state detectors (Silicon detectors, HPGe, SiLi and CdTe detectors),
- Gaseous detectors (Ionization chambers, GEM detectors, Proportional counters, ...),
- Scintillators + Photomultiplier tube
 - Inorganic : Nal, Csl, YAG, LaBr, Li doped glass scintillator...,
 - Organic : Plastic scintillators, Liquid scintillators for pulse shape discrimination.
- RF cyclotron demodulation,
- SiPM detectors,
- Micro Channel plates with delay lines or resistive anodes for localization.

FASTER in 2017

- New Fast ADC daughter-board (500MHz@16bits or 1Ghz@16bits)
- Be able to setup and readout an AsAd module :
 - AsAd \rightarrow ASIC-ADC board
 - 4 AGETs → ASIC for General Electronics for TPC
- FASTER v3



THANK YOU FOR YOUR ATTENTION

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	START	

Real Time Algorithms





RHB

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MODULAR **ELECTRONIC**

MULTI-CHANNEL SYSTEM



~700€

• ISEG BPS-Serie - 4W

• ± 500 V to ± 6 KV



~450€

- FMC project (CERN)
- 5 I/O ports
- 200 MHz Bandwidth
- LVTTL





- 2 FADC (500MHz@12bits)
- 100 MHz Bandwidth

~4600 €

- - - Integration time range from
 - 10us to 10 ms
- 32 channels
- DDC316 from TI
- ±1V input adjustable Offset I-TO-V conversion front end
 - 3pC to 12 pC (full scale)

~800€

~1500 €

~1100 €

- 4 FADC (125MHz@14bits)
- ±1V, ±2V, ±5V, ±10V input range ±1V input range
- 25 MHz Bandwidth



STANDALONE SYSTEM



