Basic Plan for DAQ

Mitsuhiro YAMAGA

KEK

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Total channel number from the detector

CsI	: $544 + 24$	$=$	568
Front Barrel	: 16 x 2 PMTs	$=$	32
Central Barrel	: 32 x 4 PMTs	$=$	128
Collar Counters	:	$=$	?
Charged Veto	:	$=$	32
Collimator6	:	$=$	?
total	:	$=$	~ 1000

Electronics

ADC : FASTBUS LeCroy 1855N 96 ch

- 12 bit with Low/High range mode (15 bit equiv.)
- 50 (400) fC/count at full range 200 (1600) pC
- Conversion $< 750\ \mu$sec/module

$>$ 10 modules ($>\sim$ 1000 ch) available

TDC : TKO 64ch HR-TDC

- 12 bit, 25/50/100 psec resolution
  at full scale of 100/200/400 nsec
- Conversion $< 90\ \mu$sec/module

15 modules ($\sim$ 1000 ch) available

Electronics (cont.)

- FASTBUS Master : AMS FPI-040

  ADC data buffer : DPM on VME box

  Trigger distributor : CAT

- TKO interface : SCH

  TDC data buffer : SMP on VME box

  Trigger distributor : GONG

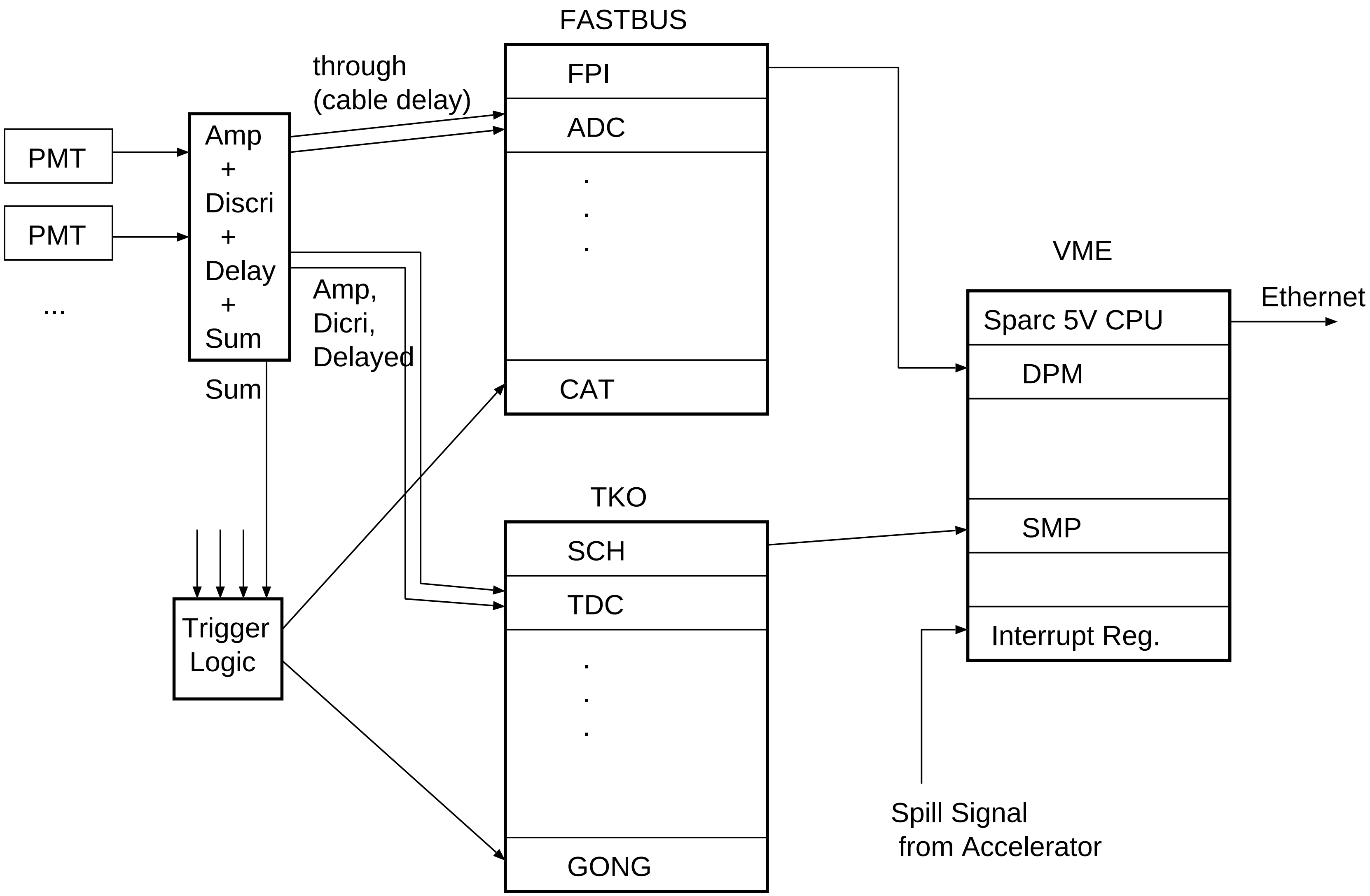
- High Voltage module : LeCroy module and CAEN module

(Another option)

FASTBUS Master : LeCroy 1821

ADC data buffer : LeCroy 1892 on FASTBUS box

Logic Diagram



Trigger Logic/Circuit ?

- Accpeptable event rate for this scheme of DAQ is estimated to be

  $\sim$ 100 Hz

  Trigger event rate is estimated (by MC study) to be

  $\sim$ 1000 Hz   (will be given in the next talk)

  Prescale the multi-cluster event by clustering algorithm ?

  - Simple multiplicity, Majority-logic, FPGA programming, ...

- Trigger logic for the Cosmic Run, Engineering Run.

Need to be discussed.

Control Software

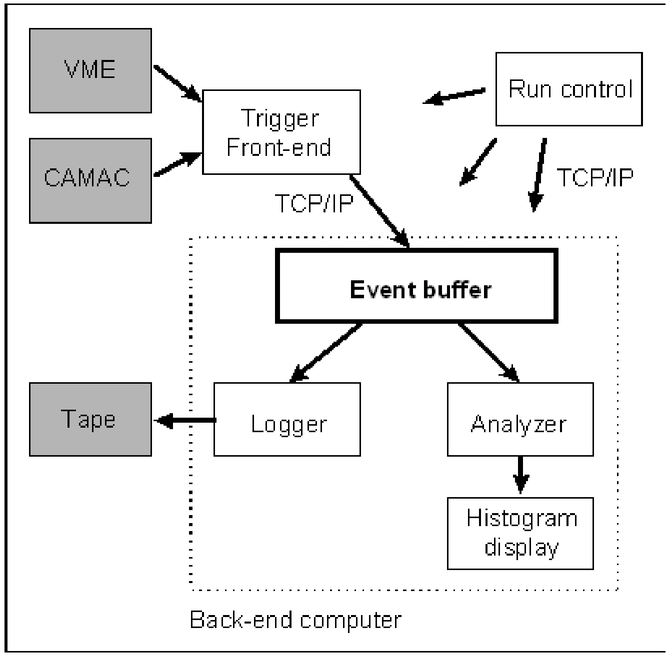
Two options for now ... **MIDAS** and **Unidaq**.

- **MIDAS** (Maximum Integrated Data Aquisision System)

  Features emphasized by N. Khomutov (MIDAS user at PIBETA exp.):

  * Stable. Has been used in PSI and TRIUMF since 1993.
    Still being developped for the new feature.
  * Portable for various Unix, Linux, VxWorks, WindowsNT.
  * Controllable via HTTP interface.
  * Integrated with PAW for online monitor.
  * Has a fast proprietary hierarchical database.
  * Slow control also available.

Control Software (cont.)



MIDAS experiment "Pibeta"			Wed Apr 12 12:33:03 2000		
Start ODB CNAF Messages ELog Alarms Programs Config Help					
Trigger settings Rates Ratios Chambers PID Handbook WebCam Accelerator					
Run #30160	Stopped	Alarms: Off	Restart: Yes	Data dir: /data	
Start: Wed Apr 12 07:50:46 2000			Stop: Wed Apr 12 08:27:26 2000		
Equipment	**FE Node**	**Events**	**Event rate[/s]**	**Data rate[kB/s]**	**Analyzed**
Trigger	Trigger Frontend@pc812	22029	0.0	0.0	100.0%
Scaler	Trigger Frontend@pc812	217	0.0	0.0	100.0%
HV	SC Frontend@pc809.psi.ch	0	0.0	0.0	0.0%
Environment	SC Frontend@pc809.psi.ch	0	0.0	0.0	0.0%
Chamber	Trigger Frontend@pc812	38	0.0	0.0	100.0%
Beamline	SC Frontend@pc809.psi.ch	0	0.0	0.0	0.0%
Channel		**Active**	**Events**	**MB written**	**GB total**
0 run30160.mid		Yes	22362	32.440	31.286
Lazy Destination		**Progress**	**File Name**	**Speed [kb/s]**	**Total**
psarchive		100 %	run30158.mid	773.9	3.3 %
Lazy Label		**Progress**	**File Name**	**# Files**	**Total**
2000-2		100 %	run30158.mid	44	45.5 %
11:01:44 [ODBEdit2] Program ODBEdit2 on host pc2106 stopped					
ODBEdit [pc2106]		Lazy_FTP [pc2106]		Lazy_Tape [pc2106]	
Logger [pc2106]		ODBEdit1 [pc2106]		mhttpd [pc2106]	
Analyzer [pc2106]		Trigger Frontend [pc812]		SC Frontend [pc809.psi.ch]	

Control Software (cont.)

- **Unidaq**

  * Many specialist in KEK (will be the KEK standard for now).

  * Limited but simple funcions provided.

  * Run control, data buffering, ...

Things to do

- Readout test for TKO TDC.
- Multi-event buffering test for FPI - DPM.
- Trigger logic for the real experiment, cosmic-run, engineering-run.
- Software.

Schedule

$\sim$ December 2001 : Hardware implementation and test

$\sim$ March 2002 : 1st version of Readout/Control software

August 2002 $\sim$: Cosmic run for CsI

October 2002 $\sim$: Engineering Run