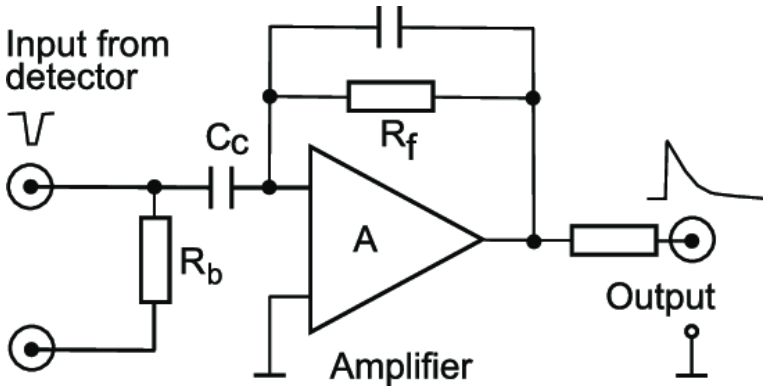
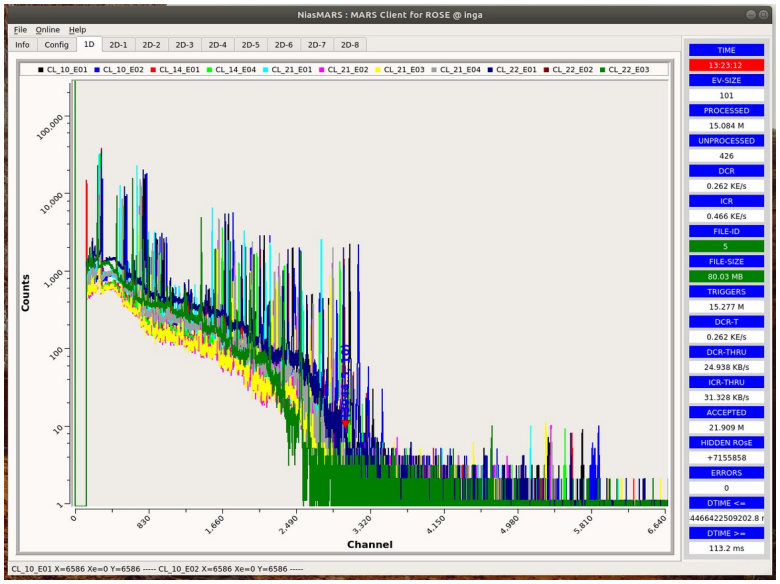
Acquisition, Event of Interest and Timestamp

Components of DAQ



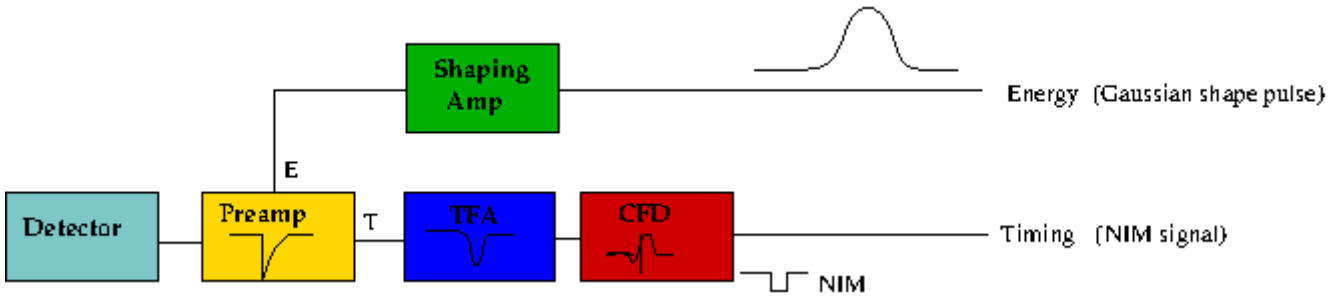
TFA
CFD
Trigger Module
TDC
Shaping Amplifier
ADC
Controller
Computer
Storage.



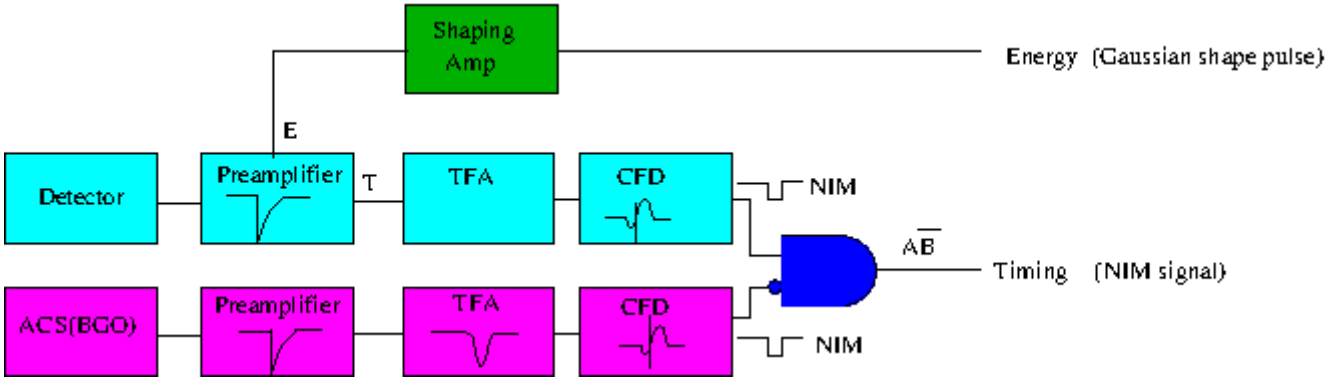
Graphics User Interface/Software

Back panel or mode of implementtion may differ

Event from A detector



Event From HPGe Detector



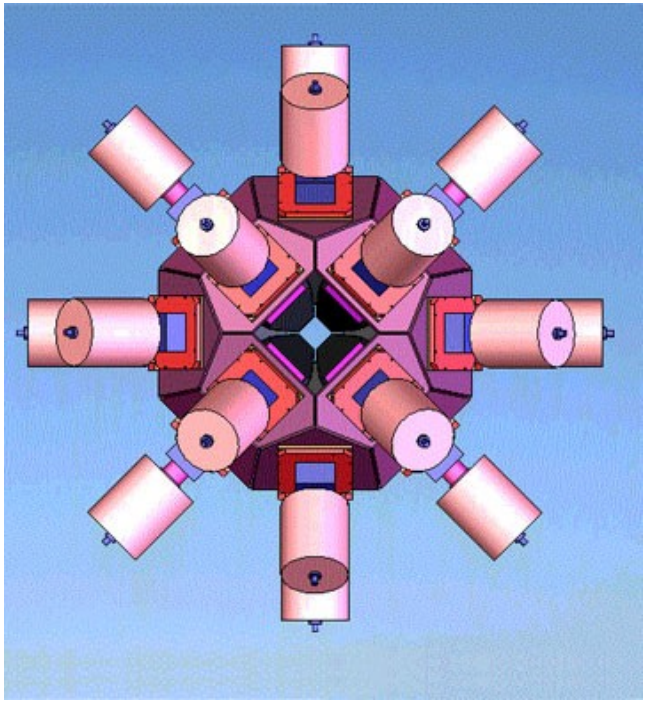
HPGe Detector comes with Anti compton shield to suppress the background noise which is due to compton scattering.

Compton Scattering ---> partial information

Inhibit the HPGe signal if ACS signal is present.

MODE of Data Collection

Multiple Detector --> multiple signals



Histogram -> No condition for event collection
No Rejection, No Timing correlation

List-mode -> condition apply **
Collected only when a Events of Interest occurs

What is an Event of Interest (EOI)???

Event which fulfill all the requirement of user and used as a trigger for the DAQ...

User requirements are correlation between the events of the detectors fired with in chosen time frame means range of TDC (400ns/800ns). Basically This is called Multiplicity.

Multiplicity means number of event comes in a given time window….

User can put the conditions :

- Collect the data only when the signal comes from at least one detector (1 fold multiplicity)

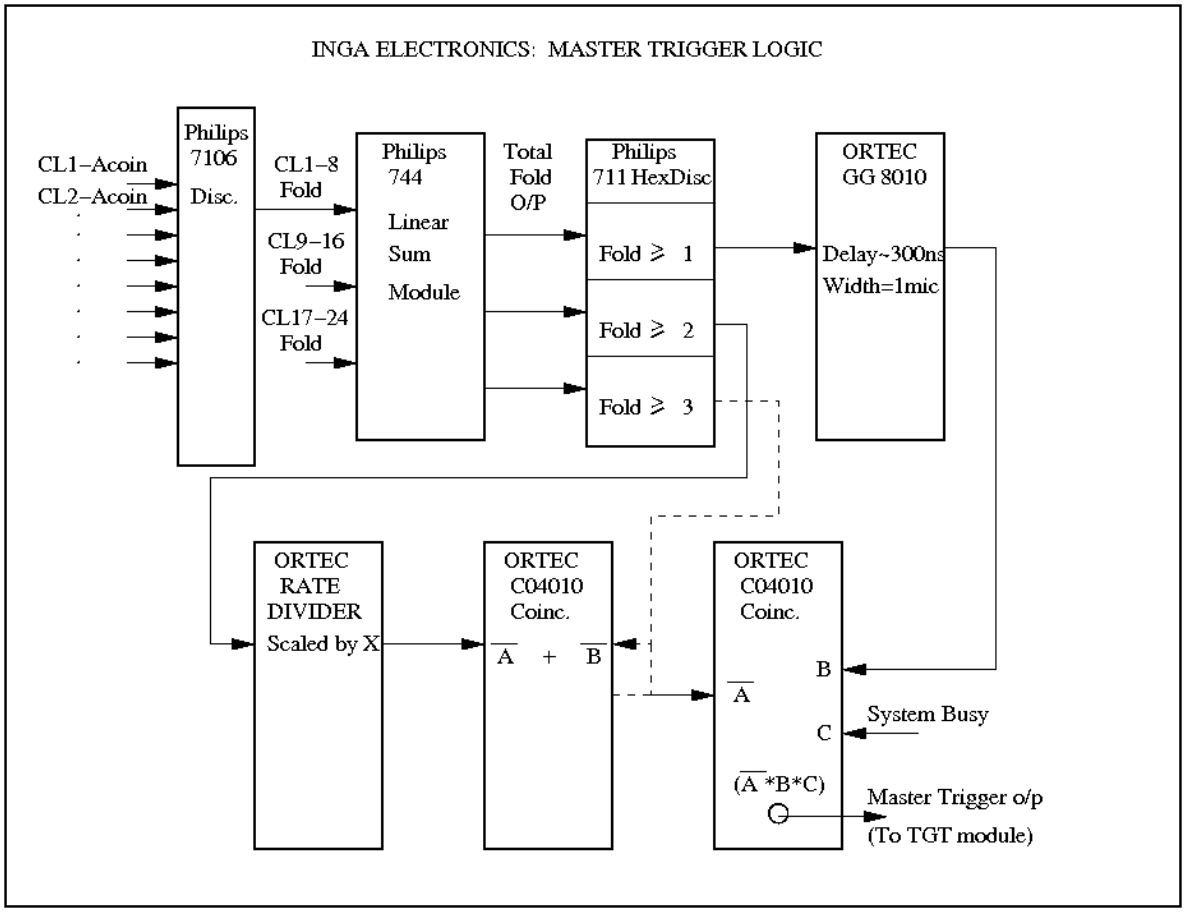
OR

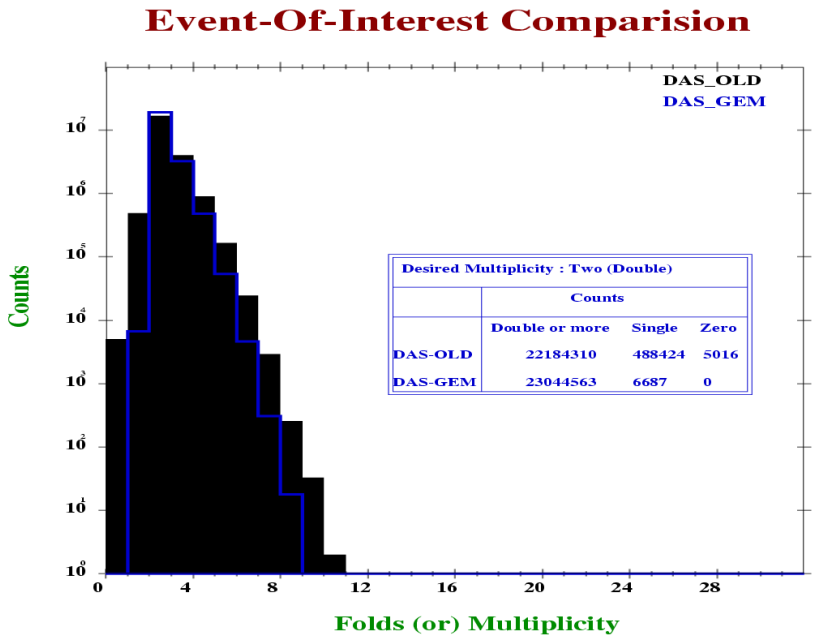
- Only when the signal comes from at least two detector in a chosen time frame.(2 fold multiplicity)

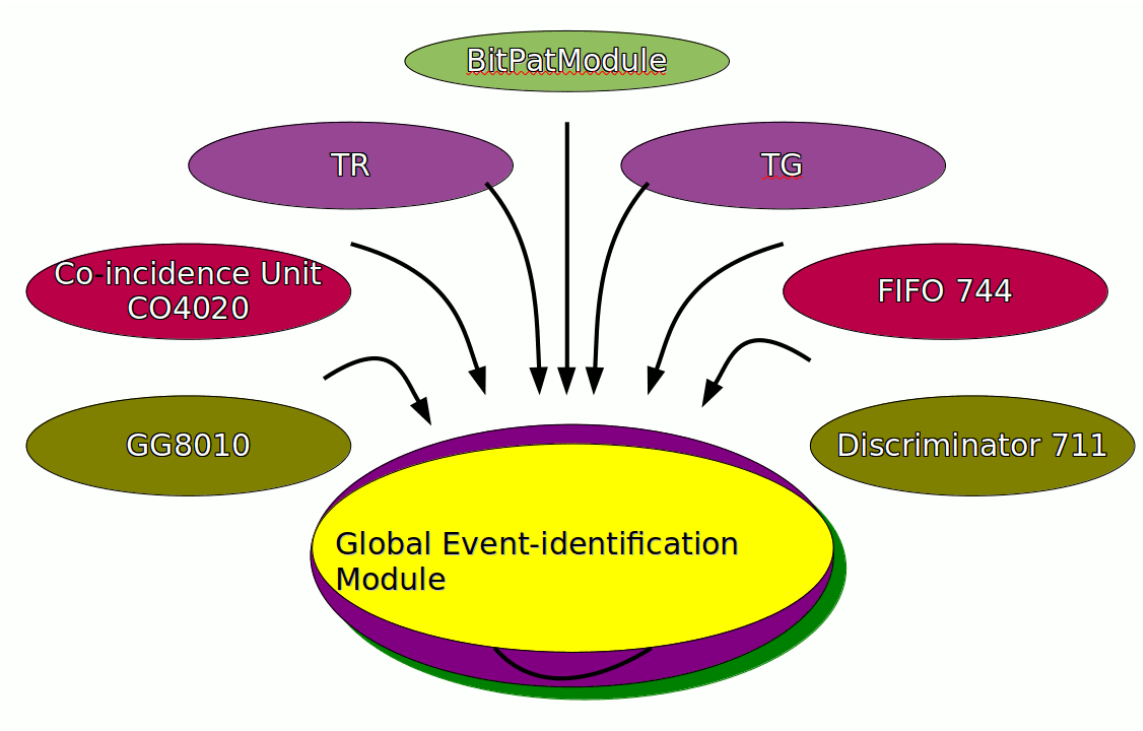
OR

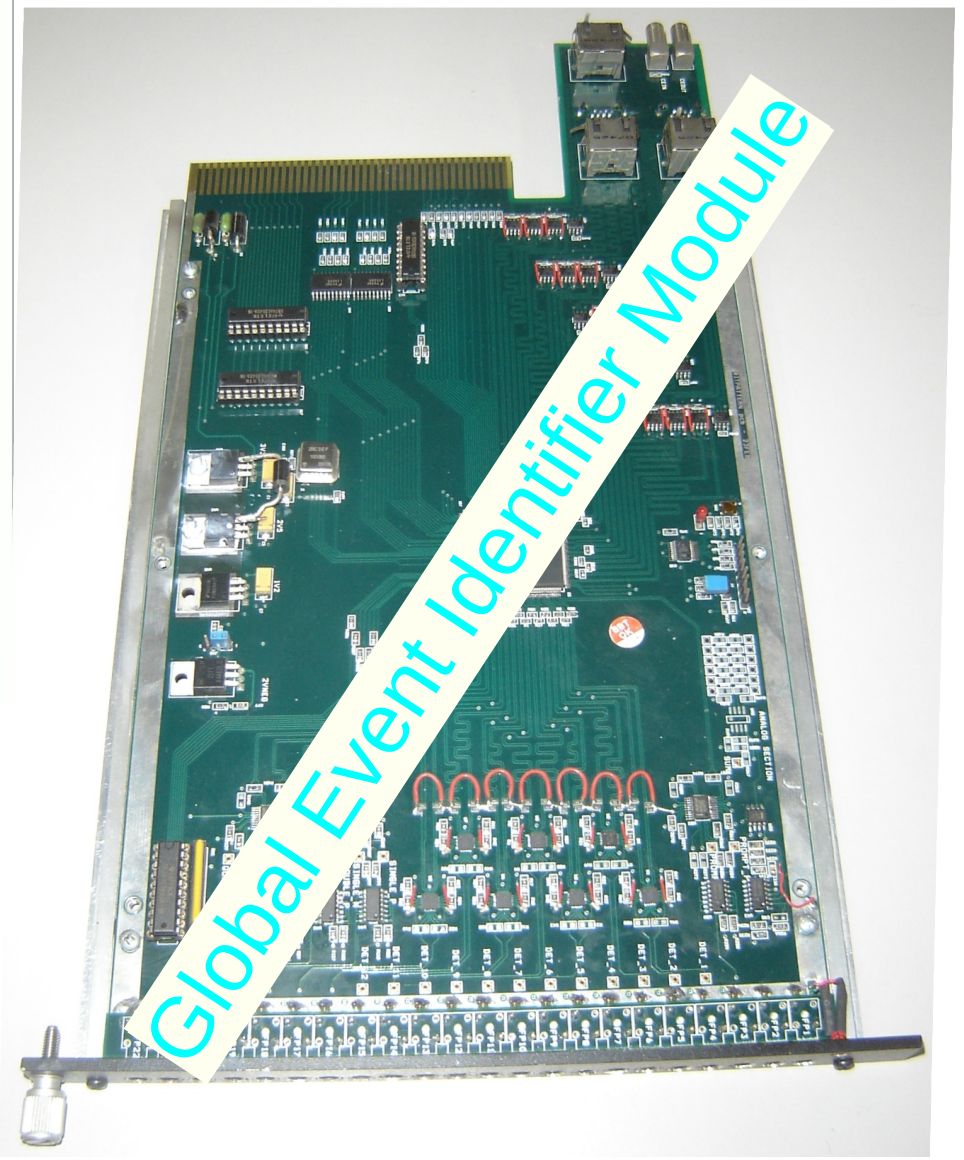
- Only when the signal comes from at least three detector in sync with some other type of detector in a time window. (3 fold multiplicity)

Multiplicity Selection

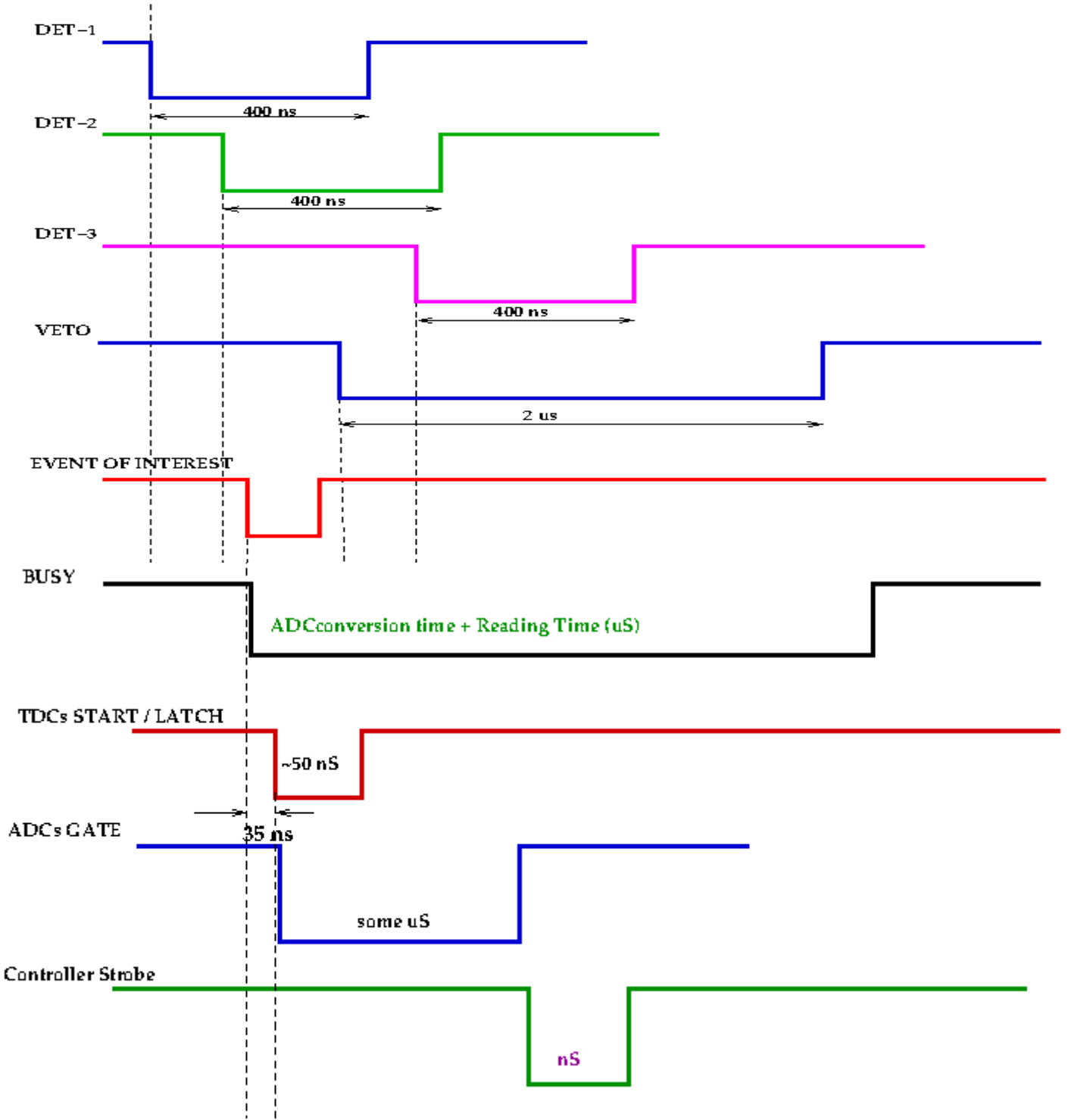




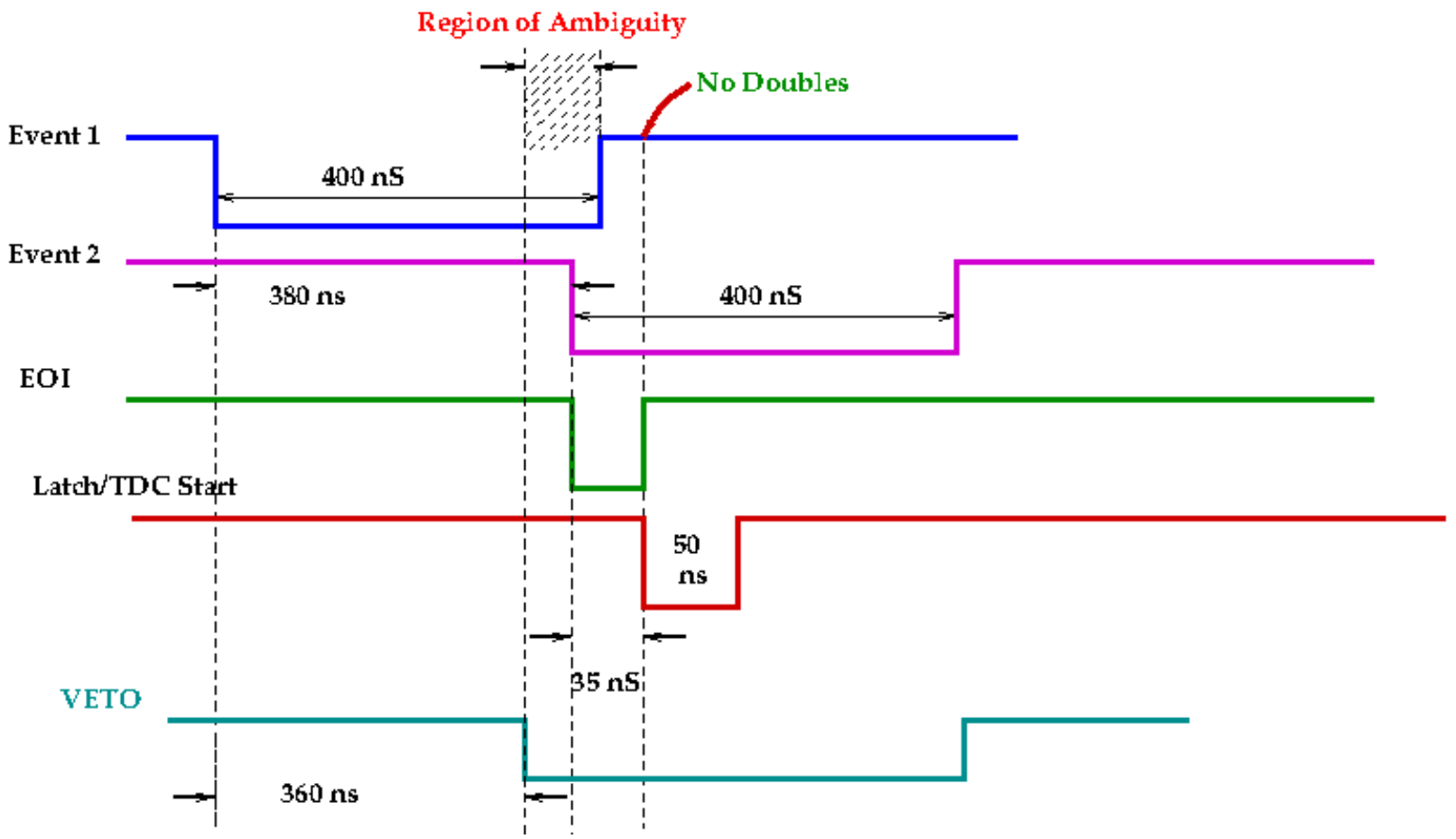

BitPatModule
TR
TG
Co incidence Unit
CO4020
FIFO 744
GG8010
Discriminator 711
Global Event-identification
Module


Global Event Identifier Module

Event of Interest generation (multiplicity -2 fold)



What is VETO ???



In This case Veto is nothing but a delayed signal of singles to prevent the false registration of bit pattern.

How do we implement user requirements ???

Convert them into a logic and write those instructions into the Trigger module through the Controller.

Controller ???

Controller is a module which works for us like mediator connected between computer and DATA bus.

List of Command through GUI --> controller --> DAQ Modules

Steps…

- All the event goes to trigger module (GEM) and GEM generate the trigger/Master strobe whenever the user condition satisfied or EOI occurs.
- Also generates a busy signal to block all the incoming event of interest till the system is engage in the processing of Accepted EOI and Time stamp this event along with latching the BIT PATTERN.
- BIT PATTERN contains the information about the fired detector for that particular EOI.
- Every time the Controller gets the trigger, it execute the list of read command which we wrote into the controller memory and send the acquired data to the computer.
- First command in list of controller is BIT PATTERN read.

- Based on the BIT PATTERN information, controller executes remaining command in list. This method is called Zero suppression read.

Zero Suppression READ → Short Read time, less dead time of the system, Space saving

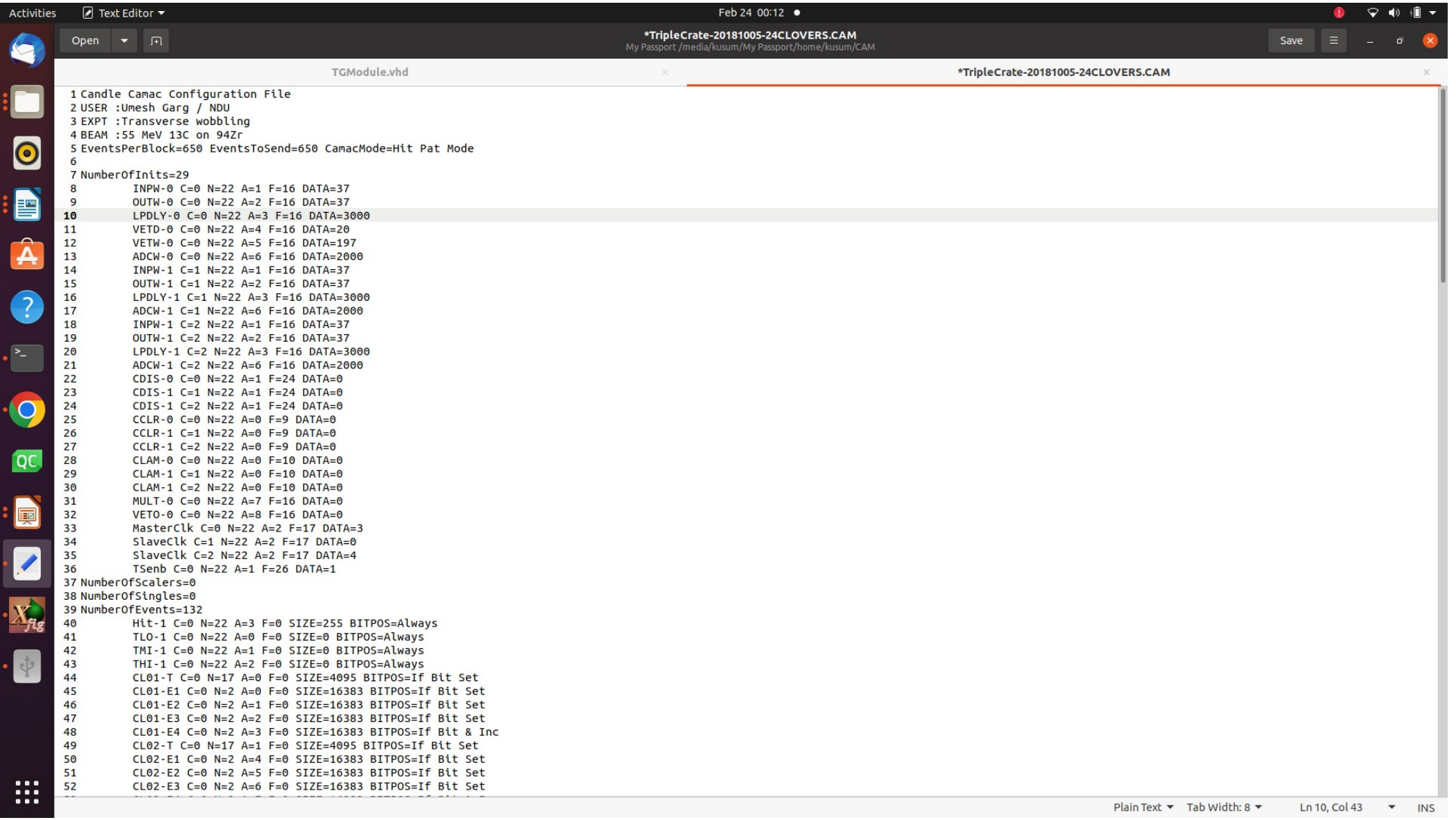
INGA ARRAY → 24 Clover → 120 Signals

1 signal ~ 1 uS read time (typically 1.2 uS for one CAMAC cycle)

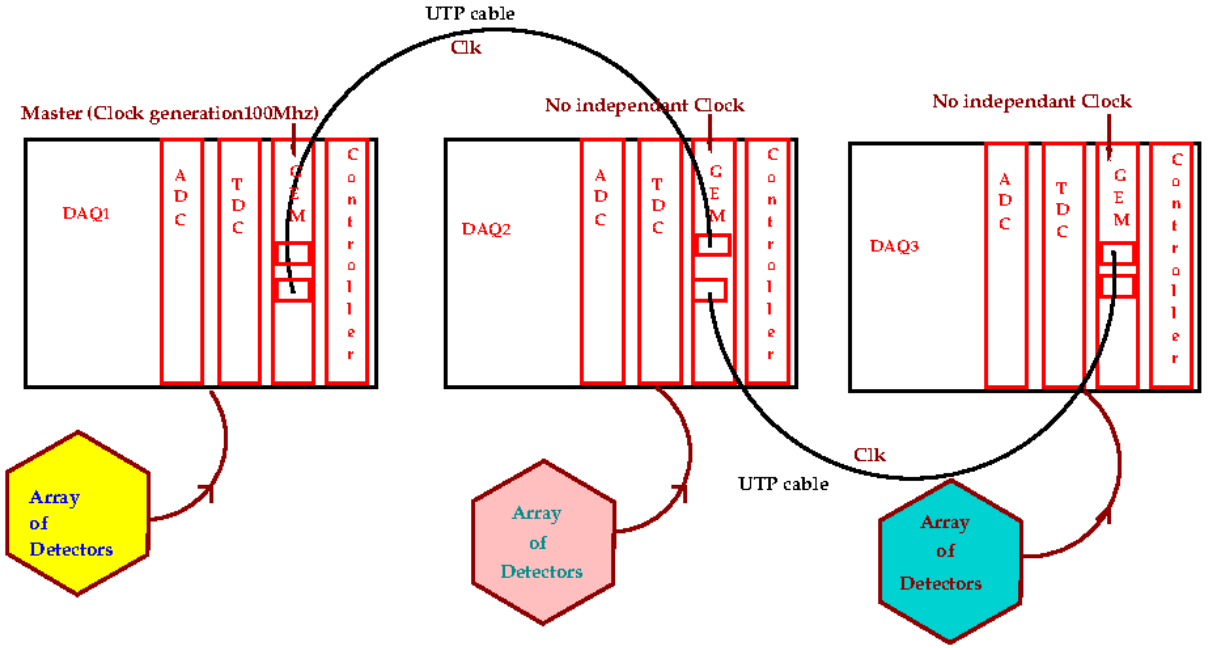
120 signal → 120uS

If only 6 detector fired for accepted EOI, in zero suppression technique controller will read only 30 signals. Read time will reduce to 30 uS.

Configuration file for CAMAC



Stamp the TIME on Accepted EOI



- GEM use 100MHz Clk to time stamp the EOI.
- Module provides a 48 bit time stamp.
- Clk travels in cascaded manners between the distributed DAQs which keeps all the DAQs in synchronization.
- Accepted EOI of distributed system can be correlated later in the analysis.

THANX.....

24 Feb 2023