

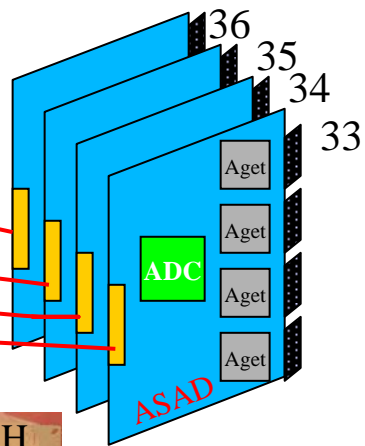
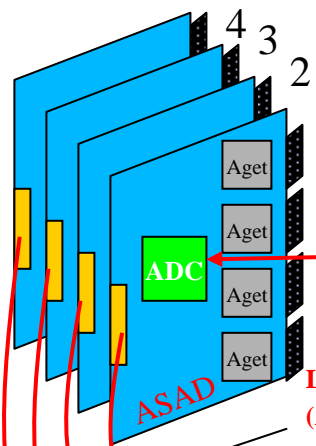


- Proposed global architecture (from Bordeaux Workshop to Caen Workshop)
- Details of the communication
- Clock distribution and synchronisation
- MUTANT module features
- Role of Back End Module (BEM)
- Remarks and Conclusion

Global architecture (1)



10000 channels = 144 ASICs
=> 36 ASAD boards (if 4 asics/ASAD)



Counting Rate
Up to 1 KHz

LVDS readout signals @ 150Mbit/s
(ADC 12bits-25MHz) + slow control and
monitoring bus over 2 meters



Ethernet Network

Front End

Back End

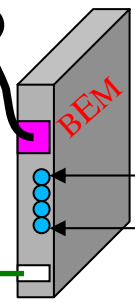
9 NIM "COBO"s
With 1 COBO for 4 ASADs

9 duplex optical fiber

to 3 commercial
PCI Express boards in 1 PC
(Data acquisition)



Ethernet link for slow control



12 slots NIM Crate
with good power supply
and cooling

MUTANT for
MULTiplicity
Trigger(s)
AND
Time

This module could be in
the acquisition room near
the pc and the scope or
inside the external trigger
system (with GMT,
CENTRUM, ...)

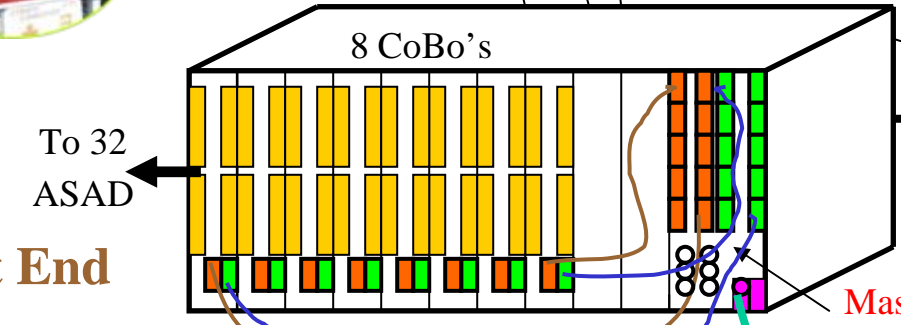
Global architecture (2)



Up to 32256 channels with 448 AGET (asics) on 112 ASAD boards

Front End

To 32 ASAD



To 32 ASAD



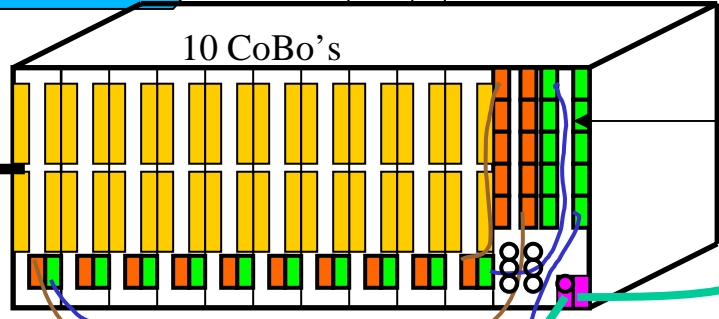
Ethernet Network

Back End



Ethernet Network

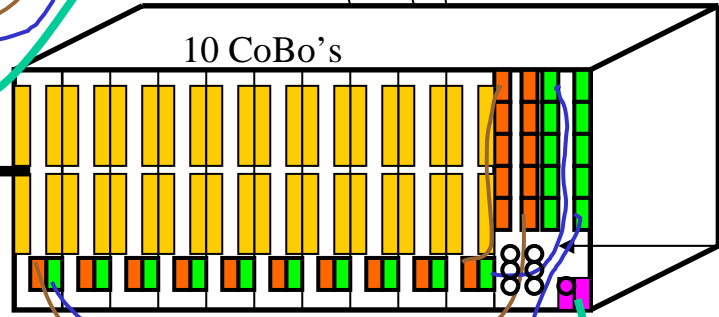
To 40 ASAD



Ethernet Network

Slave MUTANT

To 40 ASAD



Ethernet Network

Slave MUTANT

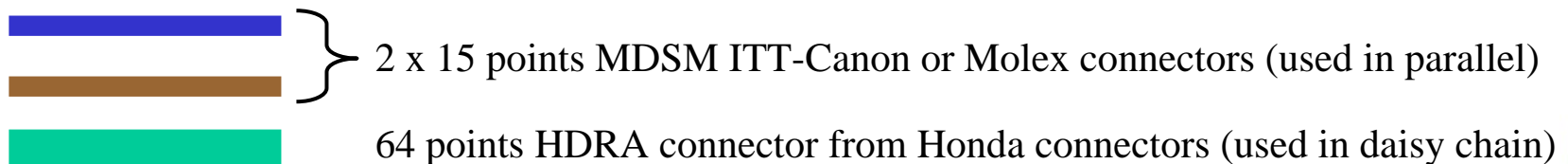
Considering Master MUTANT as the root node:

Uplink (multiplicity, bit patterns):

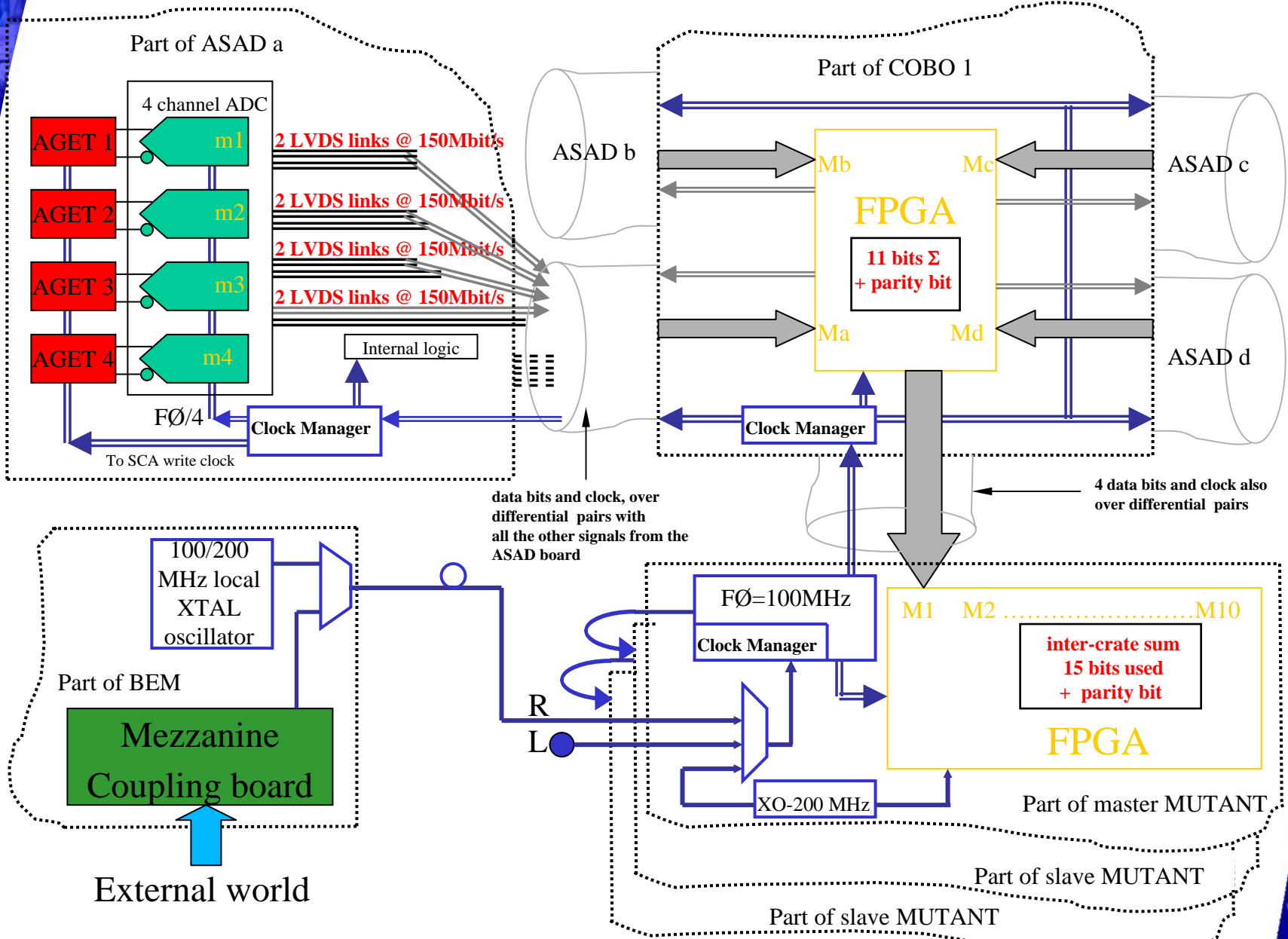
- ✓ One “4 bits” synchronous serial link from each CoBo
- ✓ One synchronous “16 bits” link from slave(s) MUTANT

Downlink (selective bit patterns, event number, time stamp):

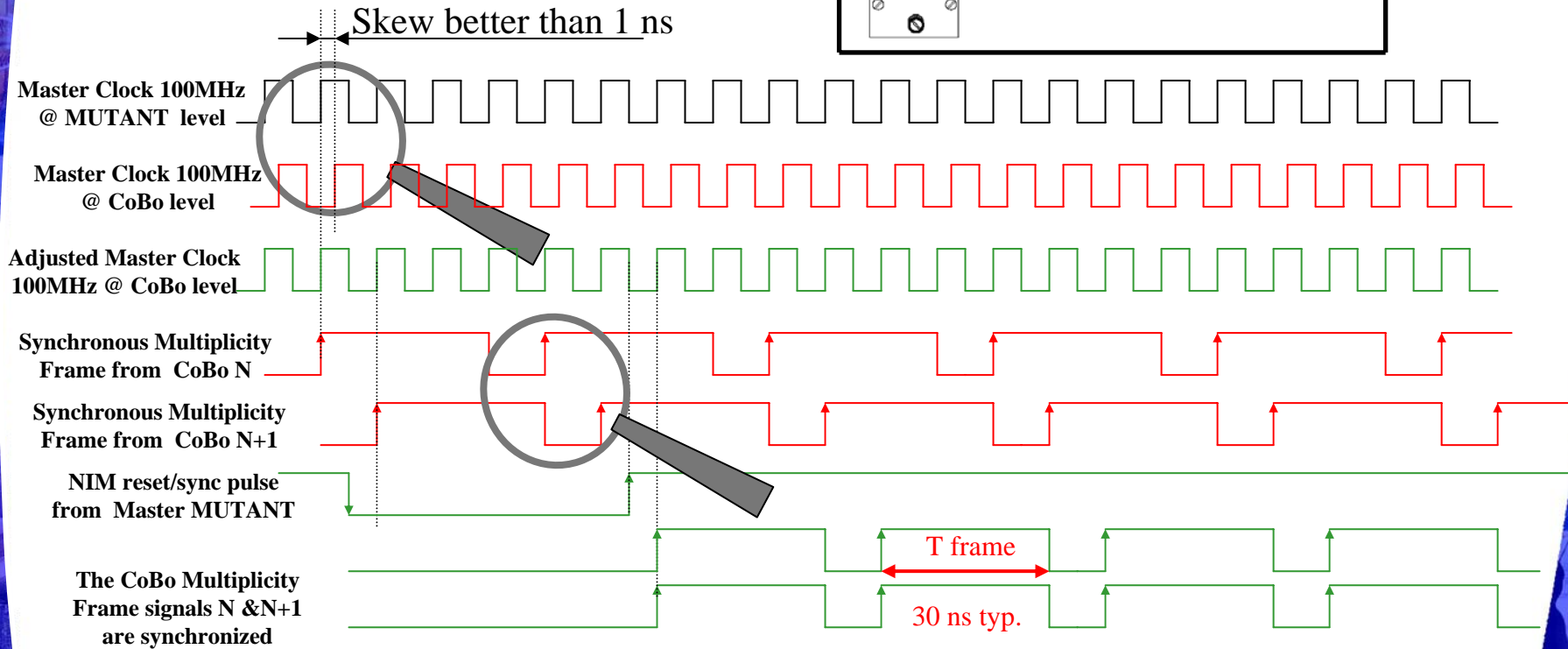
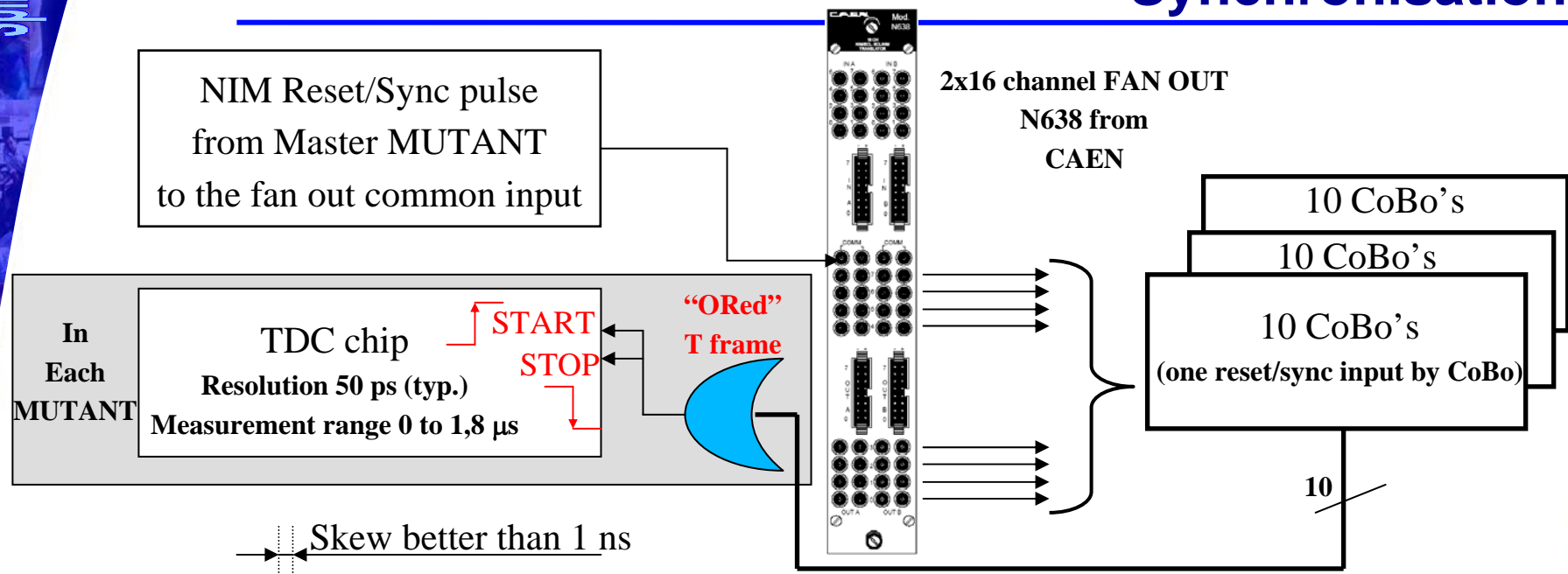
- ✓ One synchronous serial link from MUTANT (M or S) to CoBo's
- ✓ Two synchronous serial links from master MUTANT to slave MUTANT(s)



Clock distribution & Multiplicity data path

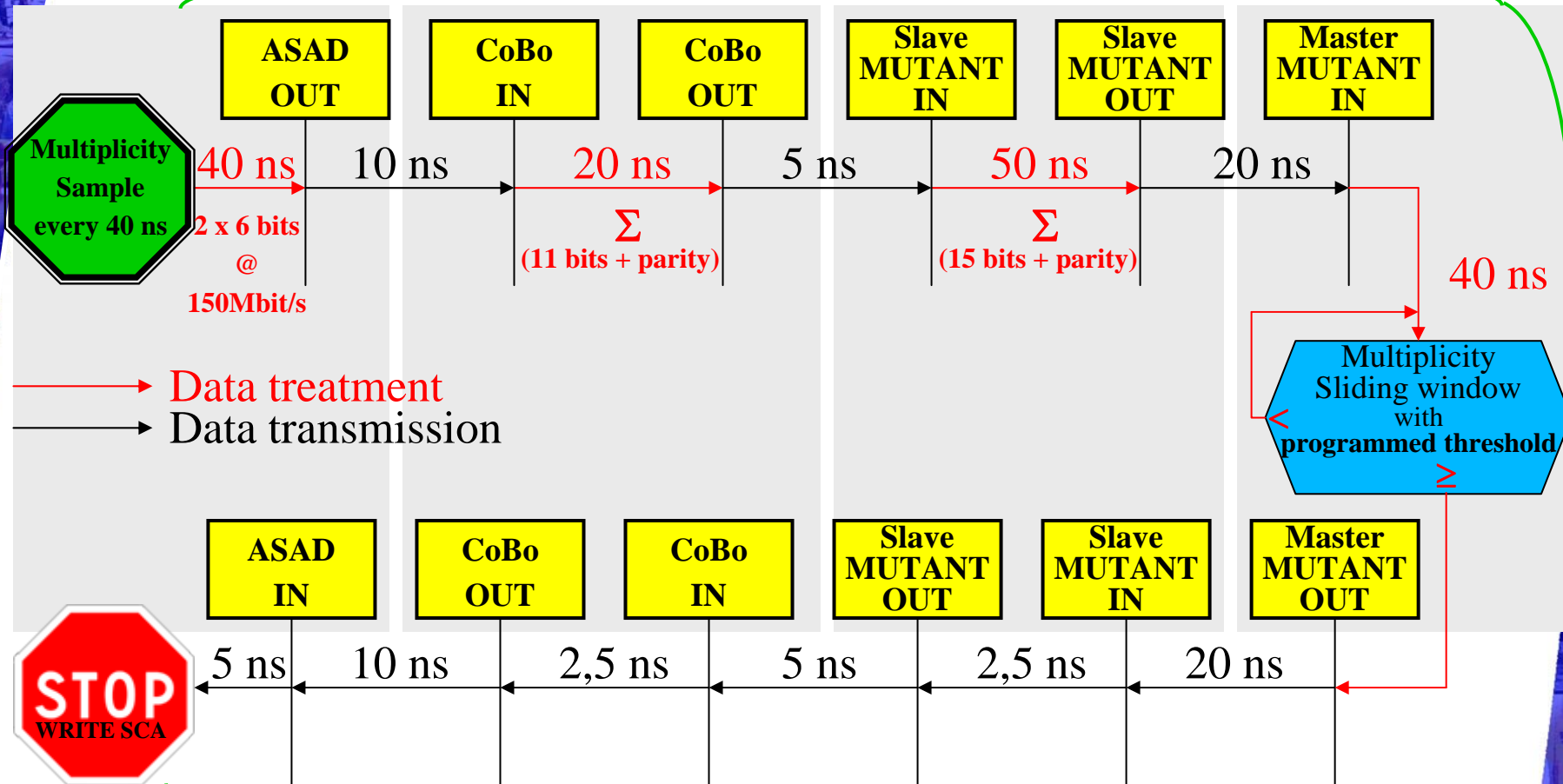


Synchronisation



Level 1 trigger timing

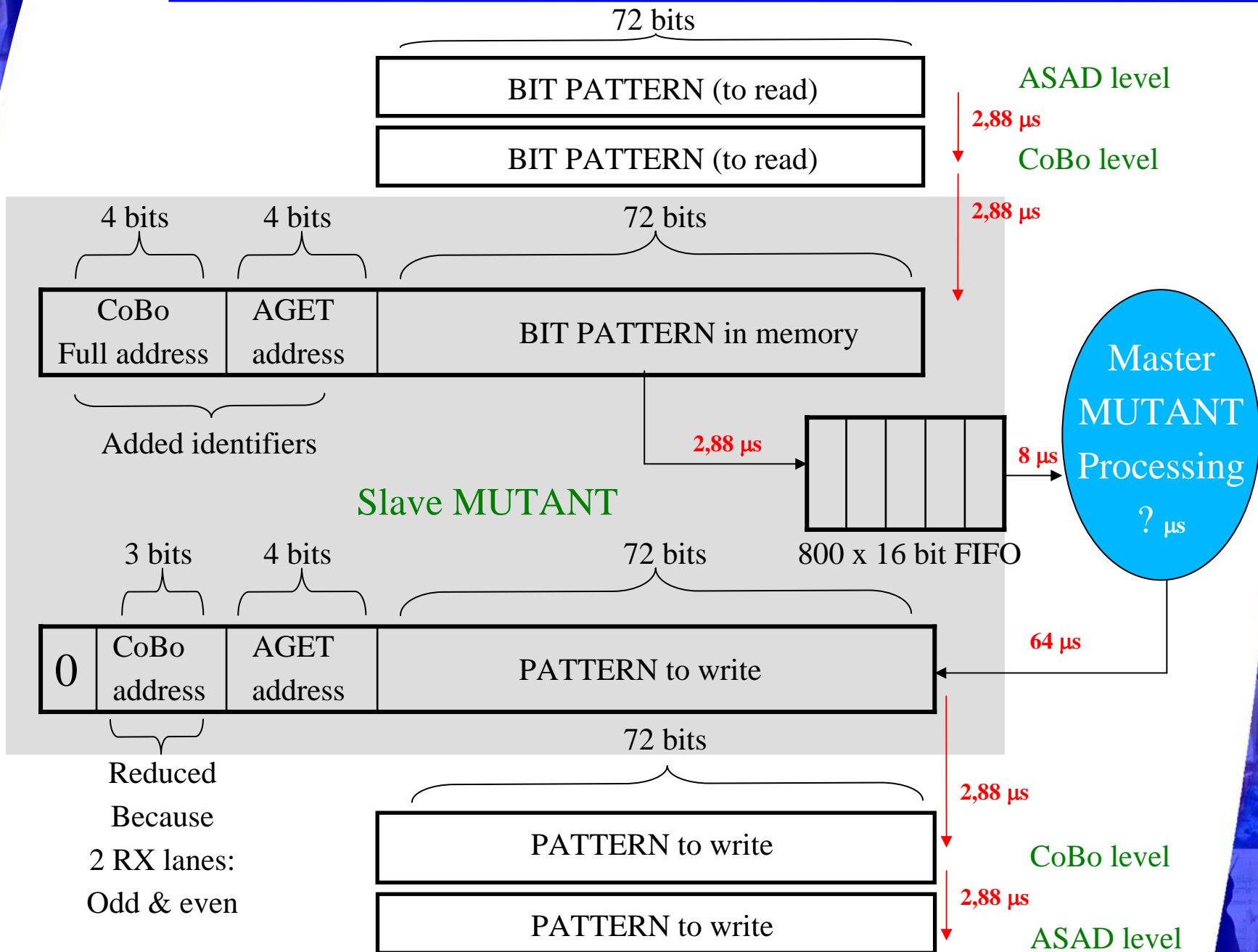
≈ 185 ns to take a decision



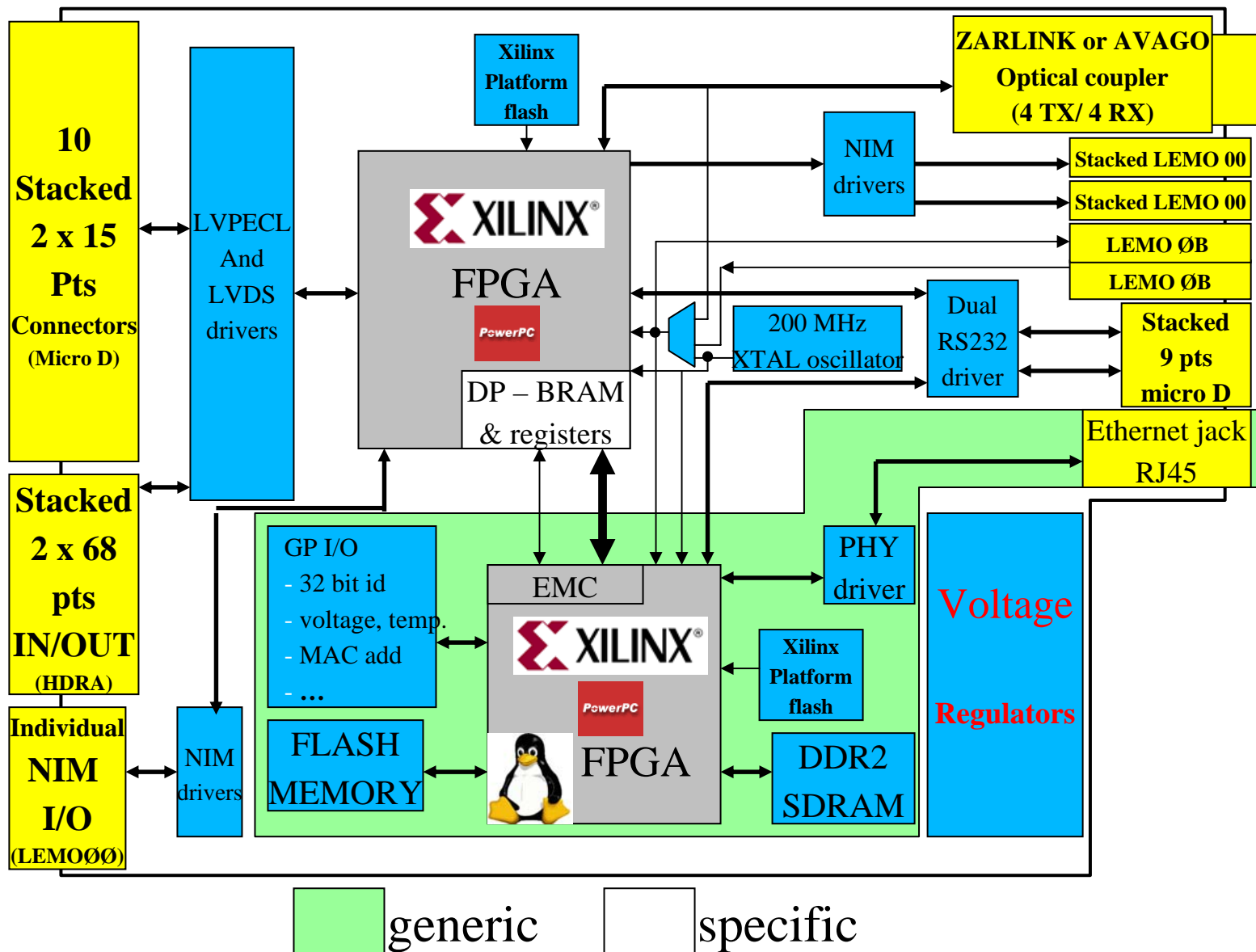
≈ 50 ns to send the « STOP_WRITE_SCA » to the AGET(s)

Conclusion: a total of ≈ 230 ns, an equivalent of 23 SCA cells @ 100 MHz

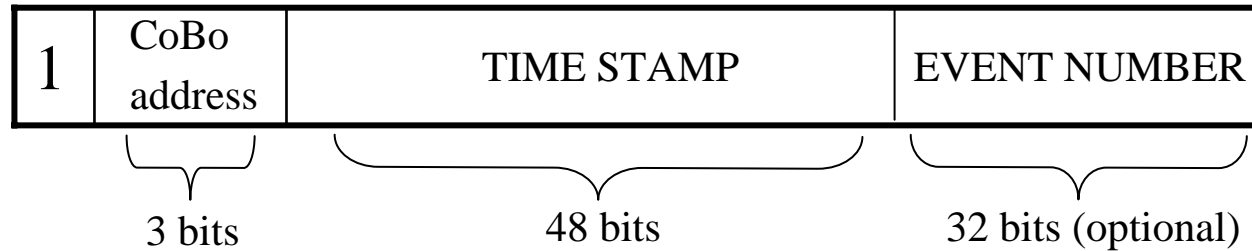
Level 2 trigger timing



MUTANT simplified block diagram



- ✓ Distributes a remote master clock over fiber (i.e. 200 MHz) to Master MUTANT
- ✓ Is able to synchronise the Master MUTANT time stamp counter
- ✓ Manage an external Trigger request / Trigger validation
- ✓ Gives remote logic inspections for the GET system
- ✓ is designed to host mezzanine boards to be coupled with CENTRUM @ GANIL, BUTIS@ GSI, ...



Also reduced

2 RX lanes: Odd & even

- ✓ Final information to broadcast or to transmit selectively in case of "free running" CoBo's
- ✓ Level 0 local I/O also available for trigger or coincidence (with L1)

So, MUTANT- BEM a couple of module indispensable for the GET system !