Introduction - News

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Calorimeter Upgrade Meeting

Meetings

New format of the meetings:

Requested to make meetings *more open* to the collaboration

- @CERN, do not focus only on electronics

In the future, try to choose a date close to the general electronics upgrade meeting

- Electronics experts may attend both meetings (next edition : December 9th/December 10th)

News

Calorimeter upgrade twiki page

https://lbtwiki.cern.ch/bin/view/CALO/CaloUpgrade

MC Simulation meeting on July 12th, 2010

- July 12th Electronics meeting was devoted mainly to MC Simulations
  - Several samples at different luminosities will be produced
  - The DST (full reconstruction) will be generated
    - The intermediate "sim" files should be kept
      we should be able to reprocess the digitization
- Main interest for us
  - PS/SPD decision
    - Do we need to provide option files without SPD/PS? volunteers?
      Effect on the reconstruction (simulation will have a ~L0?). Do we break anything?
  - Front-end packing and data flow
    - Study the performances of the packing
    - Pedestal subtraction at high luminosity

    Should the simulation include a specific LHC structure? Not the case yet.
    Later, we will need to code the packing for the simulation (volunteers?)
  - Pile-up effect
  - Spill-over (should not be a problem for us...?)

GBT

Next general electronics meeting (October 14th) is partly devoted to ECS:

- Presentation from the calo group

GBT

- GBT : the frame contains 80 bits for data and **2 bits for ECS** (40MHz)
    - use the 2 bits in both directions (2 fibres)
    - equivalent to the SPECS twisted pairs
- Master
    - a *ECS40* board located in the barracks
- Slaves
    - The GBT group provides interfaces to be integrated to our boards
    - $GBT \rightarrow I^2C - JTAG - //$: equivalent to the SPECS glue

Present Situation

Evolution from the present system

Our present system uses exclusively SPECS

- Front-end (in crate) has to be re-designed
  - Changing for GBT seems natural
    May imagine the following :
    - 1 GBT/crate for ECS (control board)
    - Signal distributed to the new FEB through the backplane
- Problems :
  - Other calorimeter parts (not in crate) do not need to be affected by the upgrade

	PS	ECAL	HCAL	Total
FEB/TVB	~100	~200	~60	~360
LEDTSB	2	8	2	12
HV/LED	2	32	8	42
Integrator	-	2	4	6
Status Bit		1		1
Total	4	42	14	421

  - The TVB/LEDTSB can be kept: cannot integrate the GBT and located in our crates

Possible solutions (I)

Several solutions have been envisaged :

- (1) Mixed solution:
  - Keep SPECS where it is presently used
  - Put GBT for new boards (FE)

  - Cheap
  - Easy

  - TVB/LEDTSB boards located in FE crate a single bus on the backplane → looks incompatible
  - Two systems to be maintained in // (software, spares)

- (2) Emulate SPECS master protocol in the ECS40 board
  - The output of the GBT slave would be a SPECS frame (OK for TVB and LEDTSB)
  - Keep SPECS everywhere else
  - No change to our front-end ECS
    - GBT → SPECS in the control board

  - Cheap

  - Specific software to be developed to emulate SPECS in ECS40 → heavy task
  - Two systems to be maintained in // (software, spares)

Possible solutions (II)

- (3) All GBT solution :
  - New boards designed with GBT protocol
  - The TVB/LEDTSB board are kept but ACTEL SPECS glue reprogrammed to be $I^2C(\mathrm{GBT}) \rightarrow I^2C$ converter
    Do we need to keep SPECS for some electronics parts (not in crate)?
    Should we make a specific interface $\mathrm{GBT} - \mathrm{Fibre} \rightarrow I^2C(\mathrm{GBT} - \mathrm{copper})$ and also reprogram their Glue to be an $I^2C(\mathrm{GBT}) \rightarrow I^2C$ converter?

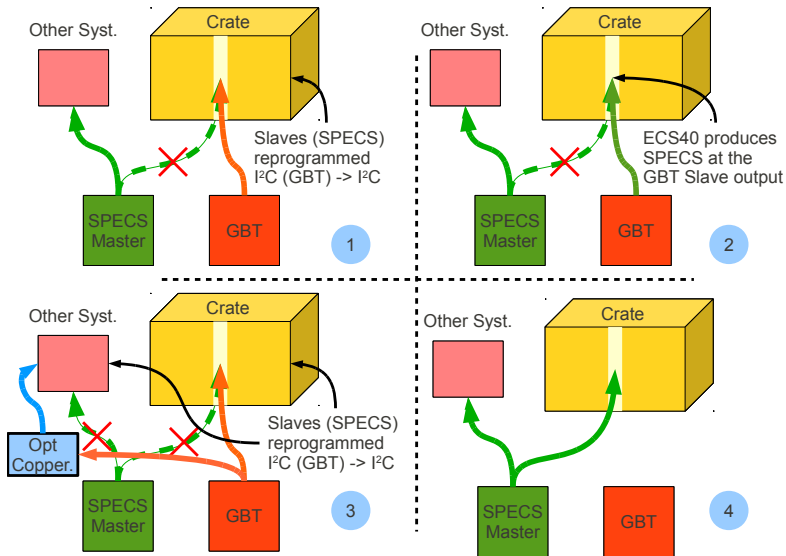   - May avoid having 2 systems in parallel

    or

    - Maintain 2 systems in // (software, spares)
    - design an interface $\mathrm{GBT} \rightarrow I^2C(\mathrm{GBT})$

- (4) All SPECS solution :
  - Completely avoid GBT for ECS
  - Keep on implementing SPECS everywhere

    - Cheap
    - Easy

    - Calorimeter uses a different system
    - Maintenance, Spares, ...

Possible solutions (III)

PS/SPD : *To Be Or Not To Be*

- LOI does not include a new design for the SPD/PS
- In the LOI, we kept the door open but we need to converge within a few months
- We miss:
    - Arguments: pros and cons
    - A first study on the feasibility
    - A group willing to work on this topic

LOI

Outline

1. Introduction
2. Analog electronics (ECAL/HCAL)
   - Integrated implementation
   - Discrete components
3. Digital electronics (ECAL/HCAL)
4. Radiation issues
   - Outcome of the previous tests
   - Planned new tests
5. Pile-up effects
   - Noise estimation method
   - Results

LOI to be sent to the LHCb Upgrade group

- Very few comments
- None of them was leading to major rewriting
- Question raised by David : What about Phase II ?