

# Summary of Test-beam Analysis Meeting - 21 July 2004

Present: T.Blake, A.Giacomin, S.Koestner, M.Needham,  
M.Schmelling, O.Steinkamp, H.Voss

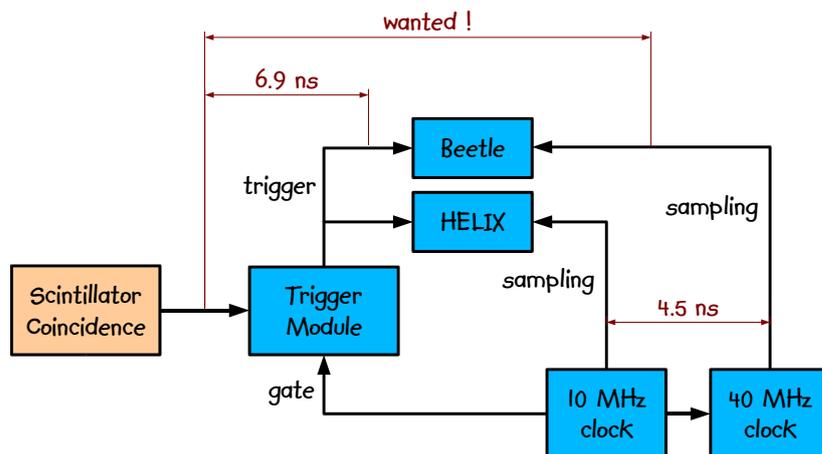
Summary: O. Steinkamp

## Data Sets

- Approximately 13 GByte of raw data have been taken. The original data are stored on the test-beam PC at CERN, a copy is available in Heidelberg.
- Pre-processed data take up approximately 6 Gbyte. One copy of the data is at CERN, a second in Lausanne. The data will also be copied to Zürich.

## Trigger Gate

- The chosen width of the trigger gate was not negligibly small compared to the Beetle pulse shape and the influence on S/N values has to be studied. The following sketch illustrates the trigger scheme:



The relevant “jitter” is that between the passing of the particle (given by the scintillator coincidence) and the sampling time of the detector signal (given by the 40 MHz clock).

- Measured at the test-beam were the “jitter” between scintillator coincidence and the Beetle trigger signal on the one hand, and the jitter between the 10MHz clock and the 40MHz clock on the other hand. The convolution of the two gives the wanted jitter, but only under the assumption that the internal jitter of the Trigger Module is negligible.

- It should still be possible to measure the relevant jitter between the input signal to the Trigger Box and the 40 MHz sampling clock in Heidelberg. Christian will be asked if he can organize this.

## Observed Problems

- Large regions of the CMS3 ladder (more than 50% of all channels) did not work for all runs after the first pulse-shape scan. The reason for this failure is not clear and should be investigated. Data have to be analysed to check whether useful information can be extracted from the working channels.
- Many channels in regions C to E on the LHCb1 ladder did not work. The suspected reason are broken bonds, this should be verified on the ladder.
- The scheduled HV scan for  $V_{fs}=100$  was not performed.
- All data taken on the last weekend look weird: S/N values for the LHCb1 ladder are significantly lower than for earlier runs, S/N values for the Irrad1 ladder are significantly higher than for earlier runs, the CMS+flex ladder shows constant high S/N values even for bias voltages below full depletion voltage. The data have to be analysed in detail in order to understand these strange effects.

## First Observations

- The pulse-shape for  $V_{fs}=400$  is “faster” for the Irrad1 ladder than for the LHCb1 ladder. This could be due to a different operating temperature of the Beetle chips: Hybrid temperatures on the LHCb1 ladder were approx.  $5^{\circ}\text{C}$  higher than on the other ladders. A quantitative comparison with Sven’s lab measurements of Beetle performance as a function of temperature should be performed.
- The pulse-shape for  $V_{fs}=400$  is “faster” for this year’s LHCb1 ladder (with Beetle 1.3) than for last year’s LHCb1 ladder (with Beetle 1.2). This is suspected to be due to different settings for “other” Beetle parameters (e.g.  $I_{currbuff}$ ). This can in principle be verified by comparing last year’s and this year’s signal shapes for the CMS3 ladder.
- First plots of S/N values as a function of track position do not show any dip in the inter-strip region for the LHCb1 ladder. This could be due to a mis-alignment of this ladder. All other ladders show the familiar dip.
- Preliminary most probable S/N values for  $V_{fs}=400$ , averaged over all inter-strip positions, are 13.7 for the CMS+flex ladder and 12 for the Irrad1 ladder.

## Plans

- Michael will check the beam-telescope alignment.
- Matt will go through the paper logbook and try to fill in missing information in the electronic logbook (spreadsheet).
- Helge will coordinate data quality checks on the test ladders, he will get help from Aurelie, Stefan and Tom. The aim is to

- check the alignment of the test ladders
  - check bad-channel masks for all ladders
  - check clustering cuts for all ladders
  - perform basic data quality checks on all runs and establish a list of “good” runs
  - try to “save” the CMS3 ladder
  - try to understand the data taken on the last weekend
- Tom and Stefan will concentrate on the analysis of the bias voltage scan.
  - Aurelie will concentrate on the analysis of pulse-shape scans.
  - Matt and Olaf will concentrate on the analysis of detector performance as a function of the track position.
  - The next meeting will take place on August 4 at 14h00, by telephone conference.