

Fermilab Test Beam Planning

(a) Hardware needs

(i) Pixel telescope:

the goal is to acquire, assemble and test enough hybrids (multichip modules comprising 1x4 pixel sensor plane bump-bonded to 4 FPIX2 ASICs), HDI (high density interconnection circuits necessary to construct modules to produce 46 detection stations. The hardware presently delivered to Fermilab is adequate for ≥ 4 modules. This activity is coordinated by David Christian (FNAL).

(ii) Pixel Daq:

3 components needed (PCI interface, SLINK board, Router). The hardware and firmware production is under test at Nevis Laboratories. These items will be provided by B. Knapp. This activity is coordinated by David Christian (FNAL).

(iii) VELO Modules:

Two double R and double ϕ modules have been assembled and irradiated by the Liverpool group. In addition, a partially functioning module is needed to commission the synchronization of the VELO data stream and PIXEL data stream. Module delivery and maintenance prior and during the test beam activities will be coordinated by T. Affolder (University of Liverpool).

(iv) Velo Modules Mechanics and Cooling:

Based on the burn-in system. Coordinated by C. Parkes (University of Glasgow). The integration in the test beam box needs to be coordinated with CM Lei (cmlei@fnal.gov).

Note: We are still in need of a liaison with CM. MA will start gathering information.

(v) Velo DAQ:

Based on the system used by The University of Glasgow group in the 2007 test of RD50 sensors (modified TELL1 standalone system). The production and test of this system will be coordinated by L. Eklund (University of Glasgow).

To be added:

Table with hardware list (boards, cables, power supplies), source, delivery time, and location in the test beam area. There are two possible location for tell1 crate and velo online computer, David Christian will give us some information on the length of the cables necessary to connect the test beam box with the counting room.

Note: The bias will be provided by Keithley 237 as the available CAEN do not

provide enough current.

Note: copy of 40 MHz clock can be provided both at a location in the proximity of the detector and near the DAO computer.

(b) Software need

(i) Pixel online software:

Processor that presides the initialization, calibration and triggered data taking of the pixel telescope. Includes data quality monitoring and slow control for the relevant parameters that need to be monitored. Software development will be coordinated by J. Wang (Syracuse University).

(ii) Offline tracking software:

Pixel data unpacking, track reconstruction and alignment software, coordinated by J.Wang (Syracuse University). Integration of VELO sensor information will be discussed at the TB08 meeting 3/13/08.

A discussion on how to integrated pixel tracking with the VELO framework in the simplest manner has been initiated. Tomasz Szumlak and JC Wang will draft a software document that will describe this infrastructure. The goal is to wrap up the analysis of test beam data within three months of data taking to proceed to other LHCb VELO responsibility, therefore simplicity and robustness are a key feature of the infrastructure.

Hardware Integration and Data Taking Schedule

(a) Pixel data acquisition integration (late march/april)

Includes tests of standalone hybrid and multichip modules. Test time alignment and integrity of acquired data.

(b) Synchronization of Pixel data stream and velo data stream
(april)

Validation of event alignment via time stamping and ability to merge data streams. Will be implemented by G. Lefeuvre (Syracuse University) teaming with J. Wang and M. Artuso, with technical assistance from L. Eklund.

(c) Installation and test of 2 station pixel telescope (3rd week of April)

(d) Installation and test of 4-station telescope (1st week of May)

These two activities are coordinated by D. Christian & the schedule is taken from a status report available at <http://epp.fnal.gov/EPP-public/DocDB/ShowDocument?docid=467>

(e) VELO -pixel integration and beam test run
Last two weeks in May. Detailed installation, commissioning, and run plan will be developed in a future tb08 meeting.

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