Minutes of PLUME Phone meeting - 2010, january 12 -

J.Baudot

Contents

Participants

- **University of Bristol**: Joel Goldstein,
- **Desy, Hamburg**: Lena Bachynska, Ulrich Koetz,
- **University of Oxford**: Andrei Nomerotski,
- **IPHC, Strasbourg**: Jerome Baudot, Nathalie Chon-Sen, Mathieu Goffe.

1 Status of the flex design and submission, Andrei

See slides there .

The final version is number 75. Andrei pointed a few items :

- The kapton flex is made of a kapton core between 50 and 75 μm surrounded by two metal layers of 17 μm, there is a thin cover layer on the top.
- Differential impedance calculation lead to choose 50 μm (rather than 75 μm) which better approximate the required 100 Ohm.
- The connector which was initially of AVX type has been changed to MOLLEX (80 pins), Oxford orders them for both male and female parts.
- A PCB version of the flex will be produced to check potential errors on the rooting and the impedance. It is thicker than the flex (around 200 μm) so the impedance may be larger.

Currently, the planning is as follow:

- January : Oxford orders the PCB-flex version (4 samples) to Graphic, 1 week for fabrication and then electrical tests (without sensor).
- February : Oxford orders a few samples of kapton-flex version to Graphic.
- March : The kapton-flex version is further tested in Oxford, potentially sensor(s) are mounted and the module is tested at IPHC.
- April : Oxford order few samples to different vendors (Cicorel, OpticPrint, Express Circuit, Datex Instruments).
- April-June : test/validation of the different samples (number of sensors mounted on each to be discussed).
- In the end of June or beginning of July, Oxford order around 20 kapton-flex to the chosen vendor.

2 Auxiliary board

The IPHC exposes the schedule for the Auxiliary board.

- By January 15, a document will summarize the specifications, to be reviewed by everybody and especially DESY for the power-pulsing tests,
- The rest of January and February will be devoted to design and routing.
- First board samples should be ready by Mid-march.

Note that without this board, it is not possible to test the flex equipped with sensors. To connect the flex to the Auxiliary board a flat kapton cable, around 50 cm will be used (To be designed and ordered by IPHC). One will have to pay attention that the differential impedance of this cable is not different from the flex one.

3 status on the mechanical design (ladder and support)

Joel reported that the design of the ladder mechanical structure and its support is ongoing though no drawings are available yet. Calculation of the maximal deflection for two types of support were made, both assume that the "stiffener" in-between the modules is 2 mm thick, that the sensors themselves are only "dead" weight and that the foam simply lies on some suport at its extremities.

- Sandwich type: the foam is only made of carbon, like RVC, so is not very rigid and stiffening comes mainly from the outer layer, i.e. the flex; maximum deflection reaches 250 μm.
- Stiff foam: the foam is of SiC type and provides all the stiffness; the maximum deflection is 40 μm for a 8% foam and 100 μm for a 4% foam.

The current baseline is the following :

- stiffener is a 14 to 15 cm long (2mm thick) SiC foam with 8% density,
- the unsupported foam length is about 13 cm,
- the foam only support the flex or module up to location of the middle ears,
- the right part of the flex is unsupported, it is intended to be cut-off in a later version of the support, but the there is a FR4 stiffener just below the mollex connector,
- the two flex cables on each side of the foam have their output connector at the same end of the ladder,
- to insure the sensors are face to face from each side of the ladder, the flex will be shifted laterally by about 1 cm,
- the foam will support the full width of both flex, so will be about 34 cm wide.

Nathalie mentioned that calculations are ongoing to specify the air cooling system required which should manage the 12 W dissipated by the ladder in continuous readout. A simple solution based on a fan seems to match. Nevertheless Joel warned that, in the past, a model of the full 20 ladders of the vertex detector dissipating 5 W in total was already not so easy to handle with air cooling. Further studies are required and this will be an important item of our next meeting. One has to recall that the air flow may impact the mechanical stability of the ladder.

4 Next meeting

Next phone call planed for Tuesday 16 february at 3:00 PM (Paris time).