

Minutes and Actions of Site Qualification Task Force

Phone Conference – 2nd of December 2004

Present: G. Darbo, M. Garcia-Sciveres, P. Gerlach, D. Giugni, F. Huegging, (V. Kostioukhine), E. Vigeolas.
Excused: L. Rossi.

LBL.

Loading of sector S9011 is completed. This is the 6th production sector loaded. Testing is two sectors behind loading. Lacking of modules will soon influence the loading rate. Next sector will be loaded using disk-1 quality modules.

Cooling is in place and is capable to bring modules to -20°C . Thermal cycles are done in an environmental chamber. Sectors are not rigidly connected to support during test to avoid that different material CTEs can stress sectors and modules.

Gil will report at the Pixel Week in the production update meeting on the sector loading.

CPPM

Module replacement tests have been performed on stave S4020 (4-module Wuppertal stave). Module placement is made using alignment with neighbor modules. Placement is within few microns respect to nominal distance from contiguous modules. No absolute survey made.

Investigation on the 3 damaged modules on stave S4031 is going on at CPPM. Jean-Claude produced a document with measurements on power supply transients in case DVDD/AVDD are commutated by the CPPM switch relay card:

http://www.ge.infn.it/ATLAS/SQTF/Minutes/Minutes_04-12-02_aux/Stave_mystery.doc

From the measurements made, transients of 10÷12 V for $\sim 1\text{ms}$ can have occurred on the 3 modules resulting damaged, while for the fourth one, also connected to the switching board but still alive, the transient could have been only of 6 V. Such transients should not occur in normal operation where power supplies are switched off before switching, but there is no protection in the system from operator error. The guilty switch board has now relays with better matching time constants between sense and power lines and transients are not anymore generated. Jean-Claude will report more details at the Pixel Week module meeting. An alternative to the CPPM switch board is the SURF where no relay are used to commutate power. The labs using SURF did not experienced failures during module testing. Maurice said that SURF cost is ~ 400 \$, he still has 10 cards, and more can be made. A decision will be taken at the next Pixel Week.

Genova

Claudia, who did not attend the meeting, prepared a few transparencies on the thermal/electrical tests on Stave S4028:

http://www.ge.infn.it/ATLAS/SQTF/Minutes/Minutes_04-12-02_aux/S4028_ThermalElectrical.ppt.

Stave 4028 is now completely qualified.

Claudia in her presentation reported on results for a completely powered stave in the cold box (6 modules through ROD/PP0 and 7 modules by SURF). Temperature of the modules varies a lot as function of the velocity of the thermal fluid inside the stave pipe. Measurements have been made at 3 different pumping settings. Min/Mid/Max. In case of Min the difference in temperature between first/last module is 10°C while at Max there is no strong temperature gradient. The pump setting affects also the thermal resistance ($\Delta T/W$); values for 6 modules are reported.

On electrical test Claudia reported that, with the SURF, the HV-off noise measurements give a value lower than usual and this has impact in the analysis of bad pixels. In particular there are several modules that show bad pixel in the first row of pixels for some FE chips. Those pixels are not really bad pixel; they respond to source. Maurice commented that SURF uses solid state relays to commutate HV and AVDD/DVDD supplies and those devices when are switched off they have ~1V offset on HV, which may be enough to reduce the level of noise in the pixels. On two modules the comparison of FLEX/LOAD test evidenced new bad pixels in same region of both modules (upper part of first column of FE#5). May it be a damage made during loading?

Last stave (S4024) loaded last week was not surveyed and tested yet.

Wuppertal

The first pre-production stave is under loading in Wuppertal. The rate is 2 modules/day, no electrical test is performed after each module is loaded. Peter reported that the stave has a twist (rotation along Z) that corresponds to $\pm 50 \mu\text{m}$ between first and last module on stave. Average value for this angle is used for all the modules and this will reproduce to non-uniformities in glue thickness. The stave will be finished next week, whereas electrical/thermal qualification will happen only after Pixel Week.

Cradle designs.

Danilo said that the stave cradles used to load modules on stave must not constrain the stave to a bow different from its natural one. This may happen if the holes for the screw in the 3 middle fixing positions do not allow a displacement in Y of at least $\pm 250 \mu\text{m}$ (maximum stave bow). The screws used are M1.4 and the holes used in Wuppertal and CPPM are 1.5 mm in diameter for the all length in the aluminum of the support point. Vadim said that in Genova the hole is smaller only on the side where there is the head of the screw, while on the side of the peek support is larger and this should not constrain the stave to change its bow. Danilo asked that designs/measures of the cradles used for loading be discussed at the Pixel Week.

Giovanni rose an other issue on cradles when used for thermal cycling: if Al cradles are used for cooling down a stave the CTE mismatch between Al and C-C generate mechanical stress on stave that can make damages. Tight connection stave/cradle must be avoided for thermal/electrical test. Sites must check their cradle in the test setups.

A.o.B.

About 25 bare staves have been brought to CPPM from Genova. Giovanni said that tomorrow he would go to Plyform to fetch 20 new bare staves.

After some discussion it was decided to have only 3 presentations at the “module loading meeting” of next Pixel Week:

1. Module position accuracy on staves (Vadim)
2. Electrical thermal test setups and results (Sven)
3. Status of Site qualification & plans for Stave/Sector production (Giovanni)

It was decided to move other talks to different meetings:

- LBL sector production -> Production Update Meeting (Gil)
- Report & Discussion of Module failures on CPP stave -> Module Meeting (Jean-Claude/Patrick)
- Bi-stave -> Integration Meeting (Danilo?)

Next Meeting: Thursday 9th of December 2004 at 11:00 (Pixel Week).