AIDA technical meeting held 13-6-11 T27@DL, R76@RAL.

Present: SLT, PCS, MK, VFEP, RDP, JS, IL

ASICs (SLT)

ASIC bonding is happening slower than planned due to limited bonding resources (machines and effort) and high demand. 7 mezzanines have been delivered, 10 more will come soon. If more mezzanines are needed quickly then AIDA priority can be increased.

DIP40 packaged ASICs- not much testing done due to pressure of other work but work can be scheduled if needed to investigate any problems identified during testing.

Discussed funding for SLT- major ASIC issues will always be investigated FOC if necessary but funding for ongoing support and testing is needed. IL reported that 10% FTE ASIC time per annum plus travel is requested in the DL/Liverpool consolidated grant (and supported in the Edinburgh grant) but the outcome of this will not be known until July or maybe early August.

FEE Testing (MK)

The first 30 FEE cards have been modified to improve the analogue input stage and are currently being re-tested (completion expected in next few days). A further 1 month effort from Jon Horswill for board testing has been agreed with TD (at no charge to NP). Jon will test the remaining 45 FEE cards (or as many as possible in 1 month).

FEE Presentation (PCS)

The LYCCA test setup at GSI was described. Data looked good during the tests. Liu is looking at the data recorded to disk and will check whether the data from LYCCA and MBS are consistent.

Equipment is now back at DL and in use by VFEP to start work on software to communicate with multiple processors and multiple data streams (DAQ currently reads only 1 data stream).

Mechanical assembly of FEE cards into the modules revealed a problem with the new cooling pads which are too thick and need too much pressure. PCS and JS investigating a solution.

30 FEE cards and 7 mezzanines waiting to be assembled into modules.

A meeting was held at DL on 6th June to discuss test assembly of AIDA in T4 ready for October tests at GSI. This covered mechanics and the MACB interface from AIDA to MBS to be developed by PCS to allow 12 FEE64 (6 modules) to be integrated in 1 system (it handles clocks, syncs, triggers etc.). MACB schematics are complete but PCB design is not yet started.

A problem was encountered at GSI because the C sized HDMI cable (used on production FEE64 cards) does not have the same pin-out as the type A used on the prototype. Therefore cable adapters will be needed. (PCS has a quote from Samtec for A-C adapters, 5M long for about £30 each).

VHDL change made during LYCCA tests was to switch from 2 output data streams (discriminator pattern and analogue data) to a single time-ordered data stream from the Virtex 5 FPGA. This change was largely successful although further work is needed to recover the MSB of the 14 bit ADC data word which is lost at the moment.

Software (VFEP)

The data format will be changed to TDR with a translator to MIDAS Sort for TD. TDR format minimises the amount of work needed for the merge code for multiple data streams.

The relay code module which passes data from TDR format to MIDAS event format for MBS needs to be modified to use the MBS counter in the event header.

During May tests an older version of MBS was used than that planned by Nik Kurz because of compatibility with main beam users. Consequence was smaller buffer size than planned.

Mechanics (JS)

The water cooled crates are all ordered in 2 variants (3-wide and 5-wide). The 5-wide units are due this week but the 3-wide units have been delayed by 1 month because there was a manufacturing error in the base plates.

The mainframe designed by Dave Seddon is delayed because JS has decided that the priority for the Liverpool workshops is to clear their AGATA backlog (needed Sept 2011). JS is also unclear about exactly what will be near the AIDA structure during tests now that some RISING equipment is being shipped to Japan. Possibly BELEN N-detector which will be used in September for tests and may still be in situ during October? RDP said that AIDA commissioning tests in October will not use neutron detection.

Question- is a Unistrut support frame suitable for October tests?

Discussion of GSI Tests (All)

Assumption for tests (based on TD's emails with GSI copied to RDP and IL):

- The October implantation/decay beam time has not yet been confirmed and there is a lot of competition for October beam time.
- The August Au beam for tracking/implantation tests is likely to be 6 hours of parasitic beam over 3 days. Dates unknown, but noted that Au in GSI schedule from 9-18th August. The Au beam time will be in Cave C.

Other assumptions:

- October tests need 3 layers of 128x128 AIDA Si, 12 FEE64 cards in 6 modules and software working with multiple data streams.
- August test could be done with a single Si layer (implantation only, no decay) but 128x128 still needs 4 FEE64 cards in 2 modules so software still needs to handle multiple data streams.

Points from discussion:

- Providing 4x FEE64 cards with 4x mezzanines for August is possible as is providing an additional 10 mezzanines in August to be ready to build up a total of 12 FEE64 cards for October tests.
- PSU and cables exist for 4x FEE cards
- A NIM bin is needed (Liverpool probably can supply). Also HV (either NIM or Liverpool's AIDA CAEN system) and PB4 test pulser (Edinburgh).
- MACB card is unlikely to be ready for August tests but an alternative can probably be rigged up by modifying the clock card and using the MBS interface built by MK for May tests. This kludge is not planned in PCS's workload and so other work will need to be rescheduled to accommodate.
- HDMI A-C adapter cables are on 6-8 week delivery from Samtec so unlikely to be available for August. But temporary adapters could be made up using HDMI plug/sockets available from Farnell.
- Noted that the PC was in the area in May tests but would have been much better in the control room on the end of a 30M Ethernet cable. ***Question- can the PC be in control room when running in Cave C too? How far is Cave C from control room?***
- ***Question- What is the August schedule? And when can we get into Cave C?***
- The multi-FEE64 software(including merge) is being developed for October so having it ready for August involves a change of priorities and will be a very tight schedule of work with no slack (i.e. only possible if no problems are encountered).
- Software for merging multiple streams but not connecting to MBS is considerably easier/quicker than the full multiple streams+MBS interface***. Question- is there any value in simply testing the high energy implantation behaviour of the ASIC standalone (without MBS data or beam tracking)?***
- In August the only mechanics possible is Unistrut, probably with 3-wide modules too.
- Should we ship the big AIDA chiller to GSI for August, back for September setup at DL and then back to GSI in October? Or should we look for a smaller chiller to use in GSI in August?
- Are AIDA detectors available for August/October tests?

Fallback solution

In case of problems with the merge software a possible fallback solution is to use Liverpool's 32x32 1mm Si DSSDs connected to a single FEE64 cards and MBS (beam tracker/MUSIC). The cable from Si to AIDA FEE64 is a potential source of noise (cf LYCCA). Detector availability is not confirmed either. This setup tests only beam tracker-DSSD although with lower SI resolution than real AIDA detectors. It uses essentially the same DAQ as in May.

(Also mentioned the possibility of a stack of 3 detectors, 32x32).

Comments from TD are needed

Comments from TD are needed on the questions in red in order to decide whether it is worthwhile going for the August beam time based on the restrictions and risks noted above. Some hard work and accelerated timetables, notably for software development will be needed to do tests in August so we need to be clear on feasibility and aims before going ahead:

For example, we need to clarify:

- Is the MBS DAQ link to beam trackers critical for success or is it enough just to get un-tracked high energy implants in the Si?
- If the beam trackers are connected, is 1 layer of AIDA Si enough for Au tests?
- What is the schedule for access to Cave C and for beam time? These define shipping dates and schedule for pre-run developments (mechanics, software, clock box)

Date of next meeting- assuming we are trying to hit the August beam time a mid-July meeting would be needed to discuss progress. Those present suggest 13:30 on 13th July if TD is available.

TD – please confirm 13th July or arrange a different date the next meeting.