

## **12GeV Trigger meeting notes:**

4-May-2012: C. Cuevas, W. Gu., B. Raydo, H. Dong, S. Kaneta, N. Nganga, E. Jastrzembski

27-April-2012: Cancelled

20-April-2012: C. Cuevas, W. Gu., A. Somov, B. Raydo, H. Dong, S. Kaneta

13-April-2012: C. Cuevas, W. Gu., A. Somov, N. Nganga, B. Raydo, B. Moffit, H. Dong, J. Wilson, E. Jastrzembski

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### **0. Trigger/Clock/Sync – TI/TD**

#### **4 May 2012**

The final award for the TI-TD boards is almost 'official' and the TET summary report has been submitted to procurement.

William has started to draft a TI-TD acceptance test procedure and the procedure should be used by another person to provide feedback.

William continues to test the TS first article board and so far the testing is progressing.

At some point in the next few weeks, we should install TS, SD, GTP, SSP and as many FADC250 boards to begin Global Trigger Crate integration testing. 6GeV beam will stop on 18-May, so in principle we should have at least enough FADC250 boards for a full crate test. The FADC250 boards in this case would serve as data generators to the GTP.

#### **20April2012**

Purchase requisition was edited to reflect the 9 Hall A units that will need to be deferred to FY13. The modified requisition was sent for approvals and the best and final request has been sent to the qualified vendor list. We expect best and final proposals soon, so an award can be processed.

Begin preparations for a Global Trigger crate test soon. We have the TS, TID, GTP, SD and SSP, so testing can begin as soon as work priorities subside for HPS trigger work. The configuration and software libraries will need to be in place also, so as a starting point the existing register maps for the new TS and GTP should be documented and distributed. Will need to request time for Bryan to work these newest boards into the CODA libraries.

#### **13April2012**

TID technical evaluation team is finished and the final award is delayed for a short time because the companies will have to provide best and final cost proposals based on lower quantities. (Hall A cannot fund 9 units this FY)

Functional test with the rear transition board is positive and still needs to be tested with the GTP.

## 1. SUB-SYSTEM PROCESSOR (SSP)

### 4 May 2012

SSP is successfully installed and used in the HPS global trigger function. The SSP is presently collecting trigger data from two crates to form final quadrant cluster triggers.

### 20 April 2012

See last week's notes.

### 13April2012

SSP firmware and GUI for the HPS displays has been developed. Final testing with the new firmware changes to CTP and FADC250 for the HPS test run is in progress. (EEL109)

uMegas detector group has requested firmware and schematics for the SSP. They are planning to use the SSP in a slightly different mode to read out their detector channels. Formal note needed to send the firmware to the uMegas group.

## 2. CUSTOMERS

### 4-May-2012

→HPS installation went well, and initial results look promising. Calibration of the detector components etc are in progress. Experiment plans not clear, but only a few weeks of beam remain for the test.

→PEPPo group is ready for experiment and custom firmware is complete for their boards.

### 20 April 2012

→Plenty of happy customers and anxious customers are the HPS calorimeter folks. There have been a number of issues related to the HPS calorimeter amplifier bias, which have no relation to the work that is still in progress for the readout and trigger hardware/firmware.

→PEPPo folks now have the latest firmware and should be ready to run their experiment! BIG THANKS to Hai, Ed and Bryan for making this happen. Positrons or bust!

### 13April2012

PEPPo folks are happy for now, but seem to have a few pesky noise issues that they would like to apply a firmware solution.

Hall D tests are going well. BCAL test is set up in the hall!

HPS setup is going well in the EEL109 and will be moved to the hall next week. Hall is open on Thursday 12-April for installation and initial testing.

## 3. "B" Switch - Signal Distribution Module (SD)

### 4 May 2012

→Production fabrication and assembler award is official: Subcontract JSA-12-C1484

The company that won the award is CEM.

The production front panels have been received.

Final manufacturing files have been delivered to procurement for distribution to CEM.

→Acceptance test procedure is a work in progress and will need to be revealed soon. We will need to have at least 16 FADC250 boards to proceed with the production SD acceptance test.

### 20 April 2012

→See notes from last week, and new PR has been submitted and approved. The Hall A quantities for the SD will be deferred until FY13, and best and final pricing proposals from companies have been received. The production award is imminent!!

→Update report on the acceptance test procedure for the production units should be reviewed. There have been significant changes in the method to test the new SD boards since the original procedure was created.

#### **13April2012**

Final Technical Evaluation Team has completed the scores on the bids and the prices were under the estimate. There is a late twist in the ordering plot because Hall A apparently does not have the funding allocation for 9 boards.

New procedure for acceptance testing the SD production boards has been drafted. The idea is to use 16 fully tested FADC250 boards to verify the individual SD production boards.

Front panel has been ordered for the SD. Looks like we will have 9 extra front panels IF nobody picks up the extra nine boards.

#### **4. System Diagrams/Fiber Optics**

##### **20 April 2012**

No report.

##### **13 April 2012**

No report.

##### **16 March 2012**

Brad S. (Hall C) suggested a simple MTP Fiber test in hall c using a few of the short jumper cables. The suggestion is to simply place a fiber patch cable in Hall C for the remainder of the 6GeV experiment and then test the fiber cable to see if there is any transmission problem. Setting up an 'active' test would take some effort with hardware/software using an evaluation board and the 150m fiber. This way a measurement of fiber degradation over a finite time interval with a known dose rate could be achieved. Ben, Chris, Brad.

#### **5. Two Crate DAq test configuration**

##### **4 May 2012**

→We do not have to rely on two VXS crates for future testing, and the next goal is to complete a procedure for a semi-automated test using 16 FADC250 with the full suite of TI, SD, and CTP boards. I believe the CODA libraries and board firmware are at stable versions, so software and a few GUIs are next.

##### **20 April 2012**

Because all of the pre-production FADC250 boards are in use, the EEL109 two crate test stand will be re-configured for a Global Trigger Crate test. We do not need two VXS crates for this test and one of the crates will be sent to UMass for the FADC250 acceptance testing work.

##### **13April2012**

No huge issue, but one item in discussion is that the 2<sup>nd</sup> CTP appears to have an issue with the CTP output fiber transceiver. Apparently the timing constraint is marginal, and when Scott returns there will be fine tuning to complete. SSP and GUI work progress is going well.

There may be some firmware change to compensate for the offset contribution to the trigger 'data' sum that is sent to the CTP. At the Wed Hall B meeting, we decided to move forward with the existing firmware and establish a procedure to measure the offset (synonymous with pedestal)

**20-JAN-2012 (Keep this date reference full DAq crate procedure)**

**3 June 2011**

**→ Successful testing with the two crates each with a single FADC250-V2, CTP, TI, SD and one SSP!!**

**16 July 2010 (Keep this note because it needs to be implemented and tested at some point) See older note dates for the list of items.**

## **6. Crate Trigger Processor (CTP)**

**4 May 2012**

→ Hai reports that the schematic is progressing and decision to use FXT series has been priced and selected for the Hall D quantities. Goal for production orders remains and these boards need to be ordered before end of FY12!

→ UDP Ethernet 'soft core' has been tested and will be tested on the GTP.

**20 April 2012**

→ Hai distributed the cost analysis for 'upgrading' the production CTP to use the 'FXT' series of FPGA. This will support the 'FX70T' @5Gb/s from the FADC250 boards, and increase the resources available on the CTP for future algorithms that may be developed for 12GeV experiments. The 'FXT' series are a drop in replacement for the existing CTP parts, so the impact to the circuit board re-design should not be a significant issue. Schematic and EECAD work will progress, and Jeff will switch priorities as soon as the F1TDC design efforts subside.

**13 April 2012**

Annotation problems have been resolved. Schematics and PCB are verified to match and the schematic changes (ECO) will be started next week. PP17 will be wired to the FPGA so that if we wanted to use the Gigabit protocol from the ROC it could be attempted. MUST keep this a high priority to meet the production schedule for Hall D.

After the HPS test run, we will need to evaluate the CLAS12 design requirements for the CTP. Their needs will probably require a higher performance chip or chips. Hai will evaluate the cost to increase the VirtexV chips on the Hall D production boards to the fastest grade and highest performance. (Logic gates)

## **7. GTP and Global Crate Developments**

**4 May 2012**

→ The GTP to TS high speed output link will need to be tested in a VXS crate including the TS rear transition card. Ethernet implementation has been started and Scott has a copy of the Ethernet source code for further development and testing. The fiber optic transceiver section still needs to be functionally tested before considering this option for the production boards.

**20 April 2012**

→ Plenty of good progress on the CTP firmware for the HPS cluster finding and the boards have been deployed to Hall B! This work will take highest priority, considering there are only a few weeks of 6GeV beam remaining.

**ACTION ITEMS: Next meeting -Friday 11 May@ 10AM in F226**