

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

20-July-2012: C. Cuevas, B. Moffit, B. Raydo, N. Nganga, A. Somov, E. Jastrzembski, Beni Z.

13-July-2012: C. Cuevas, H. Dong, B. Moffit, S. Kaneta, B. Raydo, N. Nganga, A. Somov, E. Jastrzembski

6 July 2012: No meeting

29-June-2012: Nick, Scott, Bryan, Alex, William, Chris, Ed

22-June-2012: Nick, Scott, Hai, Bryan, Alex, Ben, William, Chris

15-June-2012: Cancelled

8-June-2012: C. Cuevas, H. Dong, B. Moffit, S. Kaneta, B. Raydo, N. Nganga, E. Jastrzembski, A. Somov

1-June-2012: C. Cuevas, W. Gu, H. Dong, B. Moffit, S. Kaneta, B. Raydo, N. Nganga, E. Jastrzembski

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### **0. Trigger/Clock/Sync – TI/TD**

#### **20-July-2012**

→TI boards returned from the PEPPo group

→TI-TD Production order status:

-NO feedback from CEM yet, but scheduled delivery for 1<sup>st</sup> articles is 22-Aug. (15 TID units)

→Discussion about ordering TS “pre-production” boards before the end of August.

-Specification needed

-Consign parts or not?

-Finish and check schematic changes and board layout before ordering.

#### **13-July-2012**

→No status update for 1<sup>st</sup> article boards

#### **29-June-2012**

→TID contract manufacturer is progressing with fabrication and component orders.

→Still on schedule for 1<sup>st</sup> article board delivery requirement

→NIM article editing,,

→TS circuit changes for DensiShield cable receivers has been implemented.

#### **22-June-2012**

→No news from the CM

→ECO on the TS will include SN65LVDT100.

#### **8-June-2012**

→William has tested the LVPECL driver issue and determined that the SN65LVDS100 part will replace the existing receiver on the TS.

→Flash boards will be released from Hall B soon, so we can proceed with Global Trigger crate testing.

#### **1-June-2012**

→TI-D contract has been awarded to CEM on 29-May-2012. 22-August is the date for 15 1<sup>st</sup> article assemblies. A vendor QA visit before production begins has been proposed, but no travel plans have been confirmed...

→Sergey has returned the TI and SD boards from the Hall B HPS setup. Cody Dickover will receive at least one of the pre-production SD boards to test the FADC125. Hall D already has at least four TI boards, so William would like to know why they need another board for Cody.

→There were operational issues during the HPS run, that have not been resolved. A total of 3 crates were used during the HPS run and there were several issues. Sergey has the error list and these errors should be understood and resolved.

→Global Trigger Testing – Some discussion on what the testing includes.

- GTP→TS: Verify four DensiShield ports/cables
- Use SD and SSP (and FADC250?)
- Trigger Distribution → TS→SD→TD(1); TD(2)→TI(1);TI(2)

## 1. SUB-SYSTEM PROCESSOR (SSP)

### 20-July2012

→Production order has been approved!

→2 week period for quotations

→Fiber transceiver order has been approved. These units are for ALL SSP and CTP modules.

→ECOs are 70% complete. Final checks in a few weeks and will coincide with reception of quotations.

### 13-July-2012

→PR has been signed and quotes are in the queue

→Total number of SSP will be 25 (All Halls)

→ECO activities are in progress.

### 29-June-2012

→SSP production procurement has been signed and is in procurement for Hall quantities.

→Avago fiber transceivers have been ordered.

→Scott has the SSP and will run a quick test with the radiated fiber cable.

### 8-June-2012

→Ben has prepared an order for the SSP and CTP fiber transceivers and has a start on the specification for contract manufacturing and assembly of the production SSP boards (26)

→Goal for end of June is completion of ECO and PR submission.

### 1 June 2012

→Schematics and ECOs have started. Ben would like to begin specification and procurement cycle as early as reasonable and will need the final BOM and fabrication details. The quantities have been known for some time.

## 2. CUSTOMERS

### 20 July 2012

→UConn will receive a full VXS crate for their testing activities. Hall D VXS crate inventory is almost complete, so a new crate can be loaned/shipped soon.

→Sergey will return from vacation soon, and the Hall B PCAL group will want to start cosmic ray studies with the PCAL and FADC250 boards. (EEL-125; shower curtain area)

### 13-July2012

→2<sup>nd</sup> FADC250 board returned from PEPPo and will be given to Brad S.

-Front panel fan-out and crate have been delivered to EEL-126

-Latest firmware can be downloaded if necessary

### **29-June-2012**

#### **→Hall C test setup in EEL 126**

- VME64x crate and front panel fanout card moved to EEL126 for Brad S. test setup
- Should receive TI and FADC250 from the PEPPo folks by 17-July.
- Mini crate will be sent to UConn (1/2 year loan) for SiPM testing etc.

### **8-June-2012**

- >PePPO experiment has only a few more days of running and they are running smoothly according to the daily logs.
- Equipment that was used for HPS and other beam testing is ready for removal from Hall B. RadCon survey was completed this week.
- Hall B PCAL group will begin to instrument the DAQ in EEL-125 for detector verification.

### **1-June-2012 →PePPO**

#### **Positrons are being produced!!**

- Only a few reports of questions etc., but they are collecting data consistently.
- Trigger optimization has been worked on by Bryan, but significant issues have been eliminated.
- The FADC250 TDC function has been re-tested and understood. It appears that certain input signal shapes will cause problems with the TDC value that is reported. Firmware that captures the peak value will be modified. Hai started a discussion about TDC + Integral as one mode and this firmware revision will require documentation and requirements.

### **3. [“B” Switch - Signal Distribution Module \(SD\)](#)**

### **20-July-2012**

- Acceptance letter has been sent to CEM, and the production order will proceed.
- Within 60 days we should start receiving the rest of the production lot.
- Test procedure is complete and there are a few enhancements to be tested.

### **13-July-2012**

- >9 of 10 1<sup>st</sup> article boards have passed acceptance testing. A few resistors were identified as bad and cold solder joints identified, so there are a few minor assembly issues. 10<sup>th</sup> board requires the power connector.
- Discussion about including CTP register readbacks for the complete SD test.

### **29-June-2012**

- Test procedure draft is complete and under review.
- FADC250 test firmware has been completed. The test firmware allows all I/O for the SD test to be exercised from each payload slot. All 8 pairs and 2 SE signals from the payload slots are tested on the SD.
- Consideration for keeping the ‘test mode’ firmware as part of the final firmware revision.

### **22-June-2012**

- CEM will send the boards 25-June-2012. (1<sup>st</sup> article boards)
- 10 days to test and approve 1<sup>st</sup> article boards.
- Signal tap has been implemented for the SD Altera part
- Minor firmware revisions for the FADC250 and TI for the full crate SD acceptance.

### **8-June-2012**

- Very close to the initial run of the procedure and there are a few activities that Bryan and Ed need to complete before the test can be started.

### **1-June-2012**

-->Start the new and improved SD acceptance test procedure with as many FADC250 pre-production boards as possible.

→Notes about pre-production board locations has been posted to the wiki

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

### **20-July-2012**

→Patch cables and panels will be ordered before 15-Aug Price estimates and details on part numbers for patch panel hardware and patch cables from two companies have been received.

### **13-July-2012**

→Radiated fiber test completed. Should document the test and include details of fiber type, length, location, estimate of dose, etc.

### **29-June-2012**

→No updated pricing received from vendors yet. Not sure why this is taking so long, but the procurement for the patch cables and patch panel hardware should be off the shelf items.

→Trunk line specification still needs to be a final draft soon.

### **8-June-2012**

-->Received vendor prices for patch panels and patch cables. Will submit PR week of 25-June.

→Trunk cable specification including post installation verification will be next.

### **1-June-2012**

→Chris will proceed with an order for the fiber optic patch chassis and panels for the halls. There is no reason not to proceed with this part of the order. The patch cables and trunk fiber will be ordered together and the fiber specification still needs to be finalized.

### **11-May-2012**

→Brad S. has provided fiber lengths for the required MTP cables that will be used both the HMS and SHMS spectrometers. The number of MTP connections are low, so I suggest using trunk cables that only have 2 twelve fiber ribbons.

→After the 6GeV beam is turned off, and the test (patch) cables are surveyed from the Hall, we can run a quick test to see if the MTP cables were damaged.

### **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**

### **20-July-2012**

→Scott presented a test scheme drawing a few weeks ago for the global trigger module/crate test. Preliminary register/command list needs to be described to Bryan. TS library is in place (preliminary) and by next week (23-July) we should have this test setup to measure the last latency 'link'.

-Use FADC250 as data generators to GTP

-Use TD to distribute triggers

-Run realistic final trigger equation on GTP to simulate processing time.

### **13-July-2012**

- Two crates will be available late next week so the global crate tests can be started.
- Use FADC250 boards as data generators to GTP and 2<sup>nd</sup> crate will have the TS, SD, and TD

### **29-June-2012**

-->The two crate DAq configuration has not been used for several months, but several other tests are on-going that do not need two crates. (SD, and other testing) Scott has proposed a test setup where two crates will be necessary to test and measure the final latency time that the Global Crate & TS-TD crate will produce.

### **1-June-2012**

No specific update, but the ROC procurement for the production quantities is progressing. It is not clear if the production units will be delivered in coincidence with the delivery of the FADC250 boards, but that is not a critical issue. The full crates can be tested regardless of the ROC delivery.

### **18-May-2012**

→Bryan presented his work on the procedure outline for the full crate test station. The tested FADC250 boards will begin arriving from UMass in about a month, so we will have to dedicate an existing CTP, SD, and ROC to fully verify 16 FADC in a crate. This test will verify that all FADC250 in a crate function properly in unison with the trigger boards, and the populated crates can be relocated to the respective Hall (or storage).

### **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)**

### **20-July-2012**

- PR for 30 Hall D units has been sent for approval.
- Schematics complete
- Routing for new changes will start soon. (Jeff)

### **13-July-2012**

- PR and specification finalized and need the signatures soon. (Chris' queue)
- Order will be for Hall D quantities only (+spares). Includes upgrades FPGA devices.
- CLAS12 CTP effort will need to be discussed further and regular meetings will begin as soon as Sergey returns from holiday.

### **29-June-2012**

→Schematics and initial placement is complete. BOM and specification to be finalized and sent to procurement by 15 July.

### **8-June-2012**

- Spec has been drafted,,,,, going with FX100T + FX70T, need pricing.
- As soon as initial component placement has been completed, the specification can be finalized and signed. Soon after the signature cycle, the PR can be submitted with the BOM and signed specification.

### **1-June-2012**

- Schematics are complete
- Finalize lane assignments from PP17 (The ROC)
- Final version of CTP will have FPGA remote programmability via:
  - TI (I<sup>^</sup>2C)
  - PP17 (Option)
- The procurement cycle can begin once we finalize the latest BOM, layer stack and preliminary fabrication drawings. A draft CTP specification has been generated and will be updated soon so that we can begin the approval process and funding allocations.

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

### **20 July 2012**

- After a few discussions, the 2<sup>nd</sup> prototype GTP board will be sent for assembly. Components will need to be ordered and the existing partially assembled items will need to be removed.

### **29-June-2012**

- Global crate configuration discussion
- Streaming mode (Transmit only with link up status feedback on SE pin) 5Gb/s \* 2

### **22-June-2012**

- Aurora running @5Gb/s between FADC250(FX70T) and GTP(Altera) – PBRS
- Two additional Densi-Shield cables ordered. Fairly long lead,,
- Ethernet hardware-firmware is running. No further development progress yet.
- REVIEW SD to GTP clock signal termination/pull down scheme. SD DOES NOT pull down the outputs to Switch A.

### **8-June-2012**

- Working with FADC250 firmware to test 5Gb/s. Successful with one board. (Mini crate)
- All this work is toward the goal of testing the Global Trigger crate test configuration.
- Win7 upgrade to 64bit + memory \$

### **1-June-2012**

- VXS Aurora transceiver code to implement (SSP) data transfer.
- Borrow transceiver from CTP or SSP to test fiber transceiver section
- Prepare for GTP→TS testing
- Ethernet development is progressing

**ACTION ITEMS: Next meeting -Friday 27 July @ 10AM in F226**