

## Minutes of ATLAS Level-1 Calorimeter Trigger Phone Conference – 14<sup>th</sup> June 2007

**Birmingham:** Dave Charlton\*, Chris Curtis, Steve Hillier\*, Richard Staley\*, Peter Watkins

**Heidelberg:** Florian Föhlisch\*, Paul Hanke, Rainer Stamen\*

**Mainz:** Uli Schäfer

**QMUL:** Eric Eisenhandler\*

**RAL:** Norman Gee\*, Tony Gillman, Viraj Perera, Weiming Qian, David Sankey

**Stockholm:** Christian Bohm, Sten Hellman, Sam Silverstein

\* at CERN

### 1. Birmingham

- Chris reported on the incorporation of our DCS system into the global DCS system at CERN. Although the (Ag-plated) ROD in Birmingham operates correctly across all channels, some problems are still seen when reading back data from the CMMs and the RODs at CERN.

### 2. Heidelberg

- The Heidelberg test rig is now fully-functional; the Rx/MUX module resides in slot 2 of the PPr crate, a full complement of 16 PPMs operate in Playback mode and the PPM in slot 11 (the hardest to cool) is used to check I/O functionality (analogue signals in, LVDS data out).
- Paul and Klaus will visit CERN w/b 18<sup>th</sup> June to install the next batch of 32 PPMs in USA15. They will also begin connecting the LVDS cables to the PPr crate backplanes, using the custom tooling prepared at Heidelberg together with improved rack lighting. They hope to have at least one PPr crate fully cabled during the week.

### 3. Mainz

- A total of three JEMs and several Input Modules have been returned to *Rohde & Schwarz* for rework, which should be complete this month. They believe that all reported faults are re-workable and so no new boards should need to be made, making a total of 45 fully-working modules available by the end of June.
- A further twelve JEMs have just been shipped from Mainz to CERN, and should arrive by the week beginning 18<sup>th</sup> June. This will provide the full complement of 32 modules in USA15. A further four JEMs will be shipped to CERN later this week, which will provide the first tranche of spare modules. The target of next week's work in USA15 will therefore be to commission the second full JEP crate.

### 4. RAL

- An important meeting was held last week at the assembly company responsible for CPM production, in order to agree a plan for producing the remaining eleven modules. The outcome was an agreement that the company will use their FASTRACK facility to manufacture a batch of eleven completely new boards, procuring both new PCBs and new components; no recovery of existing components will be attempted, and FPGAs will not be re-balled.

Before manufacturing the new PCBs, some forensic tests (micro-sectioning and dye penetration) will be carried out on some of the failed boards to establish that the board production processes are satisfactory.

Temperature profiling for the reflow soldering process will be repeated, again using failed boards.

The best timescale estimate for the modules is a minimum manufacturing time of eight weeks.

Weekly progress meetings will take place *via* a telephone conference.

- A further seven CPMs that had been re-worked were returned to RAL last week for JTAG testing, but all failed.

- Four pre-production RODs are being manufactured, with delivery scheduled for 28<sup>th</sup> June.
- Four pre-production CMMs, using a different PCB manufacturer from the first pre-production batch, are being produced; completion is scheduled for 19<sup>th</sup> July.
- Adam has just begun testing the nine production VMMs at RAL.
- The PCB artwork for the S-link RTMs has been modified slightly to provide an extra 0.7mm clearance adjacent to the Auxiliary Backplane. The production order has been placed, with delivery ~mid-July.
- The CMM RTM production is under way, with delivery expected on 29<sup>th</sup> June.
- Production of the TCM-64 modules is awaiting confirmation from CERN that there are no performance problems that may require hardware modifications. There had been some queries about the programming model, CANbus operation and timing issues; these should be pursued urgently to allow the production order to be issued, as the four-week manufacturing time prevents our having modules until at least mid-July.
- The full production batch of TCM-CP/JEP modules is at CERN, ready for installation in USA15.
- Two scanned Processor Backplanes (PBs) have been despatched from RAL; one with faults was shipped to *Erni* for repair and the other (fault-free) was shipped to Mainz to be assembled into their Test crate. The PB currently in use in Mainz will then be returned to RAL for scanning. This will be the last of the eleven PBs to be assessed, and all six of the crates in USA15 are now equipped with fully-working PBs.
- Following a contact by Sam, Norman, Eric and Tony visited the connector company *Harting* in the UK last week to assess their capability for future backplane repair, if it were to prove necessary. It seems that field replacement of individual pins in the *Erni* connectors by Harting pins should be possible, so some trials will be carried out to establish the viability of such repairs.
- Layout of the PCB for the Clock Alignment Module (CAM) is currently under way in the RAL Drawing Office. The plan is to manufacture all of the PCBs and to purchase sufficient components for all CAMs, but initially to assemble and test only two modules.
- Weiming and Tony will carry out an inventory of the existing TTCdecs, and decide if more TTCrx chips should be purchased from CERN for assembling a further small batch of the daughter-cards.

## 5. *Stockholm*

- Sam had visited CERN earlier this week to assemble the remaining PBs on to USA15 crates. All six crates in USA15 are now equipped with good PBs, with another good PB on the air-cooled CPM crate in Birmingham.

Sam will visit Mainz on 2<sup>nd</sup> July to swap the good PB just shipped from RAL with the current suspect PB, which will be returned to RAL for assessment.

The final two crates in Stockholm still have to be fitted with PBs, and will then be shipped to CERN.

- All CP/JEP crates have been fitted with generic module keying; slots 1-2 can accept either a VMM or a CAM, and slots 4-19 can accept either CPMs or JEMs. Keying tabs must be added to the crates to polarise them for accepting either CPMs or JEMs.

All modules must also be fitted with the correct key tabs, which Sam will order. They should clearly be fitted as soon as available, in order to prevent unnecessary module removal and re-insertion.

## 6. *Commissioning at CERN*

- The order for the G-link fibres (PPMs-RODs and TTC) is ready, and the fibre lengths for the remaining links (CP/JEP modules to RODs) are being estimated. The lead time for delivery to CERN is currently six weeks.

- The connection of the LVDS cables to the CP and JEP crate backplanes has been proceeding very well this week, using a team of four people. Two entire crates have already been connected, and two crates have been partly connected. It is hoped that four crates will be completely cabled by the end of this week. Care must be taken not to damage the LVDS cable bundles when closing the PSU doors.

There is evidence of connector damage on some LVDS cables, where it appears that the connector has started to come apart. It is important to protect the connectors on unconnected cables by keeping them enclosed in plastic bags until they are connected to the backplanes.

- There are still some unresolved issues relating to the Processor crate PSUs:
  - i) Paul Harwood has been asked if *Wiener* can offer any solution to the PSU oscillation effect, or supply us with a simulation model for the sense circuits.

The default solution is to operate with local voltage sensing, but we must first carry out a test with a fully-loaded JEP crate, operating with all LVDS inputs active.

To monitor the onset of oscillations, and to allow oscilloscope access for monitoring the crate power lines, some modifications will be made to the CAM design to allow for the addition of monitoring daughter-cards. If local voltage sensing were used, these daughter-cards would also monitor the magnitude of the supply voltage variations under different operating conditions.
  - ii) The remote voltage sense leads should be re-wired to ensure that no short-circuits can occur on the small interconnecting PCB, which could be re-located to mount directly on to the PSU cage.
- The LVDS cable bundles in most of the PPr racks had not been sorted to match their source slots. Cables for two of the eight crates have now been re-sorted.
- L1Calo is now included in the global partition as part of the M3 integration run. A data-taking run will be started today, and the plan for the next 20 hours (until 09:00 Friday morning) will be to run stably and collect data from the newly-introduced detectors. For L1Calo, the objective will be to get the online monitoring running, and to set up the timing.
- Uli and Gilles will be at CERN next week for continuing CP/JEP commissioning tests, and Paul and Klaus will be there to begin connecting the PPr LVDS cables.

The aim is to be able to operate the PPr and CP/JEP sub-systems together with real-time data.

**Next Phone Conference – Thursday 12<sup>th</sup> July 2007 at 11:00 (10:00 in UK)**

***Tony Gillman***