

Minutes of ATLAS Level-1 Calorimeter Trigger Phone Conference – 16th November 2006

Birmingham: Chris Curtis, Stephen Hillier*, Gilles Mahout, Richard Staley, Peter Watkins
Heidelberg: Paul Hanke, Eike-Erik Kluge, Karlheinz Meier, Frederik Rühr*, Klaus Schmitt
Mainz: Markus Bendel, Uli Schäfer
QMUL: Eric Eisenhandler**, Murrough Landon*
RAL: Bruce Barnett*, Ian Brawn, Norman Gee, Tony Gillman, Damien Prieur, Weiming Qian*, Dave Sankey
Stockholm: Barbro Åsman*, Christian Bohm, Sten Hellman, Marianne Johansen
* at CERN ** at RAL

1. Birmingham

- The one remaining faulty production CPM is now working, having had an intermittently bad solder joint repaired.
- The production CPMs must still be subjected to long (overnight) runs, and must also be thermally stressed by running them at elevated temperatures. Tests at only moderately elevated temperatures (~10C) have so far been carried out by reducing the crate fan speeds. It was suggested that a more aggressive test would be to turn off the fans completely for a limited time, but only while operating a single CPM. These tests are intended to reveal any weak solder joints, and especially those associated with the BGA packages.
- The two MSBs of the TTCdec address lines have been checked to be wired correctly, so all 14 bits have now been verified. The order for the production TTCdecs can now be placed, as soon as the quotations have been received for several accelerated production schedules. (*This order has now been placed, for a total production time, including assembly, of 3-4 weeks, so we should receive all of the TTCdecs before Christmas. To justify the price premium, we must ensure that an efficient test plan is prepared before delivery.*)
- A prototype CMM and four TTCdecs have been sent to Uli from Birmingham for use in acceptance testing of the production JEMs. Bruce requested that the serial numbers of all transported production modules be recorded.
- Chris reported that tests of hardware power-down of crates *via* DCS were successful, with reporting through FSM.

2. Heidelberg

- 160 production LCDs and 20 pre-production CAN daughter-cards will be sent to Lutke for assembly early next week.
- There is no further update from Würth on the production of the PPM motherboards. They are still scheduled for delivery to KIP on 7th December, together with 160 CAN daughter-card PCBs.
- Paul noted that the production Auxiliary Backplanes will be needed soon at KIP, so that the PPr crates can be fully assembled before shipping to CERN. (The crates need to be installed in USA15 as soon as possible in order for the LVDS cabling to be installed.)
- A TCM-64 is needed at KIP as soon as possible to replace the module taken to CERN last week.
- With 16 pre-production PPMs now at CERN in USA15, Paul requested that care should be taken to ensure that all necessary infrastructure (chilled water, *etc*) is present in the PPr racks. He suggested that manual checks should initially be carried out to monitor the crate, module and MCM temperatures for a few hours after power-up. If the MCM temperatures stabilise at about the same values as observed in the full-crate tests at KIP, then it should be safe to leave the crates operating continuously under DCS monitoring and control.

3. Mainz

- The Test Rig is now ready for acceptance tests on the production JEMs.
- The assembled G-link daughter-cards and Control Modules for the JEMs are scheduled for delivery to Mainz this week.
- The Input Module PCBs (third iteration) for the JEMs are estimated to be delivered to Mainz on 27th November. Their assembly is expected to be fairly rapid.
- Trace impedances measured on some of the JEM motherboards were also found to be too high, and outside the specified $\pm 10\%$ tolerance, so all of the JEM motherboard PCBs are being re-made. Sample trace impedance measurements on all of the motherboards will then be made before assembly. It is suspected that this problem – also seen on the Input Modules – stems from the change to a Pb-free soldering process.
- There will therefore be a further four-week delay on delivery of the JEM motherboards. With an accelerated assembly process, it is estimated that they should be delivered before Christmas. The other daughter-cards can be tested before then.

Sufficient tested TTCdecs will be required in Mainz before Christmas for testing the final JEMs.

4. RAL

As Viraj was unable to be present, he sent the following report by e-mail:

- Viraj and Richard Matson visited the CPM assembly company yesterday with the JTAG test set-up to test the re-worked modules on-site. Because of problems with the JTAG license they were unable to carry out any testing, but did bring back for testing at RAL the ten CPMs that had been returned for re-work. Five of these modules have already been tested, of which three still have problems. One of the CPMs shows one net unconnected, which will require more investigation.

There will be a further visit to the company next week, once the licensing issue has been resolved.

- The few requested changes (*e.g.* cut-out dimensions 3mm x 6mm) will be incorporated into the VMM design, and the order for four pre-production modules will be placed next week.
- All of the necessary design modifications for the ROD have been carried out, and Richard Staley has checked the schematics. There are still some outstanding items from the FDR/PRR to be checked before the order for four pre-production modules can be placed.

Viraj has requested a quotation for 20 optical fibre assemblies, each 5m in length with LC connectors at both ends.

- As the lead-time for manufacturing the 300 TTCdecs was long (25 days), Viraj has requested quotations for production with faster turnarounds (5, 10, 15 or 20 days), which he should receive by the end of this week, and the order can then be placed.
- Problems were observed at CERN last week with the TTC signal not been distributed to slot 5 in either of the two PPr crates. If the prototype TCM (with ALC) had been used for these tests this would have been expected, as that design only provided for a total of 18 TTC signals, which the Auxiliary Backplane would distribute to Slots 2-4 and 6-20 (the “hole” for Slot 5 results from trace routing on the Auxiliary Backplane).

However, the tests definitely used the monolithic TCM-64, which provides 19 TTC signals, distributed by the Auxiliary Backplane to Slots 2-20. Adam has also confirmed that the Auxiliary Backplane does indeed connect the TTC pins on Slot 5 to the correct pins on Slot 21. It is therefore unclear why the TTC signals are not present on Slot 5 of both of the two PPr crates in USA15.

- The order for four pre-production CMMs has been placed, and the modules are scheduled for delivery to RAL on 13th December.
- The order for 142 production RGTM-Os has been placed, and the units are scheduled for delivery to RAL on 13th December.

- Four pre-production TCM-CP/JEPs have been in use without any reported problems. The final production order can be placed as soon as it is confirmed that the pre-production modules are completely satisfactory.
- All of the necessary modifications have been made to the TCM-64 design, and the schematics are available on the web for review. Manufacture of four pre-production modules will proceed as soon as the design is approved.

N.B. This version of the TCM-64 incorporates the design iterations made both to the TCM-64 prototype and to the TCM-CP/JEP pre-production module, so represents an “evolved” – and therefore hopefully very robust – design.

- Modified firmware had fixed the problems that had been seen when testing the CMMs.

5. *Stockholm*

- The second CP/JEP crate will be sent from Stockholm to CERN in the next few days. The third crate should follow very soon afterwards.
- Working in Bat 3150, Sam *et al* made the necessary mechanical modifications to the CP/JEP crate to allow the new, shorter power cabling loom to be fitted. The ground bus-bar holes were drilled out to accommodate M8 bolts, although apparently the 5V and 3.3V bus-bar holes were not modified.
- With the re-cabling completed, the CP/JEP crate was returned to USA15 and installed in a JEP location to allow the LVDS cabling to be started.
- One potentially serious problem discovered was that the power cabling lugs had to be bent to allow them to be attached, which caused the insulation around them to be damaged, potentially allowing shorts to develop. A temporary fix was provided by extra insulating tape, but it is very important that this is checked carefully for complete safety. A safer procedure should be developed to avoid this problem on all other crates.
- At present, the CP/JEP crate PSU is wired with the remote voltage sensing leads connected, but unless we receive some suggestions from *Wiener* about how to avoid the oscillation problems, then these leads will need to be disconnected and the PSU run in local voltage sensing mode.

6. *CERN*

- There has been a re-organisation of trigger crates in USA15, ready for the LVDS cabling installation to begin.
- Robert McLaren has a spreadsheet showing the interconnection matrix for the fibres installation.
- Some of the rack water-hoses have not been manufactured correctly and need to be checked.
- Viraj will order the short ROD input fibre assemblies, but we need to define their lengths and numbers.
- The HOLAs will be ordered from Stefan Haas.
- Next week is a Cabling Week in USA15. The final RPPP analogue cables are ready for installation on the upper C-side. The cut-down PPr dummy front-panel will not be available, but the cabling can still proceed if two PPMs are moved into the upper C-side PPr crate.
- For the LVDS cabling, starting in the JEP rack it would be best to have both crates installed to establish the optimum vertical routing.
- The repaired CMM-CTP SCSI cables are at *Cegelec*. Two of them need to be re-made, but the others have been tested to work correctly.
- Murrough requested that all module “suppliers” respond as soon as possible to his e-mail regarding module TC labels.

- There has been a request from the ATLAS Yale group for us to supply them with two PPMs and a ROD to instrument their Zero Degree Calorimeter. After some discussion it was decided that we need more information – technical and schedule-related – from them.

Next Phone Conference – Thursday 30th November 2006 at 11:00 (10:00 in UK)

Tony Gillman