

Minutes of ATLAS Level-1 Calorimeter Trigger Phone Conference – 19th January 2006

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Heidelberg: Florian Föhlich**, Paul Hanke, Eike-Erik Kluge, Kambiz Mahboubi, Karlheinz Meier, Frederik Rühr**, Hans-Christian Schultz-Coulon

Mainz: Uli Schäfer*

QMUL: Eric Eisenhandler*, Murrough Landon**,

RAL: Bruce Barnett, Ian Brawn, Norman Gee, Tony Gillman

Stockholm: Sten Hellman, Attila Hidvégi, Sam Silverstein

*at RAL **at CERN

1. Birmingham

- Eight pre-production CPMs have been successfully tested. Except for CAN operation, all functions are working correctly.
- Data transmission from CPM-TCM is only working on two CPMs, although the CAN controller appears to be alive on all eight modules. Adam will be asked to look into the problem.
- The prototype TCM in the CPM crate must be modified to provide correct TTC signal amplitudes by removing the source termination resistors. At present, the reduced amplitude encoded TTC signals tend to be producing excessive TTC clock jitter.
- Of the latest batch of 30 TTCdecs to be tested, two were found to be faulty. The good ones are being used on the new CPMs, and the deskewed clocks operate correctly when carrying out timing scans.
- When six CPMs were operated together in a crate, the power supply tripped out. This was caused by the over-voltage protection being triggered by an excessive IR drop down the 5V power leads, which were too thin (2.5mm²) for these heavier loads. They have now been replaced with thicker leads (6mm²).
- Five CPMs have operated together successfully in a crate, running with playback memory data. The backplane data timing window widths were measured to between 2.0ns and 2.5ns on each module. The next step will be to operate the modules with real-time data sourced from LSMs.
- The final two pre-production CPMs will be delivered to RAL by the end of this week (20th January).
- Gilles has begun using Pavel's MCM database to record the stages of CPM testing, and he already finds it very useful.
- For a full crate of 14 CPMs (+2 CMMs, TCM and CPU), extra cooling power will be needed. Another fan will be added to improve the rack air –flow, and possibly a water-cooled heat exchanger.
- All six types of RPPP PCB have been laid out, and a small number of pre-production Type 6 boards will now be manufactured. Once these are verified, full production of Types 1, 2, 3, 4, 5 and 6 will begin.
- Simon and Xen will be at CERN during the week beginning 23rd January to continue with the short analogue cabling installation. Their priority task will be to measure enough cable lengths to provide *Cegelec* with pre-cut cables for connector assembly during the subsequent two weeks.
- The Birmingham workshops will supply some standoff mounting pieces for the cable stocks before Simon's visit to CERN next week.

2. Heidelberg

- The first six PPM AnIn daughter-card PCBs have been sent to Würth for assembly, and they will then be tested at KIP.

- PCB layout and routing for the final PPM design is continuing, and will probably take another month.
- E-mail discussions have been taking place about the specification of the auxiliary backplane for the VME64x(P) crates, which is needed to transport TTC and CANbus signals to the PPMs (and RODs). There will be a phone conference on Friday 20th January to finalise the design details.
- A batch of 400 glob-topped MCMs without lids are at KIP for studies to understand the cause of the 3% failures believed to be associated with the glob-topping process. However, the overall yield for fully-working MCMs remains very high at 85-90%.
- Alexander will travel to CERN for the week beginning 23rd January to work with Simon and Xen on the cabling installation. He should be able to continue in this way for several months.
- Frederik will move to CERN permanently around the middle of March.
- One of the Wiener VME64xP crates at KIP has been modified to provide 48V so that it can be used to host a ROD.
- Version 3 of the PPM RemFPGA firmware works for VME readout, but not necessarily for ROD readout. Kambiz will test it further at KIP next week, but he suggests that it can be put into CVS for the moment.

3. *Mainz*

- The firmware for the JEM Input FPGAs has been improved to improve latency by a total of 1 BC (0.5 BC at the input synchronisation stage and 0.5 BC at the outputs).
- The new pre-production Control Module for the JEM is now being tested in Mainz.
- JEM tests are continuing this week at RAL.

4. *RAL*

- The two pre-production CMMs have been JTAG tested, but one failed because a wrong component had been fitted. The other module is ready to be tested by Adam.
- Two more RODs are due for delivery to RAL today (Thursday 19th January).
- Full production of the final VMMs is about to start, but with an initial two-module pre-production run.
- The design changes to the TCM-VME resulting from the recent FDR are still being worked through. Adam's help will be needed, but the overall timescale for manufacture is unknown at present. It would be useful if another Adapter Link Card and a prototype TCM could be made available.
- Ian, Bruce and Weiming are working together to make improvements to the current ROD firmware.
- The 70 TCPPs at RAL should be further tested to ensure that all ground isolation capacitors have been fitted correctly. This was not possible with the JTAG tests, but a simple pulse injection technique can check this and can also be used to look at signal quality.

5. *Stockholm*

- Two Jet firmware configuration files will be needed for the current JEM tests at RAL, to accommodate both the JEM 1.0 and JEM 1.2 modules. It is important that stable JEM operation is achieved this week before priority shifts to the Jet CMM tests next week.
- The first two pre-production Processor Backplane (PB) boards have been assessed in Stockholm. The trace impedances are within 3% of the specified values, which is much better than required, but unfortunately the manufacturer used a drill optimisation with relative, rather than absolute coordinates. The cumulative error over more than 22,000 positions put the drill holes outside tolerance, making the PCBs unusable. However, all other parameters are good, so the manufacturer

will make the complete production run of eleven boards by the end of January, which will be sent to Erni in Germany for connector assembly and testing (~one week).

- All the parts for module keying are now available in Stockholm, and Sam will bring those pieces needed for the UK modules with him when he visits RAL for the Jet CMM tests next week. He is preparing a document specifying the global keying scheme, which he will release also next week.
- An updated costing document for Stockholm items is now available.

6. CERN

- Sporadic observation of TileCal signals has begun, but so far from a maximum of only three cables (27 trigger towers), all *via* the TCPPs directly into a PPM, bypassing the Receiver. Both 10 GeV and saturated pulses have been seen, and some initial plots of PHOS4 timing scans of unsaturated pulses from one barrel module can be seen at:

<http://l.home.cern.ch/l/landon/www/tile/unsat.ps> (see pages 3, 5, 6, 7, 8, 9)

The plots display some strange features, where there are apparent gaps in the signal shapes, most obviously with one particular MCM. This effect was later dramatically reduced by changing the PPM and swapping MCMs. The residual effect may well be related to X-display resolution.

When including a Receiver in the analogue chain, no signals were observed, although this configuration had been successfully used in signal tests late last year. This may possibly be related to recent problems with the intermittent loss of power to the Receiver rack.

- Cabling of sector 9 is almost complete, with all of the USA15 connectors now assembled, and cabling of sector 5 will soon begin. Cabling of one further sector may be possible before more cable will be needed in about two weeks time.
- Only signals from the C side have been observed so far, as apparently there are problems with power supplies and/or cooling of electronics on the A side, which are expected to be resolved soon.
- Sufficient connector parts to supply Cegelec for at least the first month of cable assembly work, starting at the beginning of February, will be ordered from CERN Stores.

Next Phone Conference – Thursday 2nd February 2006 at 11:00 (UK), 12:00 (Germany, Sweden)

Tony Gillman