Minutes of ATLAS Level-1 Calorimeter Trigger Phone Conference – 22nd February 2007

Birmingham:	**Chris Curtis, Dave Charlton*, Gilles Mahout, Richard Staley**
Heidelberg:	**Paul Hanke, Karlheinz Meier, Rainer Stamen**
Mainz:	**Markus Bendel*, Andrea Neusiedl***
QMUL:	**Eric Eisenhandler*, Murrough Landon***
RAL:	**Ian Brawn, Tony Gillman, Viraj Perera, Damien Prieur, Weiming Qian***
Stockholm:	**Christian Bohm, Sten Hellman, Attila Hidvégi**
	** at CERN*

1. Birmingham

- Richard has repaired the CPM that had been returned from CERN with configuration file loading problems. It was caused simply by a bad solder joint.
- The Clock Alignment Module (CAM) schematics are almost complete, and the PCB will go for layout in the RAL Drawing Office next week. We need to decide how many CAMs to produce – the initial order will be for two pre-production modules, with probably a further six modules.
- The various mechanical structures needed for the CP/JEP crates are being designed and produced by the Birmingham workshops. The new CMM RTM support structure design is the least mature of these items, but it is expected that the workshops will deliver the necessary pieces within the next three weeks. The support system for the LVDS cable strain relief blocks and the perspex safety covers, and the Cu bus-bar extensions should be available sooner (2.5 weeks).
- The first re-designed CMM RTM, with only the press-fit backplane connectors mounted, should have been sent directly to Birmingham from the assembly company, to act as a space model for the design of its support structure, but it has not yet arrived.

2. Heidelberg

- Rainer presented the status report for L1Calo at the ATLAS plenary session this week.
- The PPM production is proceeding very well.

  Of the first 70 production modules now at KIP, 50 have been carefully inspected visually, and six were found to have minor soldering faults. All of these faults can be corrected fairly simply, but at present the modules will be put aside for repair later.

  Victor has carried out some considerable development to the PPM test rig, which now includes a sub-system known as the Universal Receiver Unit (URU). This device emulates both a ROD and a CPM or JEM, by receiving serial LVDS data and optical G-link data from the PPM under test. This will operate together with the video DAC system to provide a highly automated test rig.

  Including the 20 pre-production PPMs, there are now a total of 34 fully-working modules at KIP.

  Klaus will visit *Lüdtke* early next week to collect a further 50 PPMs, and it is expected that the remaining 40 modules will also be ready for collection by the end of next week to complete the entire PPM production run of 160 modules. *This is a very impressive achievement, and exactly according to the schedule outlined at the PRR last October.*
- The 50 TTCdecs tested by Weiming in CERN have arrived at KIP.

3. Mainz

- Three of the pre-production JEMs are now at CERN. The first 14 fully-tested production JEMs will be sent to CERN for the JEM full-crate tests in USA15, starting next week.
- It is hoped that testing of all of the production JEMs now in Mainz will be completed by the end of March.

4. RAL

- The four pre-production TCM-64 modules have been slightly delayed from the scheduled delivery date of 19th February. They are now expected on 27th February.

  Once they have been tested at RAL, the first two modules will be shipped to Heidelberg for use in the PPM test programme. The remaining two modules will be shipped to CERN for use in USA15.

- The order for nine TCM-CP/JEP modules has now been placed, and the scheduled delivery date is 9th March.

- Three of the four pre-production Rear Transition Modules (RTMs) for the CMMs should be delivered to RAL at the end of this week. (The fourth – partially-assembled – module should have already been sent directly to Birmingham, but has apparently not yet arrived.)

- The three pre-production CMMs have passed their JTAG tests successfully and the first module is now undergoing functional testing. No bugs have been found so far, and it should be completed today, although it has taken four days of work. It is estimated that the remaining two CMMs should take no more than one day per module to test, so it is expected that early next week all three modules will be ready for shipping to Birmingham for final CP crate tests, after which they will be shipped out to CERN. These final full-crate tests will include testing the new design of CMM RTM.

  As soon as the CMM testing is finished, the pre-production TCM-CP/JEP currently at RAL will be sent to CERN.

- There are further problems with the production of the four ROD PCBs, which were scheduled for delivery to the assembly company on 19th February. One of them failed inspection tests, so only three were delivered yesterday. It seems very probable that another PCB supplier must be found.

- Seven S-link RTMs for the RODs have been delivered to RAL. After visual inspection, they will be shipped to CERN.

- The assembly company has repaired 13 of the rejected CPMs by re-working the small FPGA packages, and the first four of these have been sent to RAL for JTAG tests. Viraj and Richard Matson will visit the company next week to JTAG test the remaining nine modules.

  In order to re-work the five faulty modules with large FPGA packages, the assembly company is having to upgrade some of their re-work machines.

  If these re-worked modules still have connectivity problems, the assembly company will have to obtain more PCBs and assemble completely new modules.

- The pre-production VMMs have already been used at CERN. The remaining production batch will now be ordered.

5. Stockholm

- As Sam was unable to attend, he sent the following report:

  One backplane has been completed and one partially completed.

  The company from which the backplanes were purchased is trying to contact the ERNI person who was in charge of the backplane order to discuss our options, but he has not received a reply so far. The hope is that they will agree to fix the errors in their work, but they may or may not wish to do so.

  A backup plan is to contact other companies in or around Stockholm that might be able to do the job. One serious possibility is *Ornatus AB* (ERNI distributor in Sweden), which has press-fit facilities, but after discussion with their workshop it seems our backplane is too large to fit in their equipment. Other local companies will be approached.

  In the very worst case, it may be necessary to purchase some fittings and do later repairs ourselves. Wesley Smith had his non-standard backplanes assembled in-house by a technician, so maybe we can get advice from them.

The initial proposal is to test as many crates as possible, and catalogue errors found. One or two backplanes at a time would be sent for repair, with the first ones replaced with the last two backplanes still held in Stockholm. After they are returned, other crates with errors would have their backplanes swapped with "Known Good Backplanes", and sent off in turn for repair.

This is only a starting point for a longer discussion once there has been a response from ERNI.

6. CERN

- Last week, there was a successful commissioning test in USA15 of the first CP crate filled with 14 CPMs and two CMMs. No parity errors were seen in the CMMs, but CPM parity errors were traced to a single missing bit in the FIO data between slots 15 and 16. This was traced to a faulty Backplane pin, believed to have been inserted incorrectly at assembly time. (It is very likely that this assembly problem is also the cause of another pair of FIO pins which last year were observed to be shorted to ground in the Test Rig (air-cooled PSU) in Birmingham – to be confirmed.)

  It is very important as soon as possible to perform a scan of all Backplanes at CERN to check for any other pin problems of this nature. The logistics of doing this are quite difficult, as a full CPM load must be transferred between crates.

  It was suggested that the sixth crate (water-cooled PSU), which is currently in Birmingham, for CMM RTM mechanical studies, should be scanned in this way before shipping it to CERN.

  Note that carrying out these scans with CPMs rather than JEMs does not check all of the FIO connectivity.

- Because of TileCal and LAr cable connector assembly work, access to the rear of the USA15 racks was difficult earlier this week, so the time was spent in mechanical preparation work on two of the CP/JEP crates in Bat 3150.

- LVDS cable bundles have been installed from the JEP crates to the A-side PPr crates, involving an equivalent total of about three-quarters of one JEP rack. The next stage will be to install cable bundles from one of the CP racks to the A-side PPr crates.

  The current estimate for the LVDS cable installation schedule is that about 1.5 days are needed to install the cable bundles for one Processor crate. Several people working simultaneously on pulling the cable bundles makes the task much faster.

- After the firmware upgrade to the Wiener crate PSUs, there have been problems in controlling the crate fans, which Chris is looking into.

- Weiming has tested 100 TTCdecs, with only two found to be faulty. He sent 50 to Heidelberg (already received) and 30 to Mainz. The remaining 18 will remain at CERN. A further 50 TTCdecs were sent to CERN from RAL earlier this week, which Weiming will test if he has enough time during the next week.

- The two faulty Wiener PSUs from ROD crates, which were returned to Paul Harwood some time ago, have been repaired. One has failed its acceptance test (when operated at >80% of full load current the output voltage falls below specification), although this may simply be caused by incorrect setting of the current limit. The other PSU is required to undergo a pressure test on its water-cooling system, at a total cost of 500 Euros!

- The final stages of the ROD test programme are almost complete.

- The CMM-CTP cables have been re-installed in USA15, after Richard tested them using the new cable tester designed by Xen. The complete installation will be tested once a full CP crate is available again in USA15.

- The VME problem seen when operating two RODs together in the same crate is completely solved.

Next Phone Conference – Thursday 8th March 2007 at 11:00 *(10:00 in UK)*

Tony Gillman