Minutes of ATLAS Level-1 Calorimeter Trigger Phone Conference – 8th December 2005

Birmingham:	**Richard Booth*, Dave Charlton, Steve Hillier, Gilles Mahout, Richard Staley**
Heidelberg:	**Victor Andrei, Florian Föhlisch, Paul Hanke, Eike-Erik Kluge, Kambiz Mahboubi, Karlheinz Meier, Klaus Schmitt, Hans-Christian Schultz-Coulon, Pavel Weber**
Mainz:	**Uli Schäfer**
QMUL:	**Eric Eisenhandler*, Murrough Landon****
RAL:	**Bruce Barnett, Norman Gee, Tony Gillman, Weiming Qian**
Stockholm:	**Attila Hidvégi**

**at RAL **at CERN*

1. *Birmingham*

- A further 260 LVDS cables will be needed very soon for the CPM full-crate tests.
- Gilles has managed successfully to replace a pin in the Processor Backplane.
- The DAQ software has been upgraded to the latest release – tdaq-01-04-01.
- New code for the CANbus microcontroller has been successfully tested on one of the new CPMs.
- The second new CPM still has an elusive CANbus bug, which may possibly be caused by a faulty microcontroller.
- Two prototype RPPPs (Types 1 and 4) have been successfully tested, but some minor grounding changes will be made to the layout before the production run.
- The 10 pre-production CPMs were due this week but delayed because the bare PCBs were found to be too thick, and hence outside the specification. New PCBs have been manufactured, the SMD assembly completed and the modules are now in AOI and awaiting the fitting of conventional components. The fully assembled boards are now due at RAL at the end of next week.

2. *Heidelberg*

- Preparations are being made for the Interim Design Review of the PPM next Tuesday in Heidelberg, starting at 09:00. The reviewers are Norman, Steve, Weiming, Eric and Tony (chair). The documentation can be found on the KIP web pages at:

  http://www.kip.uni-heidelberg.de/atlas/docs/index.html

  The relevant directories are: “Discussion notes”, “PreProcessor Module” and “PreProcessor System”.
- The latest batch of 150 MCMs have been fitted with lids and are ready to be tested. The first three devices are good.

3. *Mainz*

- Preparations are being made for the Production Readiness Review of the JEM next Wednesday in Mainz. The reviewers are Gilles, Kambiz, Richard, Philippe Farthouat, Stefan Haas, Tony and Eric (chair).
- Further tests have been carried out for the Review on the new JEM 1.2, and some CANbus-related problems have been observed. The Fujitsu chip pulls the SMB lines to ~4V, *i.e.* 3.3V + 1 diode-drop (presumably from a protective clamp diode on the SMB MAX6656 sensor chips, which are 3.3V-operated). When the SMB device talking, the 10K pull-up resistors cannot pull the signal high enough for the Fujitsu device to detect logic 1 reliably. As the lines used for SMB in the reference design have hysteresis, a minimum drive of 4.7V is required, so operation at present is unreliable.

- A temporary solution is to use two diodes to lift the lines by a further 0.7V and therefore safely above threshold. An alternative solution could be to use a Maxim bi-directional level translator device, which would require a PCB layout change to the Controller daughter card, but no changes to the JEM mother-board.
- The System ACE device – http://direct.xilinx.com/bvdocs/publications/ds080.pdf – on the JEM is connected to the VME sub-system such that byte-wide access mode is supported. All 16 data lines are wired, so word-wide access is possible as well. However, when switching to word operations, the meaning of the address lines changes and the registers are basically spaced by a factor of 2. Folding in the VME particularities would then mean that the registers are located in the VME space at x0: Busmode, x4: Reserved, x8: Status low, xC: Status low ... Although the block memories on the ACE chip will no longer be in contiguous space, this would not be important if block mode transfers were not used.
- The choices are to leave it at byte mode, or to shift the address lines and have a nicer register mapping in word mode, but give up the option of using byte mode. (On all UK-designed modules the ACE address lines run through programmable logic, so they can implement any addressing scheme in firmware. Therefore it is the JEM, which has hard-wired addressing, which will define the common programming model.)
- In summary, registers are currently spaced by 4 in the VME (D16) address space, rather than populating all even addresses as normally in VME. If this is unacceptable, address lines would need to be swapped in the JEM, which would require PCB tracking changes. A decision should be reached before the JEM PRR is held.
- A pair of TripleEase ejector handles is needed for the JEM1.2 to act as a template for defining the PCB dimensions, but delivery of these components to Mainz is not expected before Christmas.
- The most recent DAQ software updates have not yet been applied in Mainz.

4. RAL

- 65 production TCPP modules are due at RAL on schedule on 9th December. They will be tested using the Birmingham JTAG Test Module, with the help of Richard Matson at RAL, and will then be shipped to CERN for installation in USA15. Appropriate labels will be needed before they can be taken underground.
- 30 TTCdec cards are due at RAL on schedule next week.
- Two pre-production CMMs were due at RAL on 5th December, but this delivery is now delayed due to the System ACE chips not arriving in time. They are now due on the 12th December.
- Two RODs had been due for delivery to RAL on 20th December but this will probably not happen as the PCB company has had problems with board manufacture. Eight boards were manufactured but all failed the bare board test. Their request to add ground fill (small square Cu pads) to the inner layers to protect the tracks from over-etching has been approved.
- The changes to the VMM design recommended by the internal Review have been carried out. The right-angle male J0 connector has still to be put into the Parts Library. Hopefully, the design will go out for production next week – two pre-production modules followed by eleven production modules will be manufactured.
- The design changes to the TCM have not yet been completed.
- Viraj added a general comment on the PCB manufacturing problems. There have been problems with PCBs from two different companies, which may well be due to changes in the base material. One of the companies noted that the changing the laminate material to comply with the EU Pb-free Directive was the cause of the problem, but this has not yet been confirmed by the second company. The CPM is not the only module presenting PCB problems relating to board thickness, as a different project has

had seven loaded boards returned to have 0.2mm milled off the PCB edges. The assembly company had not observed that they were outside specification before beginning component loading.

- Bruce commented that the holding items on further dedicated test weeks at RAL were the CMM Jet firmware and the ROD Switch firmware are finished and working correctly. The consequence would be a delay to the ROD Final Design Review.
- Murrough asked if a ROD could be taken to CERN for use at low rates in combined detector runs, but this should not happen until after the third and fourth RODs have been delivered to RAL. Also, Bruce felt that the current problems are probably too severe for the module to be immediately useful in that environment.

5. Stockholm

- Eric requested that the documentation of the Jet firmware should be brought up-to-date before the JEM PRR was held, and Attila agreed that he and Sam would do this together.
- Attila suggested setting-up remotely a short high-statistics run to exercise the Jet algorithm before the JEM PRR. Only local inputs would be needed so a single JEM1.2 module in Mainz would be sufficient. Attila and Uli agreed to discuss this off-line.

6. CERN

- All trigger cables from TileCal Sector 13 now have connectors, and the first basic connectivity tests using a loop-back technique have been started. Further tests will then be made using extension cables to take the signals down to the TileCal electronics on level-1 of USA15.
- We may be able to look at test signals from one or two TileCal drawers by the end of this week, and there will probably be a set of four drawers available next week. However, this still depends on their getting the control boards for their power supplies, of which they only have four prototypes which are in use for testing the production power supplies. They expect first to prepare the C side, which is where our fully-functional PPr crate is installed.
- LAr test signals are now available, but the new longer TTC fibre has still to be laid, and a suitable attenuator re-acquired.
- Two new PCs for Bat 3150 have been ordered.
- Cabling work may require that the floor boards under the newly-installed tables be lifted, so we may have to move our PC in USA15 from the floor, either on to the table or into a nearby rack, with screen/keyboard/mouse connections via a little KVM device (of which TC have a few spares).
- After several trial and error iterations, the TDAQ sysadmins have sorted out booting and configuring of the VP315 CPUs.
- The second Preprocessor crate refuses to remain powered up, after showing CAN-related error warnings, although it had been working correctly during the previous week.
- A cleaning contract has been signed for the cavern and USA15. The floors in USA15 will be wet cleaned every Thursday and bins will be provided and emptied. So we (and others) will need to keep the floors clear of junk at least one day a week. Unfortunately this contract does not (yet) extend to Bat 3150.
- Assembly of the analogue cable connectors has been proceeding very slowly and is well behind the planned schedule. The Kosice technicians have now started to assemble connectors on to the long LAr calorimeter cables in USA15, and so will probably have little time for our cable work.

  Subject to final confirmation from Saclay, it has been decided to change from soldered to crimped connections to accelerate the assembly process.

  In order to further accelerate the cabling assembly/installation programme, an on-site cabling company at CERN has been approached for a quotation to take over some substantial fraction of the

connector assembly work. This would free up our three technicians for the more demanding job of measuring, cutting, labelling and installing the short cables in USA15. If the connector assembly company can maintain a throughput of >100 connectors per month, and if this can be matched by the cable preparation and installation, then the total cabling installation could possibly be completed by September/October 2006. A higher rate would be even better… We are now awaiting a quotation.

Next Phone Conference – Thursday 22nd December 2005 at 11:00 *(UK)*, 12:00 *(Germany, Sweden)*

Tony Gillman