

ATLAS Level-1 Calorimeter Trigger
Hardware Progress Meeting – 31st July 2001

Minutes

Present: Bruce Barnett, Ian Brawn, Eric Eisenhandler, Norman Gee, Tony Gillman, Bob Hatley, Gilles Mahout, Viraj Perera

A) Status reports:

1. CP FPGA, GTM

Viraj reported that the two new GTMs have been successfully assembled and JTAG tested, and the first module has now been delivered to CMS. VME tests on the second module (for ATLAS) have just started.

This module will be used by James to test the algorithm firmware for the CP chip in real-time, by driving it with from the XCV600 FPGA running the Serialiser firmware.

Appropriate test vectors are needed from Steve Hillier.

Viraj added that the re-work trials at Cemgraph on the old faulty GTM will proceed once suitable test firmware has been generated to run in one of the FPGAs on the board.

2. TCM/ALC, VMM, Crate PSUs

Bob reported that the PSU for the 9U Demonstrator crate, which is being used for the TCM/ALC tests, has failed. It should be replaced, but in the meantime a temporary solution using bench power supplies has been set up.

He also reported that there are three assembled TCM/ALCs, with the first one having been under test for some time.

The TTC section all works correctly, but should still be checked with a front-panel cable link to a DSS-based TTCrx to check the integrity of the PECL TTC signals.

The CANbus section also works as far as can be checked, with test code from Dave Mills' loaded and running successfully in the Fujitsu microcontroller. The next stage will be to transmit, receive and decode real data packets over the CANbus, possibly by using a pair of TCMs linked by a cable in place of the backplane.

The CPLDs can now be loaded successfully in series.

The VME section still needs to be thoroughly tested.

For the VMM, the pcbs are expected back at RAL on 2bd August 2001, following which they will go back out for assembly. The test procedure for the complete modules is still undefined, but will probably involve the use of a TCM as a slave module in the 9U Demonstrator crate.

This would be connected to the VMEbus via a second VME to VME-- cable assembly (Bob has already made the first such assembly), with the Concurrent Technologies CPU writing/reading through the address space of its dual-port RAM.

The first power supply unit for the new 9U crates from Stockholm University is now complete and fully tested, with the next three units awaiting assembly at Birmingham University. Gilles will take the completed unit to Birmingham after the meeting to act as a model.

As this was Bob's last meeting (he will retire on August 1st), Tony thanked him for successfully completing almost all the large number of hardware items for which he had been responsible over the last year or more.

3. ROD test programme

Bruce reported that he will return to the ROD tests imminently, using one of the three new Concurrent Technologies CPUs. All of these are now working, currently booting over the network in disk-less mode, and a second system will be installed at Birmingham University.

4. CPM

Gilles reported that the design will move to the RAL Drawing Office (Darren Ballard) for layout on ~1st August 2001. The first stage will be to generate a net-list for him and Richard to sign off (Richard will now be in Birmingham until mid-August). The new symbol for the BG560 CP chip package, which is urgently needed, is already in the library (*but produces "fatal error" when accessed – news following the meeting - to be followed up*).

Norman reminded us the experience of the ROD integration tests at CERN had led to a list of recommendations to be observed for all future board designs, which we must ensure are followed for the CPM. For example, the recommendation to add Cu corner fiducials to all fine-pitch BGA packages will entail some re-design of the library package outlines.

We should ensure that Chris Day in the Drawing Office consults closely with Cemgraph at Newbury during the CPM (and CMM) layout phase, so that we optimise the yield for board assembly and re-work.

We will also supply Cemgraph with an old 9U CPM demonstrator, which can have some of the 0.8mm pitch Serialising ASIC QFP packages re-worked a few times to give the company some experience of handling 9U boards.

5. CMM

Ian reported that the design is now in the Drawing Office for layout – no problems reported as yet! As for the CPM, the list of recommendations to be observed for all future board designs must be observed for the CMM.

Norman will e-mail Ralf Spiwoks with our decision to use the SCSI-3 connectors for the CMM and associated transition cards.

B) Discussion topics:

1. G-link purchase

Eric reminded us that we have not yet ordered the G-link chips, which we agreed at the Mainz Joint Meeting we would go ahead with. Tony offered to push this forward, starting by getting price quotes in the UK and from our colleagues in Germany and Sweden.

2. VHDL code maintenance

Gilles had been discussing with Ian how we might best archive and maintain our growing volume of FPGA firmware. His suggestion was to make use of the CVS repository at RAL, and it was agreed that for maximum usefulness at a later date we should store each version of the code in all possible variants – graphical source code (Leonardo/Renoir), VHDL and also the compiled binary files.

For the schematics and layout files, ID already have a well-established archiving system, with route cards recording version changes. There remains the question of ensuring we correctly track hardware and firmware version upgrades.

3. Risk Management for the calorimeter trigger

Tony outlined how a recent seminar on project risk management had highlighted the need to assess our project for areas of vulnerability – “showstoppers” – which could severely prejudice its success. He gave as examples the possible obsolescence of the G-links, around which much of our architecture is currently based, the technical difficulties of assembly/rework of fine-pitch BGAs on 9U boards and the dangers of losing key staff without adequate back-ups in place. We should be looking at ways of circumventing such problems.

A lengthy discussion followed, looking at potential examples in the CP and other sub-systems, and it was generally felt that in most areas adequate fall-back solutions were available. It was suggested that it may be useful to continue the discussion at the next Joint Meeting at RAL in November, when informed comments from other sub-systems would be available.

4. AOB

Bruce enquired about the status of the 9U crate procurement at CERN for the level-1 calorimeter trigger. Tony noted that in April 2000 he had supplied Chris Parkman with full information about our requirements, which had been accurately transcribed to the web database, so no further corrections were needed.

Next meeting – ~September 2001 (*date to be announced*)