Minutes of the T2-UK meeting at UCL

16th March 1994

Present : Fred Wickens
Frank Harris
John Strong
Bob Cranfield
Barry Green
Gordon Crone
Robin Middleton

1 Minutes of the Previous Meeting at RHBNC

No comments were received on the minutes of the previous meeting.

2 Review of actions arising from previous meeting

2.1 Measurements sub-group

Subgroup to define what to measure / study had not met. A meeting was fixed for Tuesday 22nd March at RHBNC starting at 10:45 and principally concerning JS, GJC & RM.

2.2 Beam Tests Specification Document

A final specification of what we are trying to do for the test beam this year has not yet been produced. It was decided to produce two documents.

The first is a short formal text directed at giving a basic overview of what we're trying to achieve this year in beam and lab tests and how we intend to achieve this. 1 page per institute / activity should be sent to RM, before the meeting at RHBNC on 22nd March.

The second will be a collation of papers, figures, etc. giving a detailed specification of parts of the system, how they should work and the interfaces between parts. This second document will be organised in separate sections, each edited by the experts from a particular area and subject to updates as the project proceeds. When updates occur they should be advertised via the mail reflector. This document will form a reference for all involved in the project.

Input for both the above documents should be in flat ASCII for text and postscript (as prepared by IDRAW) fro graphics.

It was agreed that the document archive at RAL should be used to store all documents produced. Files should not be world access, since they sometimes contain information which is either commercial or financial in nature. Rather, accounts should be provided for T2UK members to access and update documents. RM is to sort out the details of how this should work in practise.

2.3 Test Gear

No test gear requests or offers had so far been received.

2.4 Table of Detailed Responsibilities

Error reporting, run control, histograms, monitoring, status and communications (see section 3.1)

2.4.1 Data Input & Pre-processing

JS reported that it seems likely that Cracow (also involved in RD6) will undertake the work, although the UK may have to make a financial contribution. ZH will be at CERN on 25th March and JS will attempt to make contact and establish the current situation.

The interface would consist of 2 cards; the first would connect to the RIB and take the signals after HIPPI destination and convert them to ECL for transmission from RD6 racks to T2 racks. At the latter location ECL would be converted to TTL on a second card (this time in VME) and output (32 bits wide) would go to the T2B input FIFO. Two of each of the boards is required to feed the two planned T2Bs.

2.4.2 RoI Generation

RoI will not be available from RD6 and so must be "invented" within T2 for the 1994 tests.

2.4.3 Trigger Input

JS will find out from Cracow folk who best to talk to in RD6 to understand this area. It is likely that H/W may need to be built for this. Event, burst and run numbers all need to be passed, in addition to a trigger; as do start-of-burst (SOB) and end-of-burst (EOB).

2.4.4 Simulation

FH reported that Stephen Hunt (SH) had a model in MODSIM of a T2B and a link unit along with a graphical interface. At present SH is busy with course work until after Easter; after which he will be full time on simulation studies. Around June/July SH may move to CERN until the end of ’94 or beyond. SH will try to use DSL from Ralf Spiwoks and should also contact Krysz Korcyl (KK) who has developed a C40 model. FH is interested in more formal specification of what should be simulated.

2.4.5 Alpha processors

It has been decided to proceed with EB66 boards as the best option. The discount structure has been communicated to Bytech Systems (the supplier) from DEC based on the RAL/Manc/DEC joint project agreements and extensions. This was being finalised and a quote is expected for 16th March. 2 boards will be ordered for immediate delivery (expected in 4 to 6 weeks) and 2 boards for delivery in June.

Choice of operating system is still problematic in that DEC still do not yet have a formal commitment to VxWorks for Alpha (formerly DECelx !) on any of the boards that had been serious options. If VxWorks on the EB66 does not become available on a reasonable timescale, two further options remain :-

- to do the porting ourselves (using the DEC porting pack), or
- use the GNU cross development environment supplied with the EB66.

The latter is supported by remote symbolic debugging from download host but would mean the loss of multitasking. RM to explore what support libraries are available for the second option. BG expressed concerns over rumours of the high cost of VxWorks (RAL to check this out).

2.4.6 C40/SCI :- see later

2.4.7 Contact with RD3

FJW had tried to contact Jacques Colas, but had so far failed. JS will give Jacques LAPP/Annecy phone number to FJW.

2.4.8 Data Routing Sub-group

The sub-group had not yet met. It was agreed that the RoI/T box set-up much of the routing. Subgroup agreed to meet at RHBNC on 22nd March at 2pm..

3 Reports from Meetings

3.1 S/W meeting at UCL (3rd March)

RC summarised the meeting. Documents on software modules for use in the global area (from REHJ) and thoughts on local modules (GJC) were used as input to the meeting. Discussion focused on the following areas :-

- Data acquisition from local and global sectors
- Error reporting and status
- Run control
- Monitoring techniques
- Communications (primarily ethernet)

The following conclusions were reached :-

- Keep main processing elements as simple and free from extraneous code as possible :-
    - avoid message passing in the primary C40 chain
    - no use of C40 ports for more than one function
    - Alpha SCI handler and trigger algorithm kept separate from other code (e.g. monitoring)

- Communication between OS9 and Alpha workstation is via ethernet; 2nd private ethernet between Alpha workstation and EB66 boards (to avoid network pollution reaching time critical parts).
- Errors and status information are sent to OS9 via the C40 LIA (Link Interface Adapter).
- Errors on OS9 and Alpha workstation will use EMU (Error Message Utility) with an X based display on the Alpha W/S.
- DAQ will be based on Spider as modified by GJC (similar to Gas Microstrip set-up). Local data will be recorded through the C40/SCI interface which has VME mastership). Global data routed through SCI to VME (via an interface of choice) for recording.
- Run control will be via the RoI/T for LLVL2 and via the Alpha workstation for GLVL2.
- Monitoring of LLVL2 will be done in histograms under OS9.
- Status information will be stored in NDB under OS9 and OSF/1.
- Timing information will be added to data packets at each C40.

A discussion followed, the following points emerged :-

- GJC reported he had successfully generated EMU messages in the C40 world and read them under OS9.
- RHBNC have ordered a VME prototyping board from Radstone for use with signal handling (e.g. Start-Of-Burst (SOB), End-Of-Burst (EOB), etc.).
- UCL have agreed to investigate loading and starting of C40's from OS9
- We will NOT try to run all C40's from a single clock (nice for timing measurements, but difficult to implement !).
- BG will look into data enable / disable functions before the T2Bs

Two options were proposed for transmission of data through the local system :-

- store data in T2B during burst and then read out through the T2B system; when T2B becomes full, turn off further triggers at RoI/T box
- pass all data through during burst

The first solution has the advantage that more realistic conditions persist during burst (the perios over which measurements are made). No conclusion was reached, but UCL promised to work on it.

3.2 T2 simulation meeting at RAL (10th March)

FH reported on a simulation meeting of the previous week. The scene had been set by the need to produce results in good time as input to the technical proposal. A meeting had been set up at CERN by Nick Ellis (NNE) for the 25th March to lay out a programme of work for the technical proposal. JS summarised a "generic ATLAS model" covering the environment around both T2 and T3 systems and suggested it could provide a framework when used in conjuction with input parameters and datasets. In this way it was hoped to establish a "level playing field" for contrasting various solutions.

Manpower issues were covered and it was stated that we should not be diverted from our original goal of simulating our test setup and extrapolations to full LHC. In so much as this may provide a general framework, our participation in a bigger scheme could go ahead.

3.3 GLVL2 meeting at Manchester (11th March)

FJW commented on a meeting of the previous week on global T2 issues. Agreement had been reached on how to proceed with the C40/SCI interface ("bricolage"). The interface would consist of a DBV42 with a transition board (similar to the in use on the T2B) to a wire-wrap board (produced by Manc) and hence to the SCI daughter card. JS & BG were concerned about the suggestion that wire-wrap 96-way DIN connectors used to connect the boards together might well damage sockets and lead to un-reliable connections after a time. BG highlighted the problems of placing the 96-pin DIN on the transition board because of clashes with the TIM site or expanded global memory.

RHBNC are to define the transition board connector signals and RAL will check that the DBV42 allows for an external ready signal.

RPM had agreed to try to define a standard set of SCI calls for use in all interfaces.

A discussion on what algorithm to run in GLVL2 had concluded that a re-run of the feature extraction code would be most fruitfull. A final decision on this can be postponed to the July integration tests.

3.4 Atlas Test Beam DAQ meeting at CERN (14th March)

RPM reported on a meeting at CERN (organised by Chris Bee) to review requirements and solutions for a DAQ system for the Atlas test beam. Whilst no one had attended in person, FJW had sent a response to a questionnaire and RPM had maintained contact with Chris by email. The preliminary conclusions were that a number of work groups on :-

- H/W interface (trigger / busy logic etc.)
- S/W interface (buffer management etc.)
- Calibration proceedures
- Run control
- Monitoring

are to report back to a meeting at CERN during the week of 11th April, so that results can be summarised in time for the Trigger/DAQ meeting during Atlas week.

4 Status / Problems / News

4.1 T2B

Some problems (now circumvented) have been un-earthed on the T2B. They result from mis-leading manufacturer documentation which evolved between versions. The end result is that the existing T2B can run at a maximum of 29 MHz (design is 40 MHz) and page size has been reduced to 1/2 kbyte (instead of 1 kbyte). This has the adverse effect that not only is the buffer management software in the C40 running at 29 MHz instead of 40 MHz, but also it is having to allocate twice as many pages for a given event size.

During the next month BG will undertake studies to improve on this situation (which would lead to a new PCB). For example, whether it is possible to de-couple the clocks of the memory and the C40 (so that the memory runs at 29MHz and the C40 at 40MHz). At the end of this period a decision will be taken whether to produce two boards according to the modified design or produce one more board with the existing design. The project to place a C40 directly on a VME card has been postponed for the time being, since the present design appears to be adequate for the tests this year.

The core of the buffer manager code exists and has been exercised on a C40 with two adjacent C40s simulating the H/W environment within which it is intended to work. At present, using optimised C code on a 40 MHz C40, UCL have run it at half the required speed. RC was a bit gloomy about performance improvements, but other tests at NIKHEF and elsewhere have shown significant gains from re-coding in assembler (e.g. up to a factor of 10).

4.2 Alpha / SCI

In addition to the reports above (under actions), it was reported that the RIO (necessary for the SCI - Turbochannel interface for the Alpha workstation) had arrived and been commissioned. Work was about to commence on downloading software from the Alpha.

The RD24 wire wrap board is moving forward. Bob Hatley spent a day at CERN last week with Jan Buytaert and people from INFN Roma. It was agreed that the SCI part of the board was incompletely specified and Jan would undertake to rectify this. The Roma people would then re-do the complete schematics and wire wrap list and forward a copy to RAL. Bob is now happy to proceed with parts of the wire wrap, the remainder will remain pending the completion of the updated design information from Roma.

5 Admin.

5.1 Timescales

An updated timescales chart was distributed and immediately updated ! The end result is attached to these minutes. Of note were :-

- The realistic estimates of SCI deliveries from Manchester which imply last parts become available only in July.
- Adjustment of integration time at RAL to take account of this.
- The T2 DAQ OS9 system is delayed a few weeks until the end of March
- A point should be set at which a decision between VxWorks and the GNU based, single-task environment should be made.

5.2 Budget

FJW reported that only 10k pounds spent so far (DVB44 for UCL) plus some small but unknown expenditure on components at Manchester. FJW will request an update on small scale expenditure to date from all institutes. It was noted that a CERN stores account and cards should be set up in good time for the tests (probably with 2 cards).

5.3 Test Beam Travel Budget

It has been suggested that test beam travel should be per activity rather than per institute. To that end FJW suggested that we should bid for 15k pounds for the coming tests. This figure is based on experience gained by RD groups in previous years mounting similar scale tests.

5.4 Test gear, etc.

Postponed to meeting at RHBNC on 22nd owing to lack of time. Discussion will include both infrastructure (e.g. crates, etc.) as well as test gear requirements and offers.

6 AOB

Dropped owing to lack of time !

7 Future meetings

- Next meeting remains fixed for 13th April at RAL.
- Following meeting at Manchester on 11th May.
- Measurements, data routing & equipment lists at RHBNC - 22nd March
- T2 activities for technical proposal - 25th March at CERN

8 Summary of Actions

- Sub-group to discuss measurements and monitoring **Action: JS,GJC,RC,RPM**
- Sub-group to discuss data routing **Action: JS,GJC,RC,FJW,RPM**
- Decide best way to read out raw data **Action: UCL**
- Investigate load and start of C40s from OS9 **Action: UCL**
- Define transition board connector signals for SCI/C40 i/f **Action: RHBNC**
- Look into data enable / disable in front of T2Bs **Action: BG**
- Check if DBV42 allows for external RDY signal **Action: RAL**
- Sort out management of T2 document archive at RAL **Action: RPM**
- Send copy of document on LLVL2 software to RPM **Action: GJC**
- Find out latest status from Cracow on data/trigger input to T2 **Action: JS**
- Find out what libraries accompany the GNU environment for the EB66 **Action: RPM**
- Find out the cost of VxWorks (under DEC Campus) **Action: RAL**
- Circulate our response to Chris Bee's questionaire **Action: FJW**
- Tell FJW how much spent so far of PPESP money **Action: MANC**

- File bid of 15k pounds with PRN for test beam travel **Action: FJW**
- Give phone number of Jacques Colas to FJW **Action: JS**