JRA3 DAQ system status

Milestone : DAQ system available

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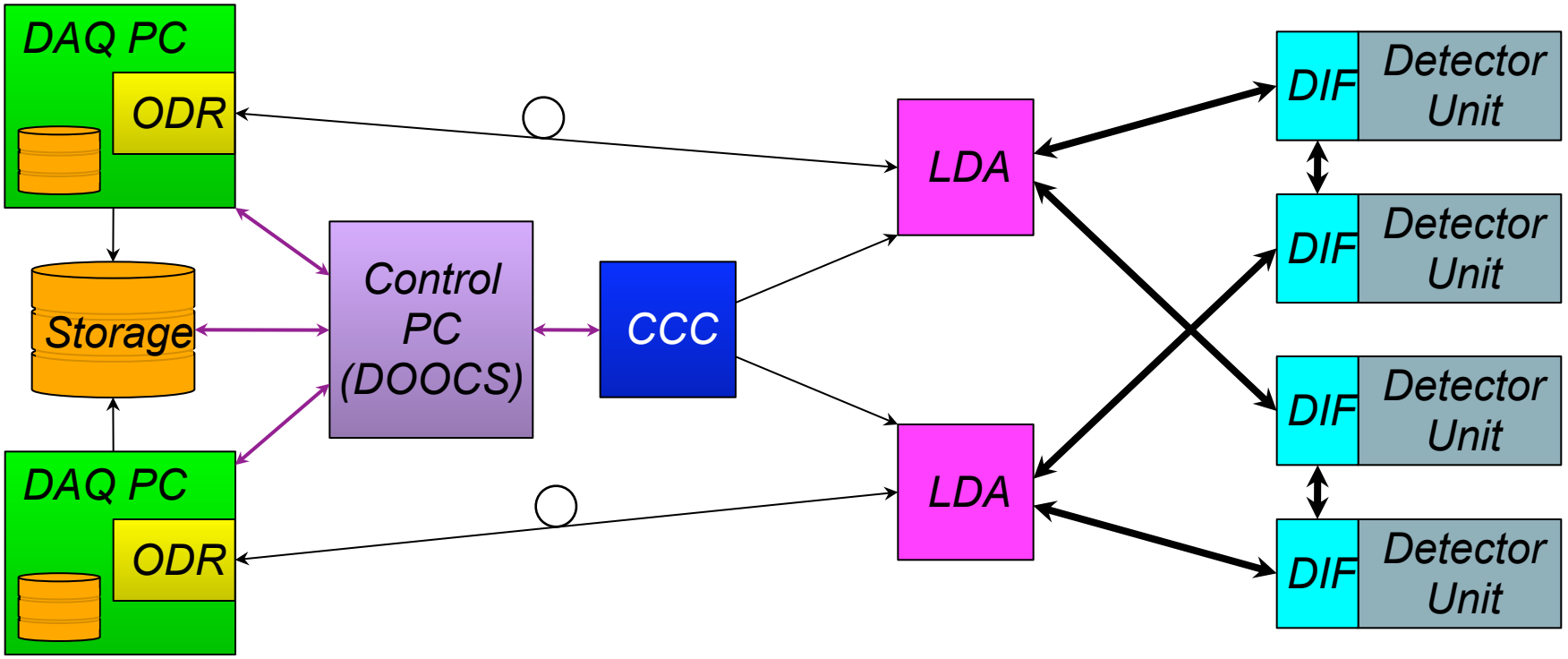
Outline

- System overview
- Previous milestone : DAQ system prototype available (Month 33, Sep/2008)
- Recent progress
- Numbers of each component and availability
- Milestone achieved ?

DAQ system overview

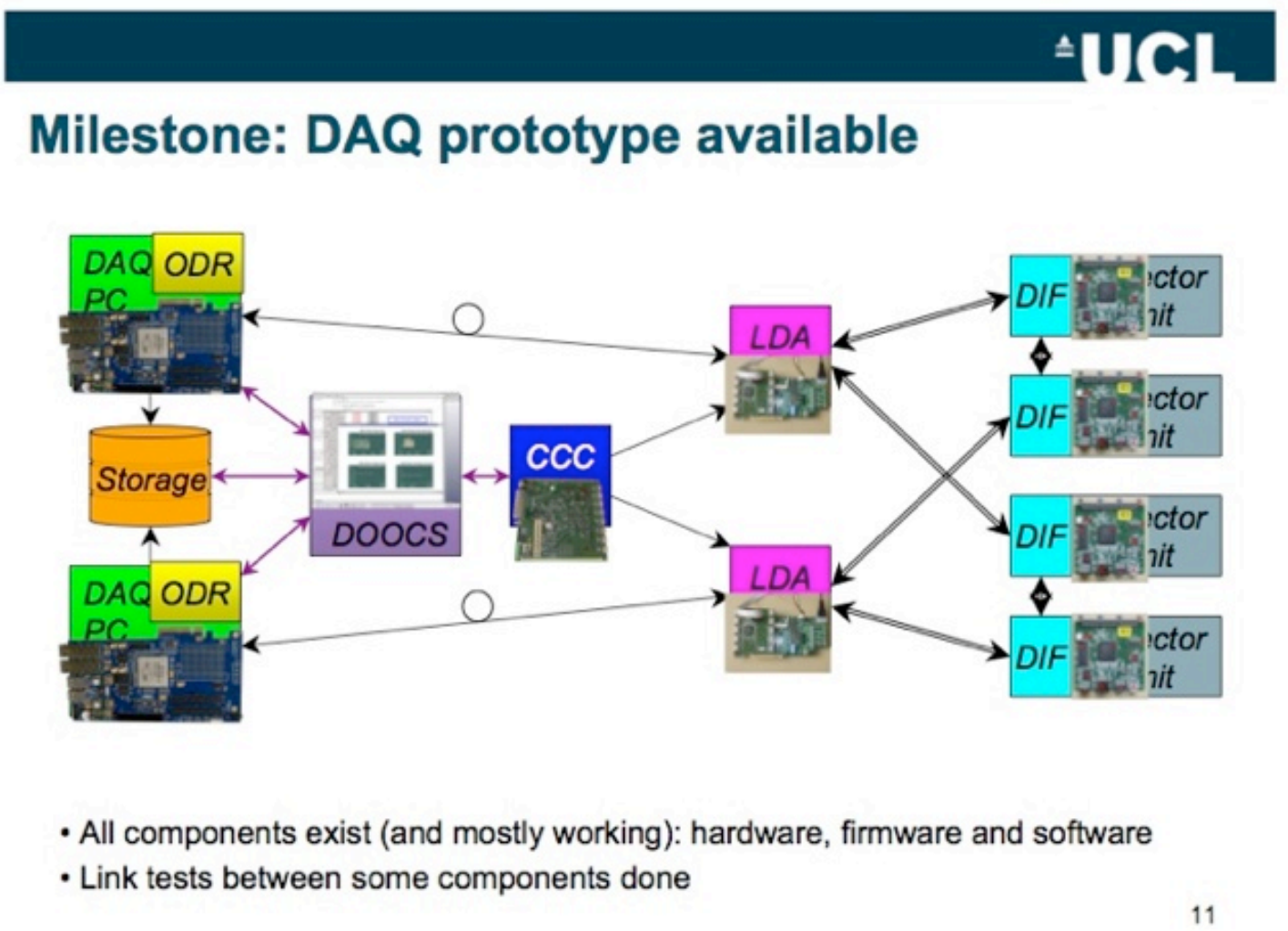
(**Detector Unit**: ASICs)
DIF: Detector InterFace connects generic DAQ and services
LDA: Link/Data Aggregator fansout/in DIFs and drives links to ODR

ODR: Off-Detector Receiver is PC interface
CCC: Clock and Control Card fans out to ODRs (or LDAs)
Control PC: Using DOOCS



Previous milestone

DAQ system prototype available (Month 33, Sep/2008)



Summary of recent progress

Have been concentrating on :

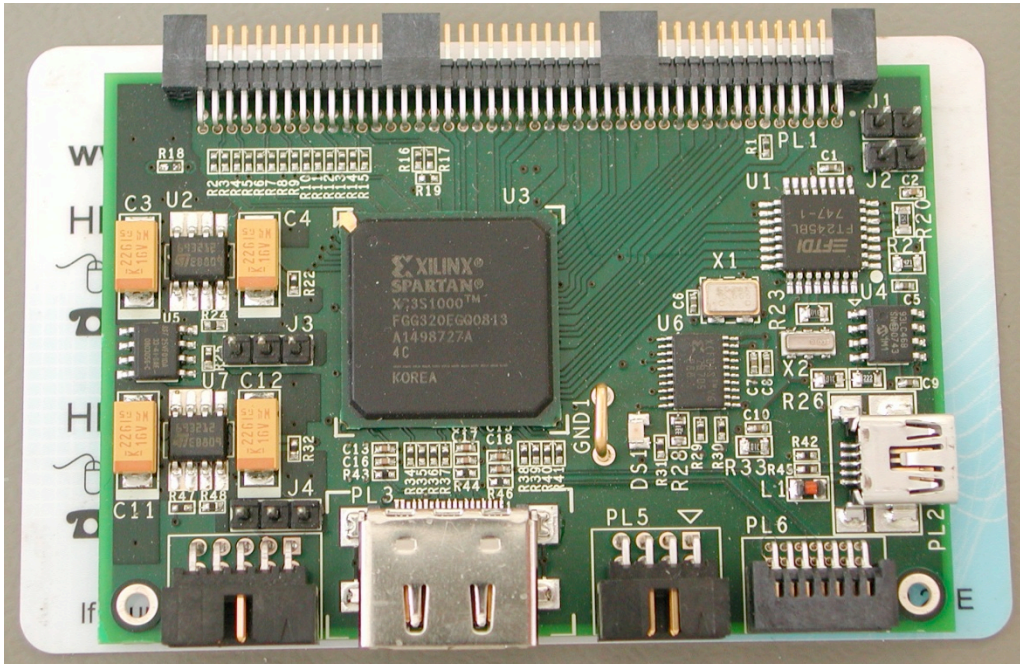
- final hardware tweaks and production versions of relevant components;
- hardware orders to have enough systems available for lab and beam tests;
- having the system available for detector groups;
- acting on feedback from detector groups;
- firmware improvements and finalisation;
- DAQ component integration and link tests;
- further addition of documentation put on the CALICE twiki.

ECAL DIF

The ECAL DIF is being developed by the Cambridge group :

- AHCAL and DHCAL DIFs developed by other groups, but all within the DIF task force;
- involves board design and manufacture and firmware development.
- produced a prototype board which worked well, in use at LLR. Have reduced number of components, whilst maintaining functionality (e.g. FPGA).
- two DIFs have been produced and tested.

- Will produce full run of 40 ECAL DIFs —all PCBs and components in-house.
- Stable version of firmware for DAQ tests. (Updated according to proposed data format within the DIF task force).
- Link tests, DIF ⇔ LDA, ongoing.

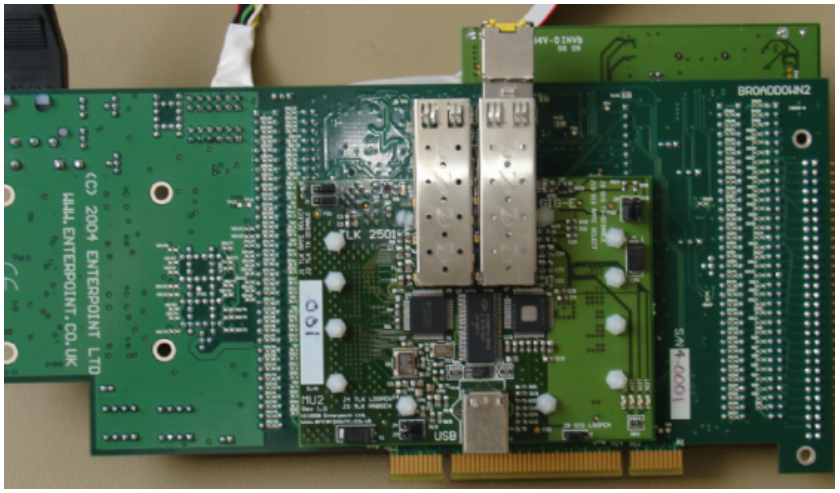


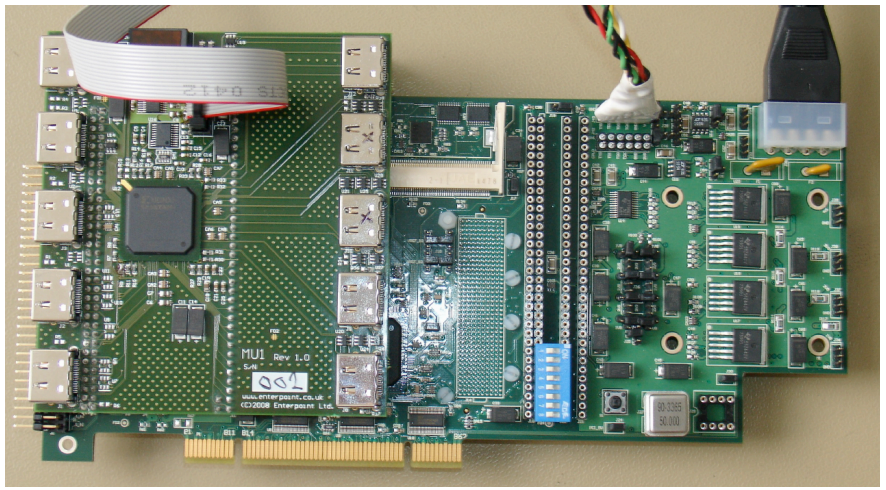
LDA

Recall the LDA hardware, from Enterpoint, consists of :

- a (Broaddown2 → Mulldonoch2) baseboard (have 20 in-house);
- an add-on HDMI board to connect to 10 DIFs (have 5 in-house with 20 being manufactured);
- an add-on ethernet board to connect to an ODR (have 5 in-house with 20 being manufactured).

So this is an example of commercially-available, off-the-shelf equipment ... all of which needed some corrections/additions/modifications from ourselves...

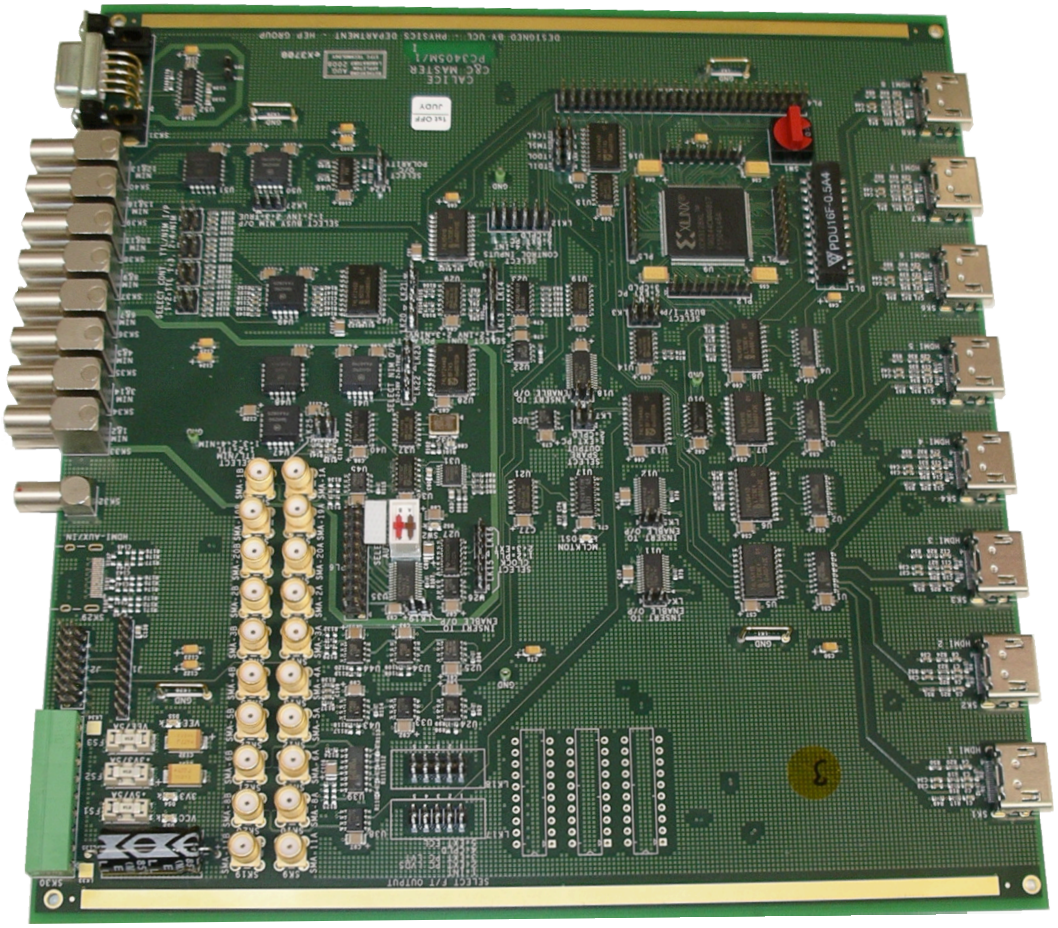




- Firmware “complete” and stable.
- One complete LDA is in LLR
- Link LDA ⇔ ODR has been tested and works.

CCC

- After building and testing two prototypes, had a further eight manufactured which have all been tested.
- Now have six CCCs all boxed up with power supplies, etc.
- One is in use at LLR.
- Extensive documentation and manual being twiki'ed.
- Available for use by detector groups.



ODR and DAQ PC

- Commercial development board bought at the beginning of project with firmware development since.
- System has generally been stable for a while : firmware written, linked to DOOCS, (now) talks to an LDA.
- Have eight boards with one in LLR.
- Have six DAQ PCs with one in LLR.

Software

Started development using DOOCS software :

- Performed by V. Bartsch (UCL) and T. Wu (RHUL).
- Interfaces to ODR, C&C, setting up database, state manafer, etc..
- They have both now left and we (in the UK) will not be able to provide support over a long time period.
- Have transferred responsibility to D. Decotigny (LLR) for development and support for the full programme of beam tests in the future.
- We (UCL) will still be able to provide some development within the EUDET programme.
- We see this as being outside the EUDET milestones—this will only be ready once we are in a test beam.

Hardware numbers needed

Detectors' requirements :

- ECAL : 30 layers ⇒ 30 DIFs, 3 LDAs, 1 ODR and DAQ PC, 1 CCC
- AHCAL : 48 layers ⇒ (48 DIFs), 5 LDAs, 2 ODRs and 1 DAQ PC, 1 CCC
- DHCAL : 40 layers ⇒ (120 DIFs, 14 DCCs), 2 LDAs, 1 ODR and DAQ PC, 1 CCC

So we have to provide :

- 30 ECAL DIFs, 10 LDAs, 4 ODRs, 3 DAQ PCs, 3 CCCs;
- sufficient spares for test-beam running;
- additional systems for tests in labs.

Our procurement plan is :

- 40 ECAL DIFs (have 2, components for 40)
- 20 LDAs (have 5, rest being manufactured)
- 8 ODRs and 8 DAQ PCs (have 8 + 6)
- 10 CCCs (have 10)

Summary

Milestone : DAQ system available ?

1. Some number of each final component are in-house.

2. A complete hardware system with firmware is being tested and used in LLR.

3. Should another group require a system, we can provide them with one.

4. Full complement of components is being manufactured and should be in-house soon.

5. Links (between DAQ components) are being established and debugged also in collaboration with detector groups.

Software has started and is certainly not complete. We see this as being something separate as it will be under constant development.

We therefore believe that the above points satisfy the milestone.