DAQ system hardware status

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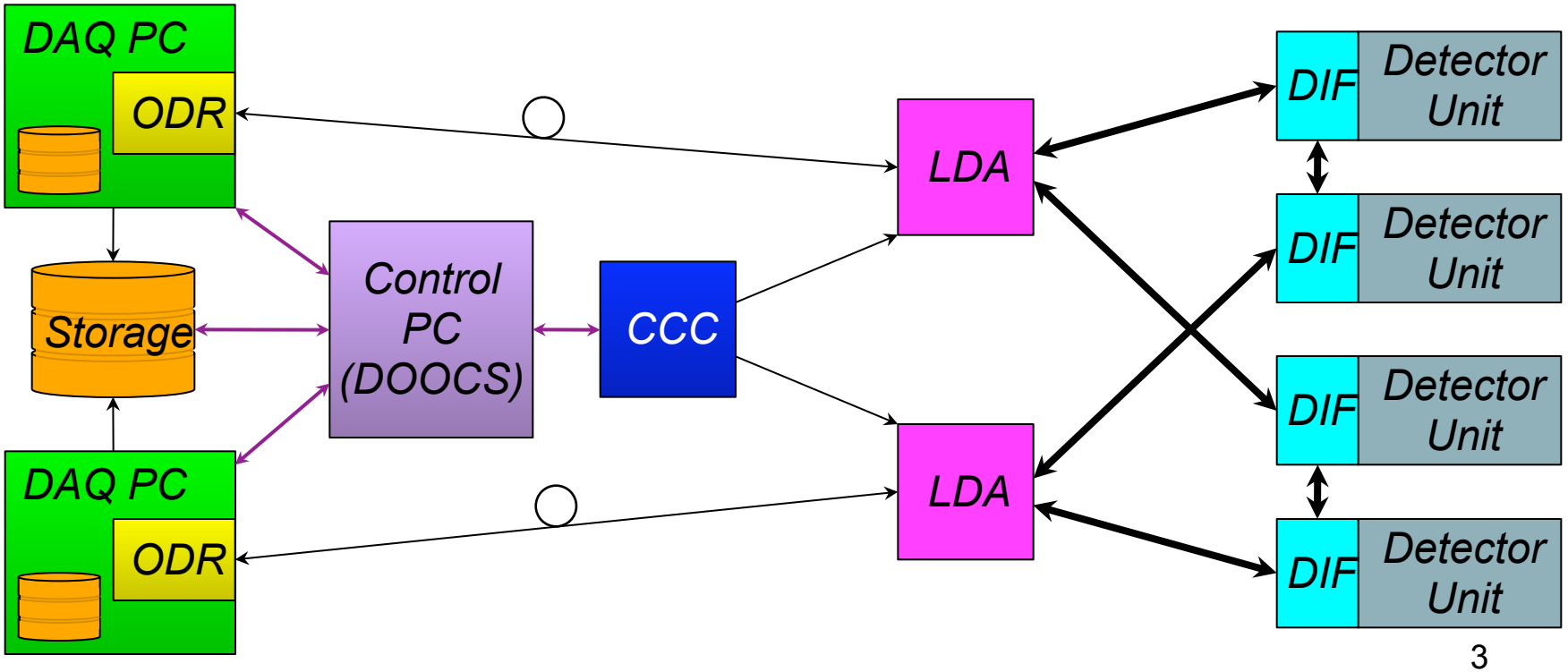
Outline

- System overview and recent progress
- Individual (hardware) component status
- System tests
- Numbers of each component and availability
- Documentation, code repository
- Summary and to dos

DAQ system overview

(**Detector Unit** : ASICs)
DIF : Detector InterFace connects generic DAQ and services
LDA : Link/Data Aggregator fans out/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



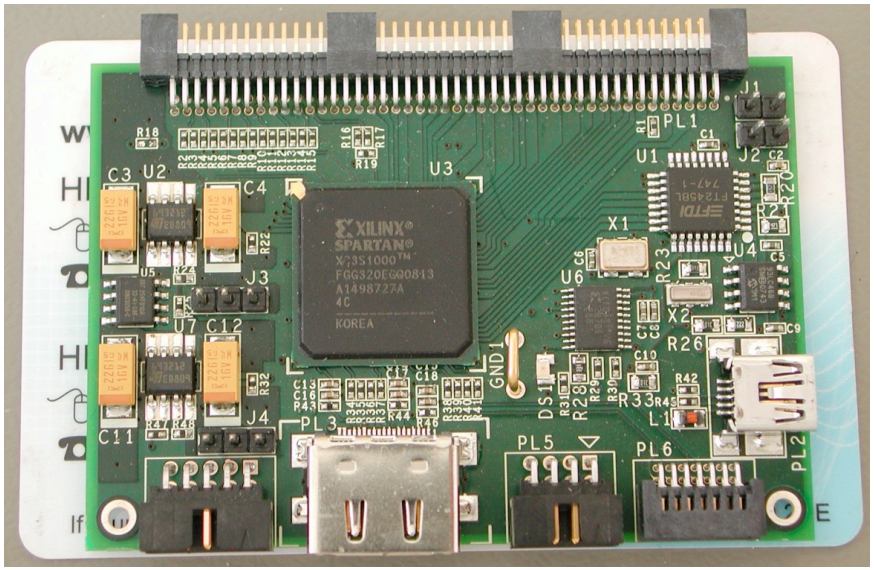
Overall status—progress since Lyon meeting

Have been concentrating on :

- firmware improvements and finalisation for all components;
- hardware orders to have enough systems available for lab and beam tests;
- system tests to get data passed along whole DAQ chain;
- documentation and placing of code in svn repository.

ECAL DIF

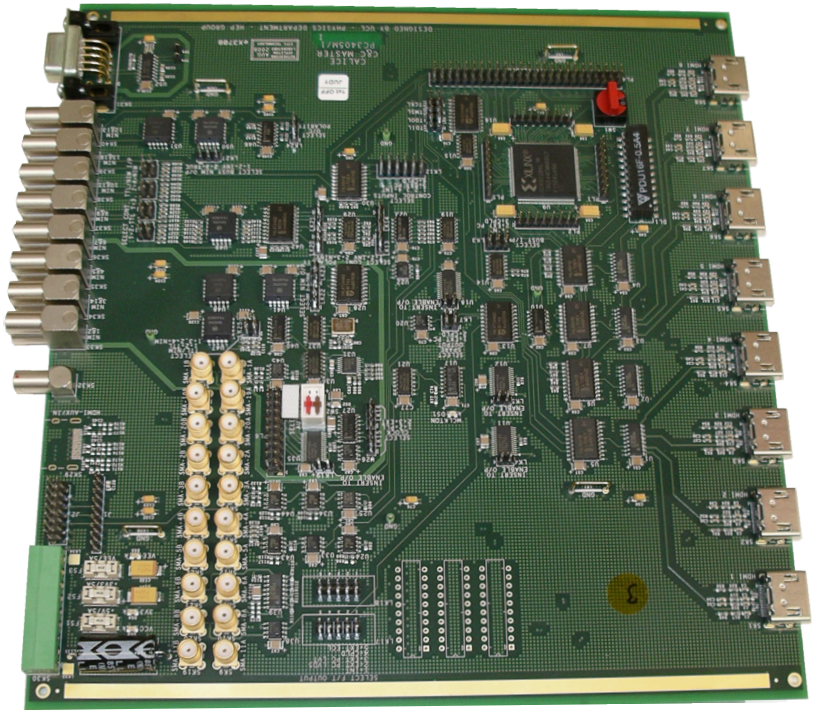
- The ECAL DIF has been developed by the Cambridge group; HCAL DIFs developed by other groups, but all within the DIF task force.
- Produced a prototype board which worked well, in use at LLR.
- For production, have reduced number of components, whilst maintaining functionality.
- 10 new DIFs have been produced and being used in system tests at UCL and also at LLR.
- Waiting on feedback.



- Can then produce full run of 40 ECAL DIFs—all PCBs and components in-house.
- Firmware developed for full DAQ system tests : test firmware to decode fast commands and generate simple test packets.

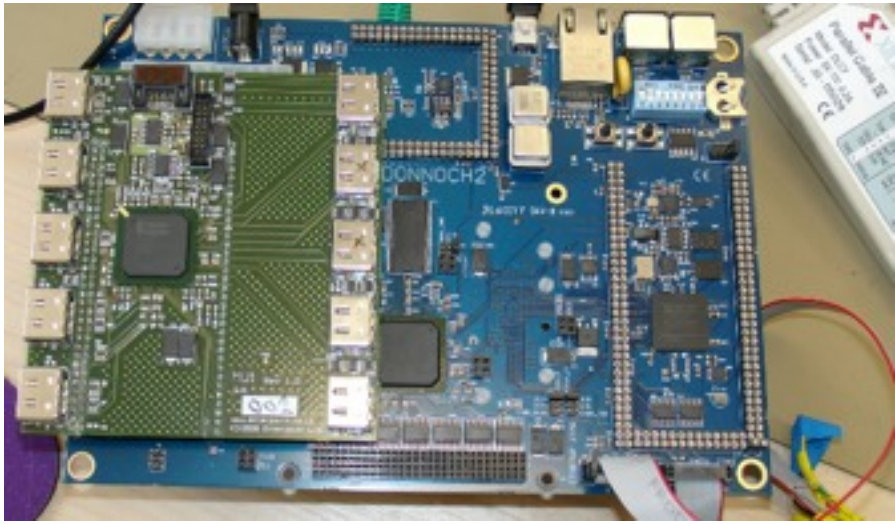
CCC

- Overall status unchanged for a while.
- Fans out clocks, fast commands and control signals.
- Fans in busy.
- Full complement of 10 boards with power supplies tested.
- One in LLR and one in LAPP.
- CCC link to LDA still needs to be done :
  - Board designed and firmware developed for testing;
  - Soon to produce enough boards for all LDAs.



LDA

- The LDA (from Enterpoint) consists of :
  - Mulldonoch2 baseboard;
  - add-on HDMI board to connect to 10 DIFs;
  - an add-on ethernet board to connect to an ODR.
- Firmware development :
  - DIF <=> LDA link running;
  - new code soon to be posted to svn;
  - same format as ODR in svn repository.



- Hardware status—recall all three boards had problems and needed re-design :
  - one complete LDA—baseboard, old Ethernet and HDMI boards in system test;
  - one complete LDA—baseboard, old Ethernet and HDMI boards in LLR;
  - have 20 baseboards in-house; works;
  - have 5 (old) and 15 (new) ethernet boards in-house; just tested one of new boards in system and works;
  - have 5 (old) and 20 (new) HDMI boards in-house; new boards have a new FPGA so firmware needs to be checked.

ODR and DAQ PC

- System has generally been stable for a while.
- Firmware rationalisation :
  - cope with different ODRs, v1 (125 MHz) and v2 (250 MHz);
  - cope with different pinouts on fibre add-ons, v1.0 and v1.1;
  - posted in CERN svn.
  - some improvements to be done, e.g. increased buffering to utilise full capability.
- Have 8 ODRs in-house along with 6 DAQ PCs :
  - one in LLR;
  - three are ready to be shipped to users;

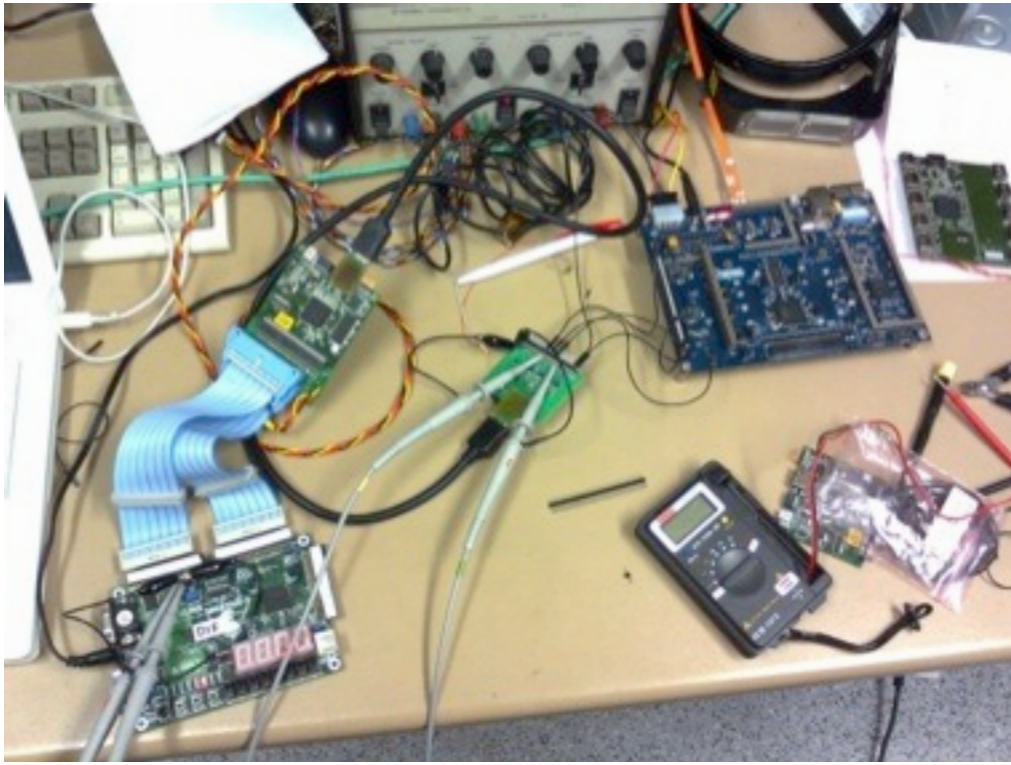
System tests

Have a system set-up in UCL :

- DAQ PC with ODR <=> LDA <=> DIF;
- using wireshark and `scope to check data flow;
- have successfully sent fast commands all the way up to the DIF and received data packets back on the PC—full chain established (this week);

To do :

- multiple DIFs;
- multiple LDAs;
- include CCC.



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

DAQ groups 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.

Summary of status :

- 40 ECAL DIFs (have built 10, components for rest)
- 15+5 LDAs (HDMI test needed; build boards together and test)
- 8 ODRs and 6 DAQ PCs (ready)
- 10 CCCs (ready)

Documentation / repository

- All components *should* have extensive documentation on twiki : it is being updated and as components are basically done, can soon be finalised.
- Twiki main :

  https://twiki.cern.ch/twiki/bin/view/CALICE/CALICEDAQ
- Also list of hardware availability /status started.

  https://twiki.cern.ch/twiki/bin/view/CALICE/HardwareList
- Code being put in CERN svn :

  https://svn.cern.ch/reps/calicedaq/

Summary

- Progress (firmware, purchasing, developing) for all components and overall system.
- We have built up a stock of components which should be sufficient for lab and beam tests. Almost complete.
- As stated before, CALICE-UK no longer exists and we continue our work using EUDET money and (mainly) our spare time. But this cannot go on for too much longer.
- We currently have a working system which the detector groups need to become familiar with very soon.
- Stock of hardware to be delivered to detector groups soon. Who wants what ?

To dos

- Build all DIFs when received feedback (not critical).
- LDA :
  - test new HDMI boards;
  - build CCC connection boards;
  - put systems together, i.e. mount boards and load firmware.
- System tests : multiple DIFs; multiple LDAs; and inclusion of CCC.
- Ensure all work is thoroughly documented on the CALICE wiki and code stored in svn.