ATLAS DAQ/HLT rack DCS

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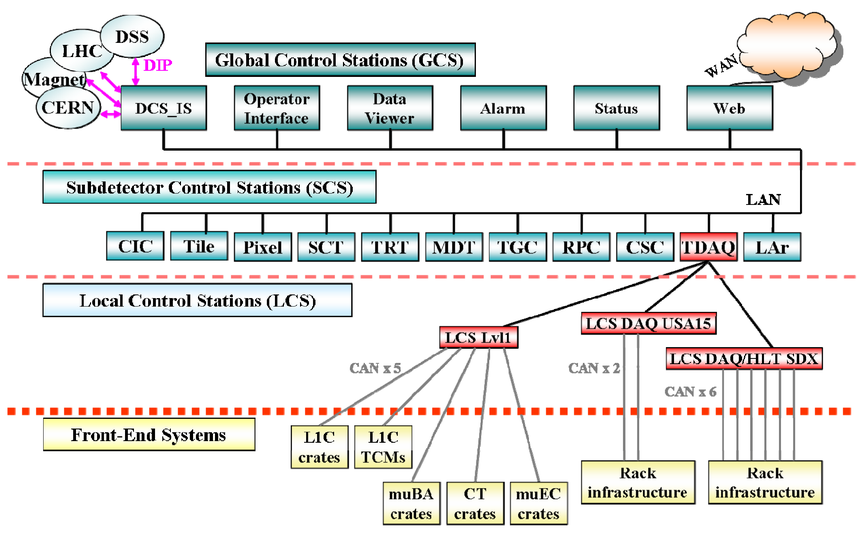
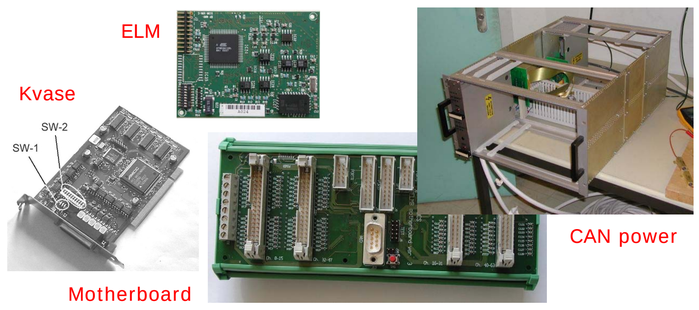
Scope of the DAQ/HLT rack DCS

The DAQ/HLT equipment is housed in 120 racks with horizontal air flow and water air-cooling. The DAQ/HLT rack DCS is similar to the local DCS of detector subsystems – its scope is shown below:



DCS tools for sensor readout

The control and monitoring of the ATLAS experiment infrastructure is provided by Detector Control System. The independent DCS of detector subsystems, based on the hierarchy of the Local Control Stations (LCS) and the Subdetector Control Stations (SCS) are unified by the Global Control Stations (GCS). The central ATLAS DCS group also provides a set of standard tools, used by subsystems to implement their local control systems.



Rack parameters for monitoring

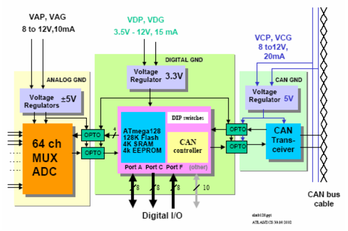
The following parameters will be monitored by the rack DCS inside the racks in USA15 and SDX1 computing rooms:

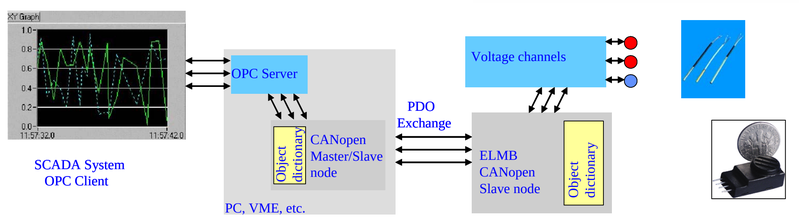
- air temperature – by 3 sensors at the top, middle and bottom inside the rack,
- temperature of the inlet and outlet cooling water pipes of the rack cooler,
- relative humidity (dew point) – by a relative humidity sensor located on the bottom of the rack cooler,
- cooler fans failure (while is not critical for the operation of the equipment in the rack) – provided that a fan status signals are available

In a few racks there is Single Board Computer (SBC) in VME crate which require a remote Reset. This control feature will be also implemented in the rack DCS.

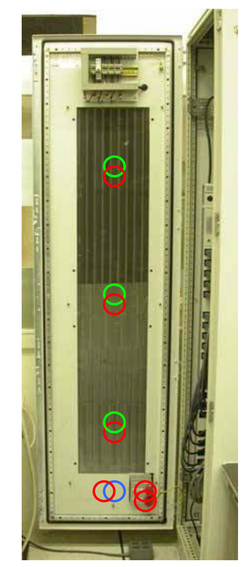
Sensors readout chain

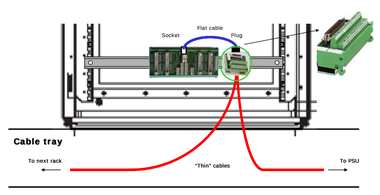
The “standard” DCS toolkit is based on a general-purpose CANbus node with the 64 channel ADC and input/output ports for monitoring and control of detector equipment. It is connected to the LCS with a CANbus interface. The commercial control package (PVSS II) and additional components, developed by CERN Joint Controls Project





All rack sensors (5 temperature, 1 relative humidity and 3 fan rotation) will be located on the rear door of the rack, where the cooler is mounted. The signals from the sensors are routed to the wiring terminal and connected to one of four available ELMB connectors. One ELMB is used for 3 neighboring racks leaving one connector for a possible upgrade or test purposes.





Prototype implementation and tests

First prototype was assembled in the lab and contained complete measurement chain for temperature and humidity sensors. Initial measurements were done for the temperature and the relative humidity The second prototype is under commissioning in the USA15 underground counting room. It exploits one LCS, full length CANbus cable and two ELMB nodes in DAQ racks. The ELMBs are located at the rear of the racks in custom boxes and the sensors – at the rear doors.

The LCS is running PVSS – the main DCS tool for ATLAS. The CERN Joint Controls Project Framework provides an integrated set of guidelines and software tools which is used to develop the control applications.