HPS DAQ Operations Manual v1.0

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1 System Description

The HPS experiment data acquisition (DAQ) handles the acquisition of data for the two sub-detectors: the SVT, and the ECal. HPS employs two DAQ architectures: the SVT is readout with Advanced Telecom Communications Architecture (ATCA) hardware while the ECal use VXS based hardware. The trigger system receives input from the ECal, and distributes a trigger signal to all detector subsystems to read out a selected event. Figure 1 gives a schematic block diagram of the DAQ system. For the ECal, every VXS crate contains a Readout Controller (ROC) that collects digitized information, processes it, and sends it on to the Event Builder (EB). The ROC is a single blade Intel-based CPU module running DAQ software under CentOS Linux OS. For the SVT ATCA system, a multi-ROC setup runs on embedded processors situated on the ATCA main board. The EB assembles information from the SVT and ECal ROCs into a single event which is passed to the Event Recorder (ER) that writes it to a RAID5-based data storage system. The DAQ network system is a Foundry router providing high-speed connections between the DAQ components and to the JLab computing facility.

2 DAQ Control

2.1 Starting the DAQ from scratch

1. Log into `clondaq1` as `clasrun`.

*Contact person for document.

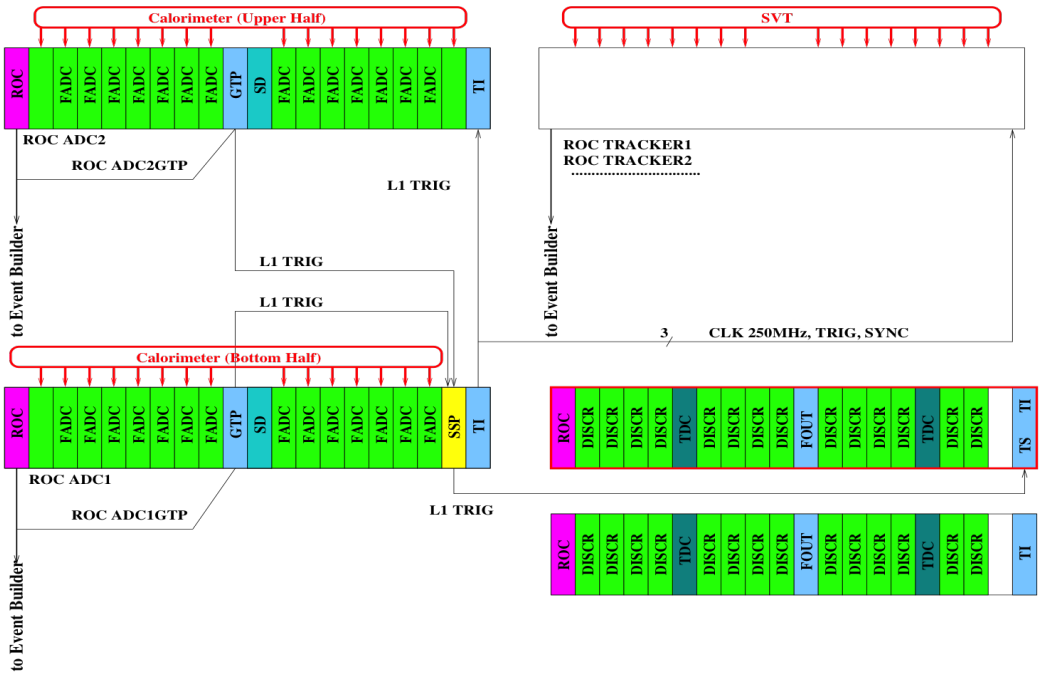

Figure 1: Schematic overview of the DAQ and trigger system.

2. To start all DAQ processes, type the following command in a terminal: `hps_start`. This opens up all windows and GUIs needed on the current workspace.

3. The workspace should look like Fig. 2.

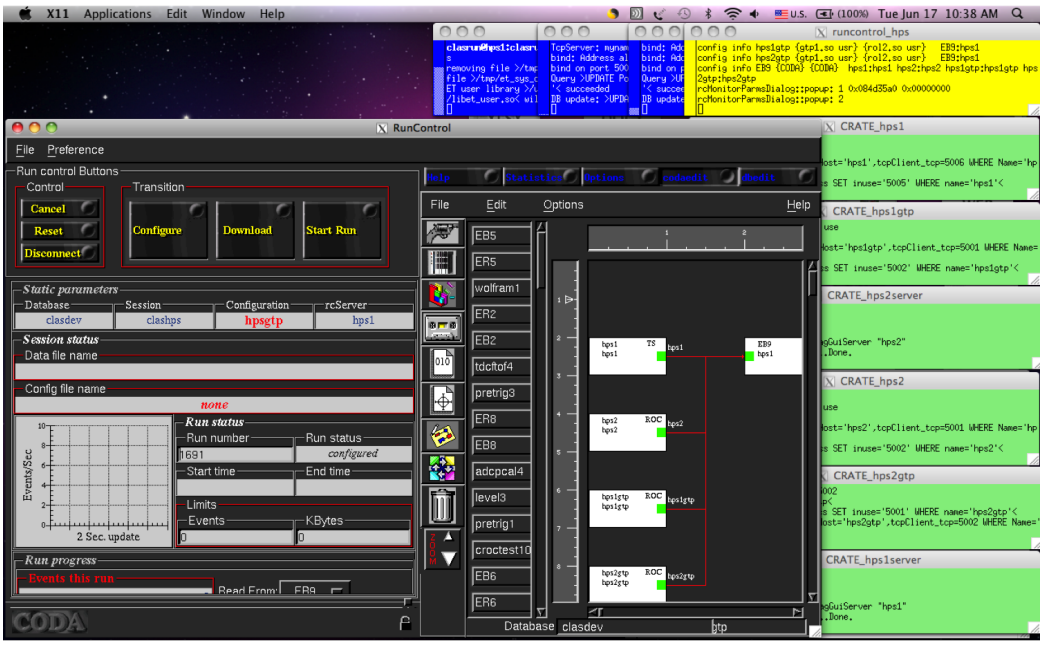

Figure 2: CODA workspace.

2.2 Starting a normal run

1. Make sure beam conditions are stable and ready for running. See beam line manual for more details.

2. Make sure the ECal is powered and its status is OK. See ECal manual for more details.

3. Make sure the SVT is powered and its status is OK. See SVT manual for more details.

4. Make sure the SVT position is appropriate for the run. **Check with shift leader if not sure.**

5. Check that the DAQ workspace is ready to go (see Section above how to start the DAQ).

6. **If continuing with same the same run configuration from a stopped run continue to 12.**

7. In the `RunControl` GUI: click `connect`, a new GUI opens.

8. Click on `DAQ Configuration` and choose the `HPS` configuration.

9. Press `Config` in the same GUI and choose run configuration file. Click OK.

10. Make sure that datafile name, daq configuration and run configuration file name shown on `RunControl` GUI are correct.

11. Press `Download`. When `Prestart` button shows up the DAQ is ready to take data.

12. Press `Prestart` and wait between 5 and 10s and no errors are reported.

13. Press `Start Run` to start data taking. Check that the run status is 'running' and that triggers are issued.

2.3 Stopping a run

1. Go to the `RunControl` GUI and press `End Run` to stop data taking. Check that the run status is 'stopped' and that triggers are not issued.

2.4 Stopping and restarting the DAQ in case of problems

2.4.1 Stopping the DAQ

If DAQ problems occur and restarting the run do not work all DAQ processes can be restarted by typing:

1. `hps_exit` in a terminal on `clondaq1`

This will cleanup all processes and you can restart by following the procedures above.

2.4.2 Restarting the DAQ in case of problems

Sometimes hardware reset needed to bring DAQ system back to normal. For HPS there are four VME/VXS crates: `hps11`, `hps12`, `hps1` and `hps2`. These can be power cycled to try and get back into the normal state. Crate `hps11` is a master, so it have to be rebooter first, followed by others. To reboot, do the following:

1. Type command `roc_reboot hps11` in a terminal.
2. Type command `roc_reboot crate_id` in the same terminal where `crate_id` is `hps12`, `hps1` or `hps2`.

If it does not help or you are unsure, contact the DAQ expert.