

# 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`.

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\*Contact person for document.



- 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.
- The workspace should look like Fig. 2.

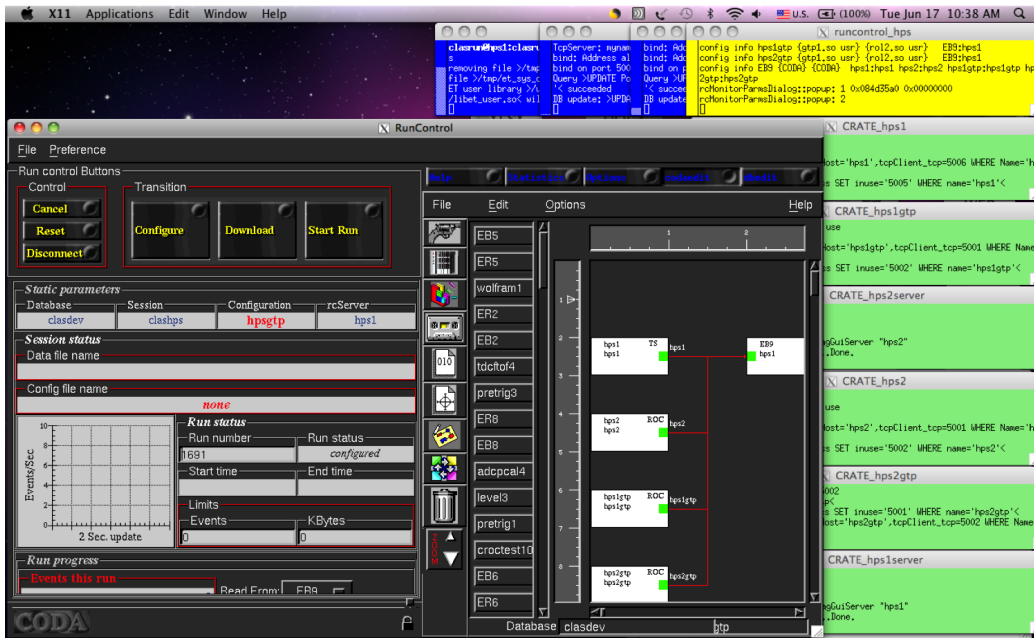


Figure 2: CODA workspace.

## 2.2 Starting a normal run

- Make sure beam conditions are stable and ready for running. See beam line manual for more details.
- Make sure the ECal is powered and its status is OK. See ECal manual for more details.
- 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.