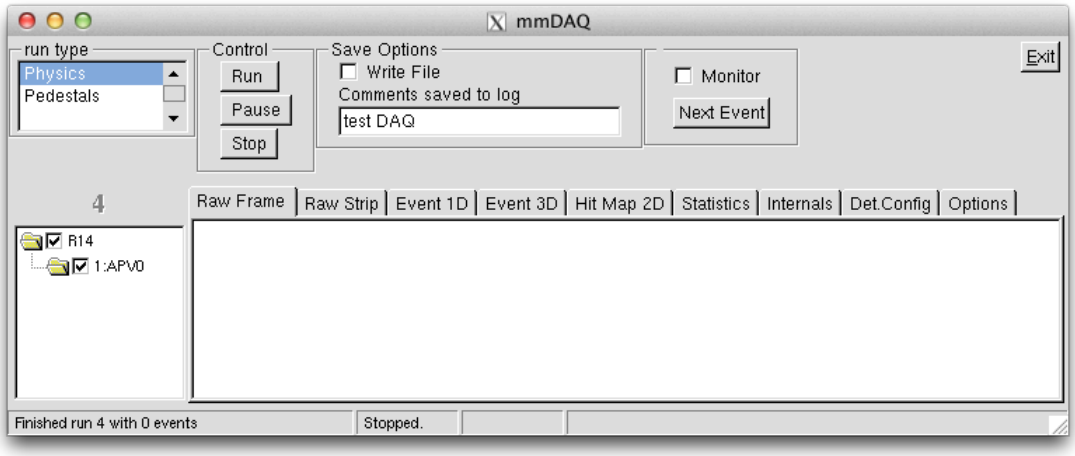
mmDAQ shifter manual
(test beam in H2, June 2012)



1. Not covered:

- SRS DCS
- channel mapping definitions (chip's channel to detector's strip)
- mmDAQ configuration files

It is assumed that hardware configuration is OK (ex. the hardware sends correct number of UDP frames)

2. After a system restart

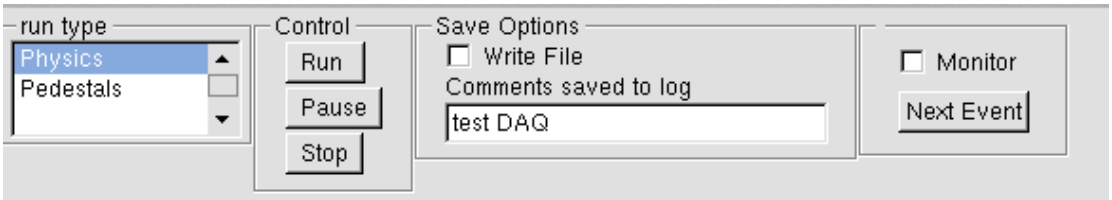
~~**Set up of the network connection**~~

The network should be already set up on the Mmdaqpc2 PC.
run: `sudo /home/dateuser/configure_daq.sh`
This runs ifconfig to setup the Ethernet port with correct IP address 10.0.0.3 and MTU above 9000. Verify network by pinging the FEC card (e.g. ping 10.0.0.2).
There should be no errors.
`ping 10.0.0.2` (then CTRL-C)

3. Starting the program:

Check if the program is not running already (also a number 2 in the title bar indicates this is the second instance of the mmdaq)
change directory to `/sw/mmdaq` (do not skip this step)
run: `./mmdaq --config:/data/2012/testbeam_June/H2.config &`
(no space before or after the colon)
Main window should appear, keep the shell visible to check for crashes.

4. Starting the run:



'Physics' run:

- If not done already: Load Pedestal information (required for zero suppression) (see Loading the pedestal data)
- select 'Physics' in RunType

'Pedestals' run:

- any loaded pedestals will be ignored
- select 'Pedestals' in RunType

Then for both types of runs:

- select or deselect 'Write file' –no effect after the run has been started (!)
- select or deselect 'Monitor' – for online monitoring and online statistics
- type in the 'Comments' – these will be saved in the log file and written to the ROOT file. Content of this field is copied when the user presses the 'Stop' button.

-click 'Run'. And verify the status bar message.
The program will create a new ROOT file and the new run number will be displayed in red.
Run will abort if FEC does not answer to ping.

-start sending data through the SRS DCS control panel

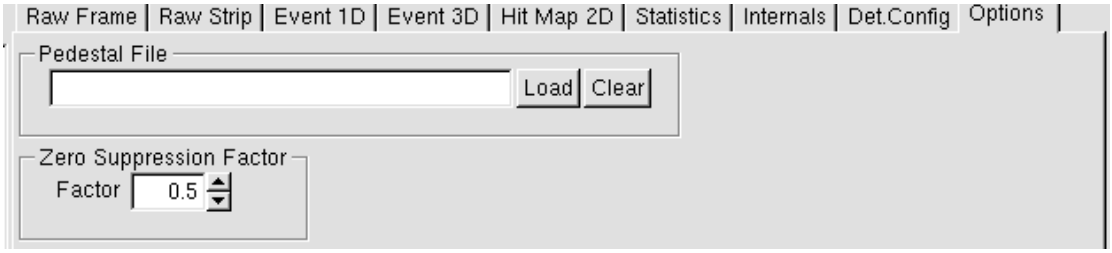
5. During the run:

- 'Pause' is used to temporarily pause the data taking. This will desynchronize event numbers with the BAT telescope. Do not use.

'Run type', 'Write to file' have no effect during the run

6. Stopping the run

- Stop sending data on the SRS DCS control panel
- Verify and update the comments before pressing 'Stop'
- Press 'stop'. Run will stop, data will be saved, and comments will be copied to the log and the ROOT file. The run number display on the left will turn gray and will display the last run number



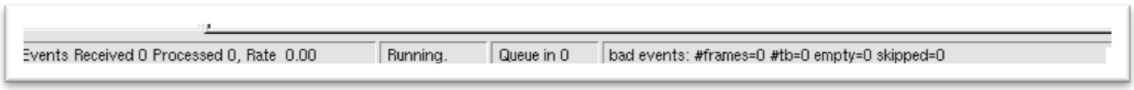
Load Pedestal information is required for zero suppression during the physics run.
In the 'Options' tab:

- Type in the file name with the pedestal data (i.e. last pedestal run): i.e. run20041.root
- And click 'Load'. Verify the number of channels in the status bar message. 'Loaded pedestal for ### channels'. Wrong number of channels would indicate the pedestal file does not correspond to current configuration. Or wrong mapping file/chip declaration in configuration.
- Select proper 'Zero Suppression Factor' Channel is suppressed when: Sum of charge for the channel < factor * channel_pedestal_stdev. Pedestals once loaded will be used until overwritten by a next load. The loaded pedestal data is saved in the ROOT file for the 'Physics' run.
  Usual good value: 0.8-1.0

8. Monitoring

The 'Monitor' switch enables and disables data monitoring. No monitoring plots except the status bar will be updated and no data will be gathered for the 'Statistics' plots.
To display only the next event uncheck the 'Monitor' press once the 'Next Event' button and wait for the next good event.

The status bar:



Panel 1: Current event number and event rate (updated after each event). Number of events saved to file is reduced by total number of bad events (Panel 4)
Panel 2: Status: Running, Stopped
Panel 3: Size of the internal queue. Queue is limited to 1500 events. If queue in shows around 1500 the data rate is too high and events will be skipped
Panel 4: Bad events counting:
#frames – events with bad-number-of-frames flag. Number of UDP frames collected between two new event markers is not equal to the specified number of chips.
Possible reasons: rate to high (events skipped), or bad configuration if no good events at all.

#tb – events with bad-number-of-time-bins flag. For the APV: Number of time bins in at one of the chip's data differs from the others. Usually due to bad hardware initialization – stop the run and reinitialize SRS
#empty – empty events. No data above the zero suppression threshold.
#skipped – when internal queue is full of run is paused.

Tabs:

Raw frame: Raw data from each chip. Marked red when error is detected.
Raw Strip. Not active.
Event 1D: After the mapping to chambers: plot qmax and tbqmax
Event 2D: After the mapping to chambers. One plot per chamber, all 2D charge data. Warning: CPU intensive - can lower the acquisition rate.
Statistics:
qmax_strip – All channels' qmax plotted vs the strip number.
Tbqmax – Timing for event's max charge (1/event), in time bin numbers
N_max – Charge distribution (1/event)
Internals: Not active

9. Finally, the crashes:

Please monitor the shell for crash output.
The program crashes have been observed in these cases:
- run with high number of bad events (please make a note what kind of bad events from the status bar panel 4)
- After pressing the 'Stop' button. Other factors unknown. It needs to be verified each time (log and the ROOT file) but until now every time the data files were OK. (Crashed after saving the data)
- After the program start , the 'Start' of the first run is the most often
Please notify me with any relevant information about a crash you may experience.

To restart after a crash :
Verify that no mmdaq process is running (use `ps -ef |grep mmdaq`)
And then kill the process number kill ####, or `killall mmdaq`
Then restart as in point 'Starting the program'