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Welcome to the LHCb Muon DAQ Monitoring page

This page contains directions on how to access Muon Online Monitoring Histograms

LHCb Online Page

Useful links & documentation

Talks

• Muon Commissioning Jun 08 G. Graziani/G. Passaleva
• LHCb week Jan 08 G. Graziani
• Muon Commissioning Nov 07 G. Graziani

Links

• Online machines
• LHCb Online Monitoring Framework
• LHCb Online Presenter page

Mission of the Muon DAQ Online Monitoring

Online Monitoring of Muon data is done within the framework of the LHCb Online Data Quality Monitoring, which is under active development. Please note that:

• we can only monitor events triggered and saved to disk by the LHCb DAQ. Thus, the Online Monitoring has only access to the list of firing logical channels and to their fine time, as given by the Muon TELL1s. Monitoring at lower level is done by the appropriate tools within the PVSS panels and is decoupled from this framework;
• the monitoring information consists of a set of histograms that can give a prompt feedback on the Data quality; the information must be synthetic and not redundant since we want to save the histograms at regular intervals and there are obvious technical constraints on the size;
• detector monitoring should be standalone. In the future, the Monitoring Farm will run the reconstruction on a fraction of events (10-50 Hz) to monitor tracks, etc.;
• monitoring histograms can be seen online using the Presenter application, that is (and must be) only an histogram viewer, NOT a debugging or analysis tool;
• for future stable DAQ operation, the possibility is foreseen to have automatic histogram analysis, generating alarms for the main shifters in case of unexpected problems.

The framework components are being tested during the commissioning phase. For the muon, we presently have a monitoring task called "MuonDAQMon", which runs the "MuonMonitor" and "CosmicMonitor" algorithms.

How to see the histograms (for the impatient)

Muon monitoring pages are available in the LHCb Online Presenter and can be seen only from the LHCb Online Network

• login on some node of the LHCb online network (see this page for instructions). From Linux:
  ♦ ssh -X lbgw (only from cern)
  ♦ ssh plus
for Linux (Muon recommended version):

- setup LHCb environment
  - bash: . /group/muon/scripts/lhcbsetup.sh
  - tcsh: source /group/muon/scripts/lhcbsetup.csh
- run the presenter:
  - /group/muon/scripts/runpresenter

for Windows (are you sure?), e.g. from one of the Control Room stations:

- open a command-line window (type "cmd" in "Run Application" from the Main Menu)
- set DIM_DNS_NODE=mona08
- set GROUPDIR=G:
- g:\online\presenter\presenter.bat

- browse through the page tree on the left, look in the "Muon Commissioning" folder
- SINGLE click on your favorite page

- Directions about using the Presenter are available here
- note that page loading can be slow, depending on network traffic and/or on the fact that some histograms must be produced on the fly, PLEASE BE PATIENT: the more you click the more you slow down the application
- PLEASE NEVER edit/save new pages by yourself: submit your requirements to people in charge (Giacomo, Giovanni P.)

if you can see no histograms

- PLEASE DON'T START CLICKING LIKE HELL
- if the histograms are not appearing or are empty with a title like "ERROR: no sources available...", it means that:
  - we are not taking data or the online monitoring is not running, so there are simply no histograms to look at;
  - you are not looking at the right partition: click on "refresh partitions" and then select your partition from the menu. The default partition is LHCb, that is ok for global data taking.

looking at older histograms

- Histograms "Savesets" will be regularly saved under
  /group/online/Histograms/Savesets/MuonDAQMon- YYYYMMDD_T_HHMMSS_.root and
  /group/online/Histograms/Savesets/MuonDAQMon-runXXXXX.root (this is now being temporarily done by a custom script). These are ROOT files you can handle using ROOT or also with the Presenter itself:
  - select Tools -> History Mode
  - select “file...” from the saveset menu (the one which defaults to “last file”); then click on it
  - select the MuonDAQMon-* .root file you want to see
- informations on DAQ running conditions can be found on the MUON and L0 Trigger logbooks

Histogram content

here are some comments about the pages currently available in the "Muon Commissioning" folder.

General muon monitoring ("MuonMonitor" algorithm):

**Hit Rates**

- multiplicity of logical channels and logical pads as a function of time;

**Hit Multiplicity and Time Spectrum**

How to see the histograms (for the impatient)
number and time spectrum of logical channels. You can also see the numbers of log. channels that are not used on any logical pad. Time is in ns, obtained by the BX id and by the TDC fine time: time=0 means the center of the triggered BX;

**Pad Multiplicity and Time Spectrum**
the same for logical pads. You can also see the distribution of the time difference between the two log. channels for crossed pads;

**Multiplicity per station**
multiplicity of logical pads per station

**Multiplicity per region**
raws correspond to stations (M1 to M5), columns to region (first column for all, next for regions 1 to 4);

**Pad Time per region**
time of logical pads per region;

**Time diff. of crossings per region**
time difference between the two log. channels inside crossed logical pads per region;

**Unassociated hits per region**
number of log. channels not belonging to any pad (indicating electronic noise) per region;

**Pads by Side**
pads distributions for side C and A;

**Raw Bank Size**
size of NZS (only present for debugging runs), ERROR, ZS banks;

**Qx/MyRz by ODE**
counts and time spectrum for every logical channel, organized by ODE;

**Qx/Pad map My**
geometrical map of logical pads for quadrant x station y;

**Qx/ODE Occupancy My**
occupancy of logical channels for each ODE;

**Pad Map Summary** (or M_y_)
geometrical map of logical pads;

**Pulsed Run summary**
fraction of firing channels by station (useful for pulsed runs).

Monitoring with cosmic tracks (tracks are reconstructed requiring at least 3 aligned hits, "CosmicMonitor” algorithm):

**Cosmic Track Summary**
track multiplicity, hits per track, track chi2, estimated time resolution

**Cosmic Track Maps**
geometrical map of logical pads owned by tracks

**Cosmic Track Residuals**
track fit residuals in X, Y, time

**Cosmic Track X (Y,time) Residual Map**
(slow...requires patience) X-Y maps of average residual, to spot regions with bad space or time alignment

**Cosmic Polar angles**
theta and phi angles with respect to vertical direction (phi=0 in the zy plane)

**Cosmic Track slopes**
theta_x and theta_y in the LHCb frame, note that theta_y can be used to separate "forward” and "backward” tracks

**Cosmic hit times**
time of each track hit (logical pad belonging to track): raw time and residual (difference from average track time, corrected for time of flight). Residuals are also shown per station

**Cosmic track time**
absolute track time (obtained from the average of all hits, corrected for time of flight). Time is plotted
at two z positions: M5 station and ECAL, and separately for forward and backward tracks (separated using the y slope theta_y)

-- GiacomoGraziani - 23 Jul 2008 (last update on 24/8/08)