E835 Online Monitor

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1. Introduction

Main E835 detector consists of Central Calorimeter, Forward Calorimeter, Cerenkov detector, Silicon Barrel, Straw Chambers, Scintillating Fibers and Hodoscopes. During running time, it is very important to monitor the data flowing through the system to ensure the correct operation of the experiment, and monitor the status of each subdetector online to see if it is functioning normally or something wrong inside. Online monitor can tell us the casual problems which we do not expect during the running time, let us deal with it as early as possible, thereby ensures the good quality of the data we are taking.

E835 online monitor is based on DART (Fermilab Data Acquisition System Architecture) consumer and is written in C, TCL and TK, it utilizes TK windowing environment, most of online commands can be issued just by clicking the buttons inside the TK window. Histoscope (tool to display the histograms, Fermilab product) and PAW (CERN lib) are employed as the histogram viewers.

A fraction of events from the main data stream are sent to the computer where the online monitor resides, online minotor will unpack the event and decode data into each subdetector right after it gets the event, then fill the histograms which we want to watch for each subdetector during the data taking. From these histograms we can easily understand the current status of each subdetector. Online monitor can also run the event display program by clicking the event display button to observe the events we are taking.

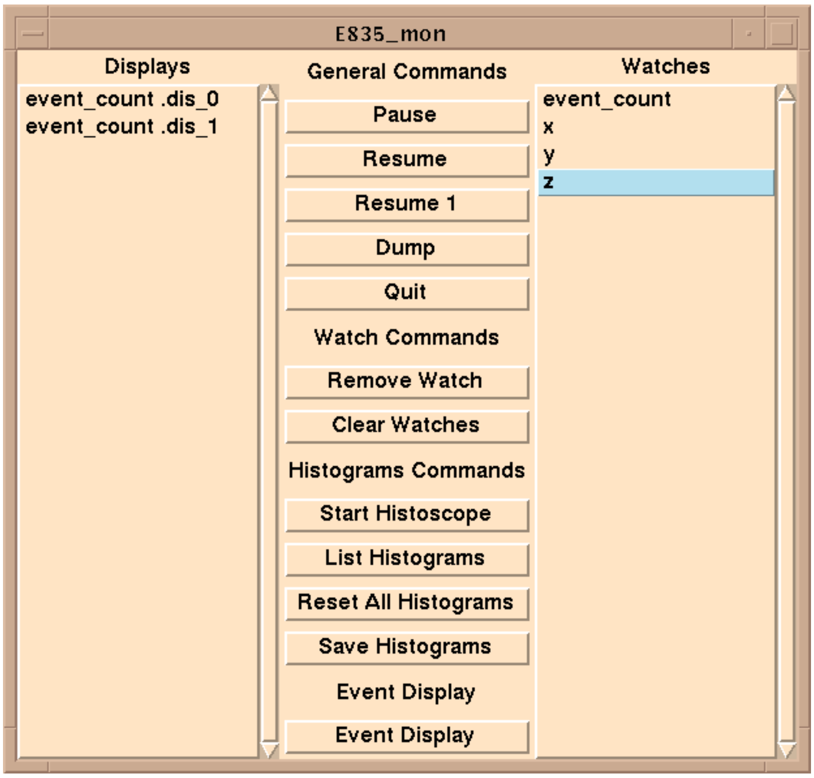
During testing period and at the very beginning of the experiment, we would like to monitor the status of every channel of each subdetector to make sure it works normally. There are thousands of channels in each subdetector, so it is impossible to define all histogarms for all channels at the same time due to the limitation of computer memory. An online command (bookhisto) is realized to book and fill the histograms online, which makes it feasible that you can add the histograms which you are interested in during the running time.

For the testing purpose, a program (dfm_hoist) which simulates the data acquisition system to privide the events to online monitor has been set up, it reads the events from a file, and sends the events to online monitor in the exact same way as the data acquisition system does, it is very useful and convenient for us to debug and test the codes we are writing.

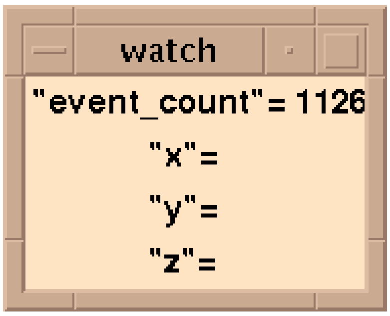
E835 online monitor resides on fn835z (SGI Indigo, 100 MHz CPU, UNIX(IRIX)), Events will be provided by Hoist Server (fn835y.fnal.gov, E835 Data Acquisition) or Dfm_Hoist Server (fn835z.fnal.gov, Events from File).

2. TK Window

A TK window will pop up when you run the online monitor, you can almost do everything just by clicking the buttons in this window. You can also type the corresponding online TCL commands to do the same things.



Following are the examples when you watch and display varible Event_count



3. Online Commands

Following online commands are available for E835 online monitor. Use help command to get the syntax for each command.

- help
  Get help for available online commands.
- pause
  Pause the event acquisition.
- resume
  Resume the event acquisition.
- cdir
  Change PAW directory.
- dump
  Dump current event.
- quit
  Quit online monitor.
- starthisto
  Start Histoscope.
- hlis
  List booked histograms.
- hres
  Reset specified histogram or all (if 0 entered).
- hsav
  Save histograms in the specified hbook file.

- bookhisto
  Book histogram online (available for all varibles in hits.cde and clust.cde).
- watch
  Watch the specified varible.
- reset watch
  Reset the value of the selected varible being watched.
- clear watch
  Remove the selected varible being watch from the “watch” list.
- display
  Display the specified varible.
- info commands
  List all available commands.
- info vars
  List all available varibles which can be watched and displayed.
- event_display
  Run event display.

4. Histogram Viewer: Histoscope

Histoscope is employed as a tool to select and display histograms and Ntuples from online monitor program as data is being analyzed. Using Histoscope we can interactively "browse" through the large quantities of statistical data that our data acquisition programs gather as we run. Histoscope can be run independently or invoked directly by clicking the starthisto button in TK window.

For more information about Histoscope, type

$setup histo
$cd $HISTO_DIR/doc

look Histoscope manual histo_users_guide.ps (Postscript file) or look the World Wide Web page

http://cdibm.fnal.gov/nirvana/histo.html

Subdirectories for each subdetectors (DAQ, CCAL, FCAL, Silicon Barrel, Straw Chambers, Scintillating Fiber, Cerenkov detector and Hodoscopes) have been created in PAWC to hold their own histograms respectively, you can change the directory by using online command "cdir".

5. Histogram Viewer: PAW

- Initialization

  PAW> message ’enter the name of the global section ’
  PAW> GLNAME=E835
  PAW> read GLNAME
  PAW> message ’opening global section ’ [GLNAME]
  PAW> global [GLNAME]
  PAW> cd //[GLNAME]

  Note: “global” maps the global section GLNAME, the current directory is changed to //GNAME

- Executing Macro Files

  PAW>exec DAQ
  PAW>exec CCAL
  PAW>exec FCAL
  PAW>exec SILI
  PAW>exec SCIFI
  ......

Note: PAW displays histograms by using shared memory, the maximum shared memory on fn835z is 25 Mbyte. PAW viewer is currently turned off due to large number of histograms.