TDmon: TD monitoring program
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David E. Jaffe

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Abstract

TDmon monitors the response of range stack TD's, TDC's and ADC'S to the TDMON trigger, reports non-standard conditions and compiles a list of channels with non-standard conditions for each run.

1 What it does now

ADC, TDC and TD occupation in TDMON triggers is monitored and missing hits are reported. RS TDC "event mismatch" and "serial number mismatch" occurances in TDMON triggers will generate also warning messages.

25 April 2002: Now warnings are generated if TD and ADC areas, TD and TDC times deviate too far from a previous run chosen as a reference. Currently a warning is generated if the $|\bar{pull}| > 5$, where $pull \equiv (x - \bar{x})/\sigma(x)$ where $\bar{x}$ and $\sigma(x)$ are the mean and standard deviation of quantity x in the reference run. In addition the TD 'pedestal' is monitored and a warning is generated if the mean differs from the nominal value of 3 by more than 1.5 (this is the same criteria used by TDDAC for a "good" channel).

2 Understanding the error messages

Here's an example of an error message that appears as an xmessage pop-up window: [1]

```
 Errors found in TDMON triggers. Run 48997 25/04/:2 14.46.25
  --> Convention is LAYER,end,SECTOR <--
 TD# Element  system(misses) Quantity <Pull> Nbad Nmeas,    478 events monitored
  26 RS 2M13 tTD   5.31   0 119, NaTD -8.55   0 119,
   4 RS 4M 3 NaTD -5.05   0 120,
  53 RS 5M 3 NaTD -5.31   0 120,
  98 RS10M 4 TDC(  1)
 234 RS18M24 NaTD -9.56   0 119,
 231 RS19M19 NaTD -5.27   0 120,
   3 RS 3P 4 NaTD -5.09   0 119,
  19 RS 3P11 NaTD -6.36   0 120,
  40 RS 4P20 NaTD -9.99   0 119,
  49 RS 5P 3 NaTD -5.92   0 120,
  81 RS 5P18 NaTD -6.50   0 120,
  83 RS 7P20 NaTD -9.14   0 119,
  96 RS 8P24 TDC(  1)
 107 BadPED PED:Mean=4.62,rms=0.49,
 158 RS14P 6 NaTD -6.91   0 120,
 233 RS17P23 NaTD -6.11   0 120,
 222 RS18P16 NaTD -6.98   0 119,
```

The first line gives the run number and current time. The second line gives the convention used for reporting RS detector elements. The next line labels the subsequent columns of the first list and gives the number of TDMON triggers that have been monitored. The subsequent lines give the TD channel number, the detector element number and system (ADC, TDC or TD) that has missing hits and/or large $pull(x)$ and/or a bad TD pedestal. Only the TD channel number is reported if the pedestal is bad. Here $x =$ delT, tTD, tTDC or NaTD where

1. delT = time(TD) - time(TDC),
2. tTD = time(TD),
3. tTDC = time(TDC) and
4. NaTD = normalized TD area, the TD area normalized by the ADC for reference phototube.

So `26 RS 2M13 tTD 5.31 0 119, NaTD -8.55 0 119,` means that for TD channel 26, RS layer 2, sector 13, upstream, the mean value of the *pull* for the TD time was 5.31 and normalized TD area was -8.55. Missing TD hits are also listed by TD number at the bottom.

Note that each TDMON trigger illuminates only a quarter of the range stack. Here "Missing " means that a TD pulse was expected in a specified time window and none was found when the ADC, TDC or TD was unpacked in "CAL" mode. Frequent occurances of "Missing" also show up in the TD occupation plot produced by QOD.

The message list in the pop-up window is truncated at 10 TD channels per failure mode. The full list of channels is in the logfile.

3 Some details

`/e787d/bnlonl/TDmonitor/run_tdmon` runs the jobs. There is an ascii control file `TDmon.control` that determines how frequently error reports are generated and the criteria for such reports. Logfiles are in

[1] The xmessage window appears in the lower right hand corner of the screen in the same (annoying?) fashion as the DeToX window.

`/e787d/bnlonl/TDmonitor/log/tdmon.nnnnn.log` where `nnnnn` is the run number. Logfiles are gzipped at the end of each run to save space. Histogram files are in `/e787d/bnlonl/TDmonitor/hist/` and are also gzipped at the end of each run. Run summary files for each detector element are in `/e787d/bnlonl/TDmonitor/RunS` and for the 12 reference PMTs `/e787d/bnlonl/TDmonitor/RefSum/` . Bad channel summaries are in `/e787d/bnlonl/TDmonitor/DataBase/` . I will give $1 to the first three people who tell me they have read this note. Comments, suggestions, questions, etc. to djaffe@bnl.gov .