Appendix C.6: The Trigger Quick-Look Operator Manual

30th January 2007

Scripts

There are two basic script for the Trigger System quicklook:

- BASIC LEVEL
  TriggerScanBasic Basic Trigger data analysis

- EXPERT LEVEL
  TriggerScanExpert More detailed Trigger data analysis

The operator have to look only the BASIC LEVEL output to take an action.

BASIC LEVEL

Produces one or more files (jpg, gif, ps or pdf) depending on the chosen output format.

In any case, the output consists of 11 pages of pictures that describe the performances of the Trigger board and of the 48 PMTs of the ToF System.

Description of "basic" figures:

FIGURE at Page 1

- **Description:** This histogram shows the **event counter** as function of the CPU time.
- **NOMINAL/STANDARD**: The plot has a characteristic serration shape. The value goes to 0 for each new run.
- **NON-STANDARD:**
  - A shape different from the described one could indicate problems in the acquisition.

  ➔ **ACTION: Call specialist.**

FIGURE at Page 2

- **Description:** : is composed by 2 plots: the first (top) shows the **acquisition dead time** as function of the CPU time. The second one (bottom) shows the **acquisition live time** as function of the CPU time.
- **NOMINAL/STANDARD**: First plot: a lower band corresponds to the standard dead time; higher values correspond to tracker/calorimeter calibrations.
  In case of working schedule 3, another band at ~50ms is present corresponding to the reading of the S1 rate used to define the trigger configuration.
  The characteristic shape is shown in the following picture.

- **NON-STANDARD:**
  - Shapes different from those described could indicate problems in the acquisition.

  ➔ **ACTION: Call specialist.**

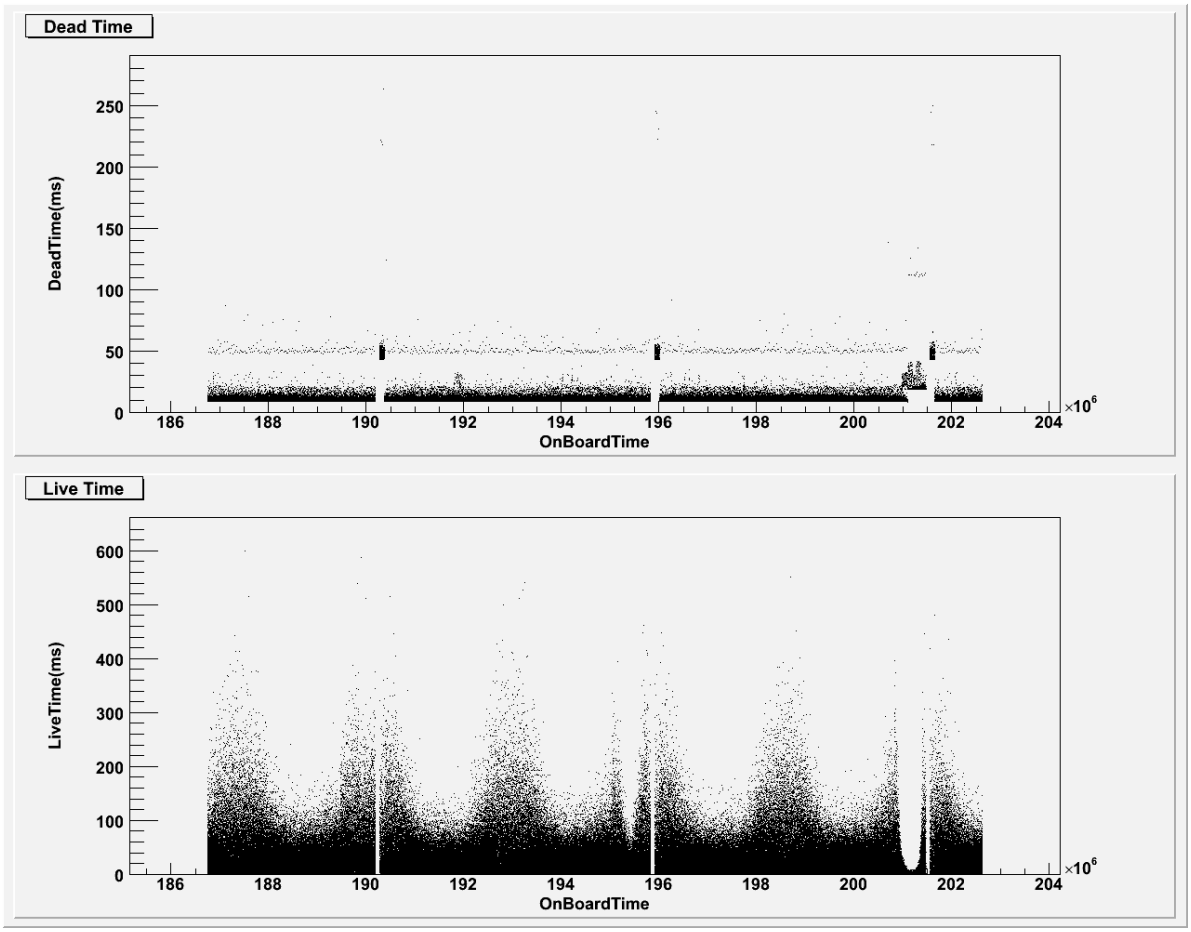

Fig. 1

FIGURE at Page 3

- **Description:** : is composed by 2 plots: the first (top) shows the **average over 1 min of the dead time** as function of the CPU time. The second one (bottom) shows the **average over 1 min of the live time** as function of the CPU time.
- **NOMINAL/STANDARD**: First plot: standard dead time in ms is shown; spikes correspond to tracker/calorimeter calibrations.

- **NON-STANDARD:**
  - Shapes different from those described could indicate problems in the acquisition.

  ➔ **ACTION: Call specialist.**

FIGURE at Page 4

- **Description:** (**PMT Plane Counter**) is composed by 3 plots: the first histogram shows the rate of the Boolean function of **S11 AND S12** the second histogram shows the rate of **S21 AND S22** and the third shows the rate of **S31 AND S32,** all as function of the CPU time. As an example S11 represents the logic OR of all the PMTs for the first plane of S1 scintillator plane.
- **NOMINAL/STANDARD**: The shape of the histograms look like a sinusoidal curve. The rate values depend on the orbital position with higher peaks corresponding to S.A anomaly, more evident in S1.
- **NON-STANDARD:**
  - Shapes different from those described could indicate problems in the acquisition.

  ➔ **ACTION: Call specialist.**

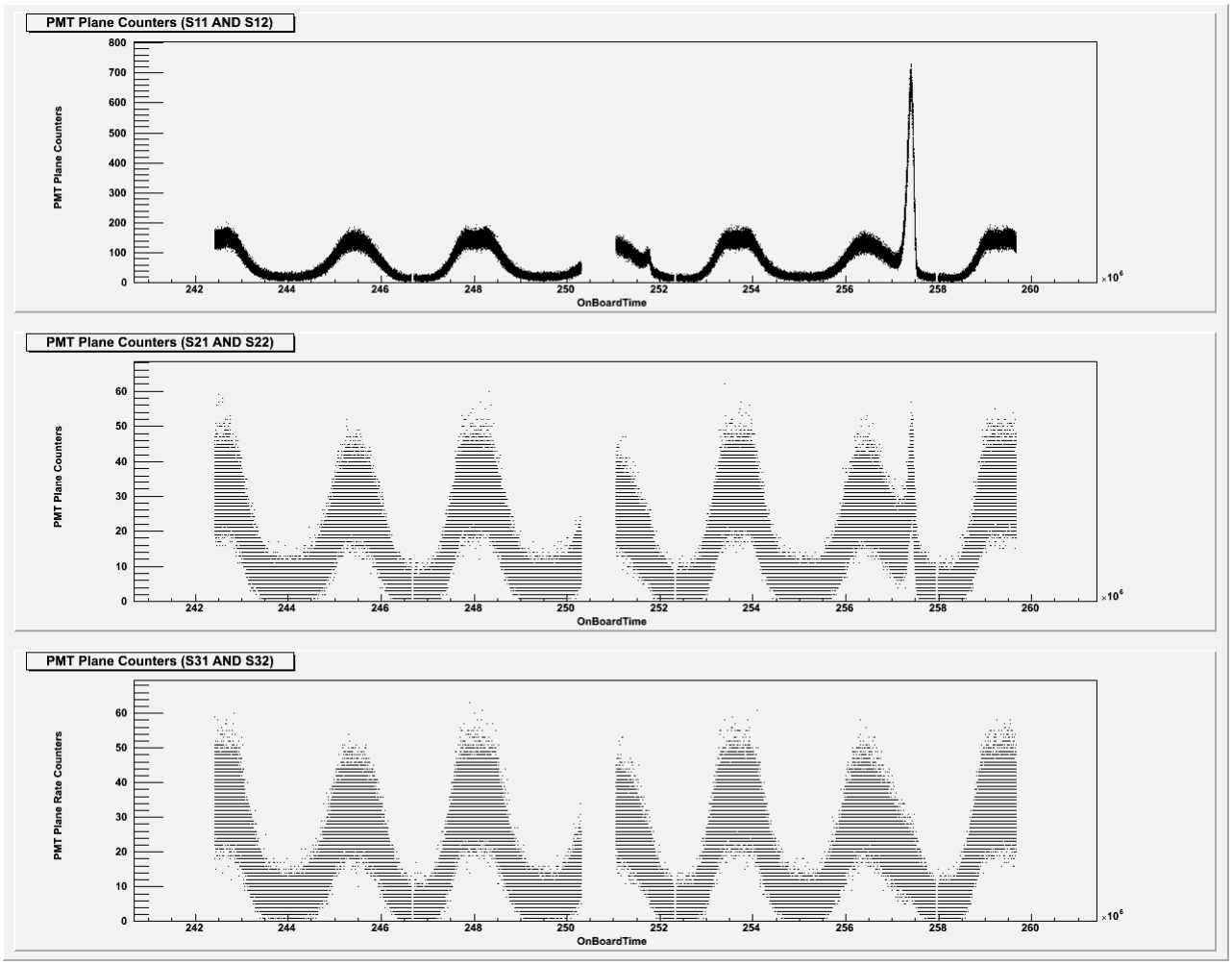

Fig. 2

FIGURE at Page 5 to 7

- **Description:** (**Trigger Rate Counters**) : In these histograms are plotted the trigger rate for all the possible PAMELA trigger configurations. The rates are calculated by counting signals in a fixed time window. For the ToF trigger configurations the time window is 1.6 ms wide, while for the Calorimeter and S4 it is 1 s wide. In any case the plotted rates are expressed in Hertz and given as function of the CPU time, except the case of the Calorimeter.
- **NOMINAL/STANDARD**: The shape of the histograms look like a sinusoidal curve. The expected Calorimeter counting rate is very low, so can be also equal to zero.
- **NON-STANDARD:**
  - Shapes different from those described could indicate problems in the acquisition.

  ➔ **ACTION: Call specialist.**

FIGURE at Page 8 to 12

- **Description:** (**PMT Rate counters**) : In these histograms are plotted the rate for all the ToF PMTs as a function of the CPU time.
- **NOMINAL/STANDARD**: The shape of the histograms look like a sinusoidal curve.
- **NON-STANDARD:**
  - Shapes different from those described could indicate problems in the acquisition. Empty histograms can indicate dead or masked channel.

  ➔ **ACTION: Call specialist.**

EXPERT LEVEL

Produces one or more files (jpg, gif, ps or pdf) depending on the chosen output format.

In any case, the output consists of 6 pages of pictures that describe more details on the performances of the Trigger board and of the 48 PMTs of the ToF System.

Description of the figures:

FIGURE at Page 1 to 4

- **Description:** (**ToF Pattern of trigger**) : In these histograms are plotted the pattern of trigger for all the ToF PMTs. The pattern of trigger shows the PMT which generated the trigger signal. In the Appendix C.6.1 are reported the PMT id.
- **NOMINAL/STANDARD**: The shape of the histograms relative to S3 and S2 pattern is flat while the shape relative to S11 and S12 has two symmetrical peaks corresponding to the center of the half planes. The histogram values depend on the orbital position and PMT settings.
- **NON-STANDARD:**
  - Shapes different from those described could indicate problems in the acquisition. A missing bin indicates a dead or masked channel.

FIGURE at Page 5 to 6

- **Description:** (**Calo and S4 Pattern of trigger**) : In these histograms are plotted the pattern of trigger for signals coming from S4 and Calorimeter. The pattern of trigger shows the S4 or Calo sections which generated the trigger signal. In the Appendix C.6.1 are reported the S4 and Calo section id.
- **NOMINAL/STANDARD**: The shape of the histograms should be flat but its value depend on the orbital position.
- **NON-STANDARD:**

- Shapes different from those described could indicate problems in the acquisition.

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Appendix C.6.1

Calorimeter signal id:

4 Calo4	3 Calo3	2 Calo2	1 Calo1

S4 signal id

3 S4_3	2 S4_2	1 S4_1

S3 signal id

12 s323b	11 s322b	10 s321b	9 s323a	8 s322a	7 s321a	6 s313b	5 s312b	4 s311b	3 s313a	2 s312a	1 s311a

S2 signal id

8 s222b	7 s221b	6 s222a	5 s221a	4 s212b	3 s211b	2 s212a	1 s211a

S12 signal id

12 s126b	11 s125b	10 s124b	9 s123b	8 s122b	7 s121b	6 s126a	5 s125a	4 s124a	3 s123a	2 s122a	1 s121a

S11 signal id

16 s118b	15 s117b	14 s116b	13 s115b	12 s114b	11 s113b	10 s112b	9 s111b	8 s118a	7 s117a	6 s116a	5 s115a	4 s114a	3 s113a	2 s112a	1 s111a