How to measure resets using DPPMCA

This documents shows how to either (a) count resets or (b) measure the reset period from a detector using DPPMCA. The reset period is an indicator of the total current through the detector, both signal current from X-rays and dark or leakage current. The dark current increases exponentially with temperature, so knowing the reset period is a good indicator of cooling and a check on the detector.

To configure DPPMCA, you must do the following steps, shown on screen captures below:

1) Connect to the processor, open "Acquisition Setup", and go to the "Misc" tab. To count the resets, in the "General Purpose Counter" box, set "Counter Input" to DETRES (Detector Reset). To measure the reset period, set the "Counter Input" to RESPER (Reset Period). Make sure the box labelled "Counter uses MCA_EN?" is set to "Off"

2) Open "View", "Preferences", then select the "Analysis" tab. Check the "View General Purpose Counter" box. This causes DPPMCA to display the GP counter data.

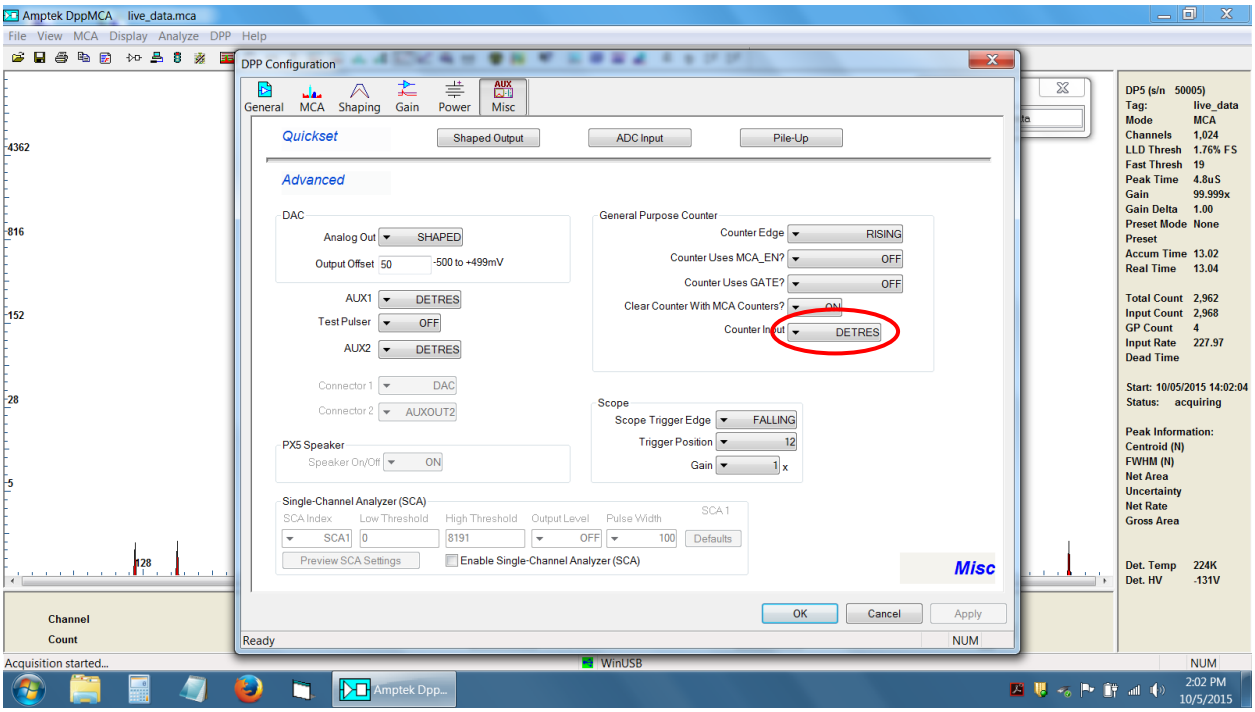
3) If you now look at the Info panel, you will see GP Count.

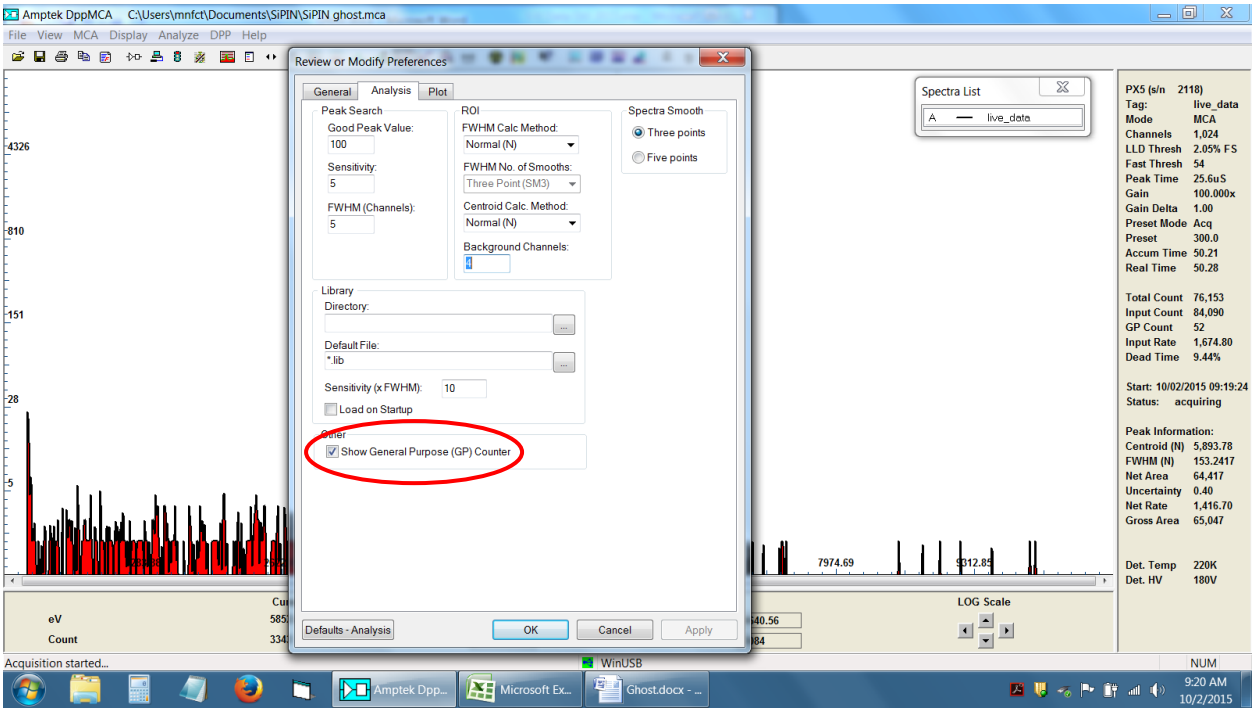
    a. If you set the input to DETRES, then the GP counter shows the number of resets counted in the acquisition time. A reading of 10 counts in 5 seconds means 2 resets per second.

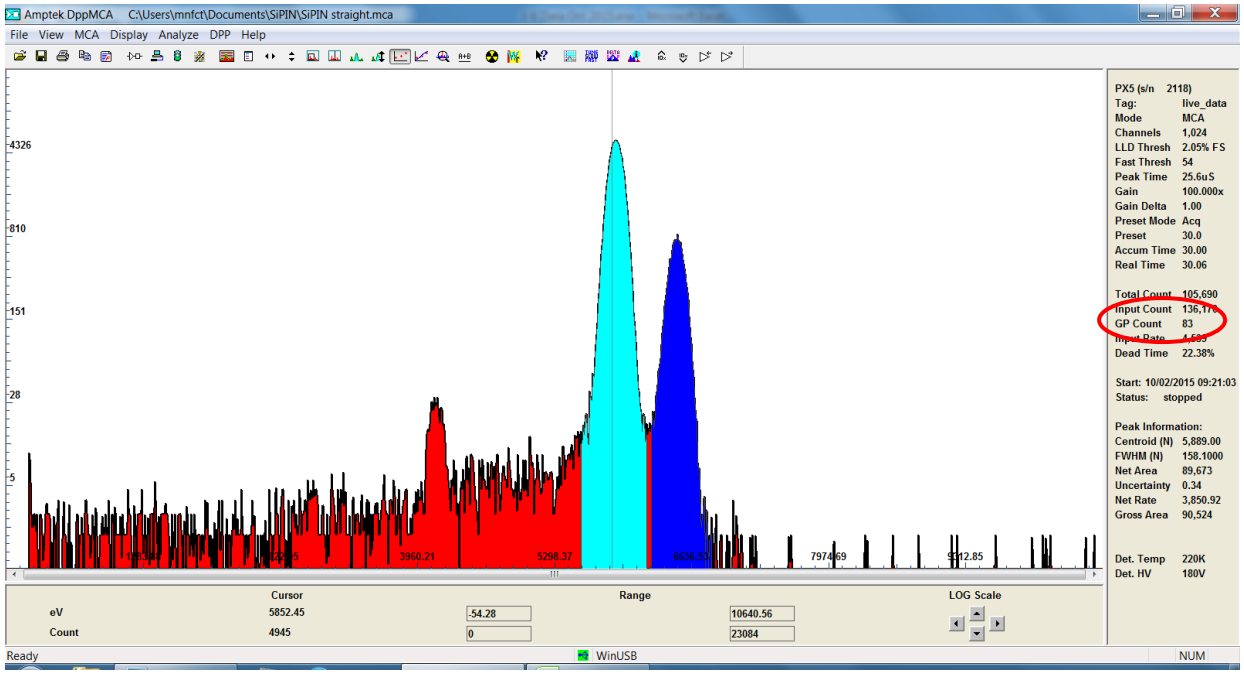
    b. If you set the input to RESPER, then the GP counter shows the reset rate, in millisec. A read of 500 means 500 msec, or 2 resets per second.

4) As a check, I put the source in place and restart acquisition. If you move the source closer, you will see more resets in a given time period.

5) Remove the source so you only have leakage current. Restart acquisition and measure the reset rate. For a good detector at full cooling, the reset period should be tens of seconds, even up to 90 seconds. If the detector is not cooling properly, the dark current will double for every ~6°C.




Amptek DppMCA C:\Users\mnfct\Documents\SiPIN\SiPIN ghost.mca
File View MCA Display Analyze DPP Help
Review or Modify Preferences
General Analysis Plot
Peak Search
Good Peak Value: 100
Sensitivity: 5
FWHM (Channels): 5
ROI
FWHM Calc Method: Normal (N)
FWHM No. of Smooths: Three Point (SM3)
Centroid Calc. Method: Normal (N)
Background Channels: 4
Spectra Smooth
Three points
Five points
Library
Directory:
Default File: *.lib
Sensitivity (x FWHM): 10
Load on Startup
Other
Show General Purpose (GP) Counter
Defaults - Analysis
OK
Cancel
Apply
Spectra List
A live_data
PX5 (s/n 2118)
Tag: live_data
Mode MCA
Channels 1,024
LLD Thresh 2.05% FS
Fast Thresh 54
Peak Time 25.6uS
Gain 100.000x
Gain Delta 1.00
Preset Mode Acq
Preset 300.0
Accum Time 50.21
Real Time 50.28
Total Count 76,153
Input Count 84,090
GP Count 52
Input Rate 1,674.80
Dead Time 9.44%
Start: 10/02/2015 09:19:24
Status: acquiring
Peak Information:
Centroid (N) 5,893.78
FWHM (N) 153.2417
Net Area 64,417
Uncertainty 0.40
Net Rate 1,416.70
Gross Area 65,047
Det. Temp 220K
Det. HV 180V
LOG Scale
eV
Count
Acquisition started...
WinUSB
NUM
Amptek Dpp...
Microsoft Ex...
Ghost.docx - ...
9:20 AM
10/2/2015


Amptek DppMCA C:\Users\mnfct\Documents\SiPIN\SiPIN straight.mca
File View MCA Display Analyze DPP Help
PX5 (s/n 2118)
Tag: live_data
Mode MCA
Channels 1,024
LLD Thresh 2.05% FS
Fast Thresh 54
Peak Time 25.6uS
Gain 100.000x
Gain Delta 1.00
Preset Mode Acq
Preset 30.0
Accum Time 30.00
Real Time 30.06
Total Count 105,690
Input Count 136,176
GP Count 83
Dead Time 22.38%
Start: 10/02/2015 09:21:03
Status: stopped
Peak Information:
Centroid (N) 5,889.00
FWHM (N) 158.1000
Net Area 89,673
Uncertainty 0.34
Net Rate 3,850.92
Gross Area 90,524
Det. Temp 220K
Det. HV 180V
Cursor
Range
LOG Scale
eV 5852.45 -54.28 10640.56
Count 4945 0 23084
Ready
WinUSB
NUM