

TRD Memory Usage for mCBM digitisation

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Problem:

```
root -l '$VMCWORKDIR/macro/mcbm/mcbm_digi.C(1000,  
"/home/adriana/data/mcbmSimulations/benchmark", 1.e7, 1.e7, 0)'
```

```
adriana@Monster2: ~  
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[INFO] TrdDigitize: Finish run  
[INFO] TrdDigitize: Processing analogue buffers  
[INFO] TrdDigitize: 251 digls created and sent to DAQ  
[INFO] TrdDigitize: Run summary  
[INFO] =====  
[WARN] FairRootManager::GetOutFile() deprecated. Use separate file to store additional data.  
[INFO] =====  
[INFO] ToFDigitize: Run summary (Time includes Hist filling)  
[INFO] Events processed : 10  
[INFO] ToFPtnt / event : 83.9  
[INFO] ToFDgt / event : 32.6  
[INFO] Digls per point : 0.38858  
[INFO] Real time per event : 0.82149e-05 s  
[INFO] CbmToFDigitize: WriteHistos => Control histograms will not be written to disk!  
[INFO] CbmToFDigitize: WriteHistos => To change this behavior please provide a full path with the SetHistoFileName method  
[INFO] =====  
[INFO] Daq: Finish run  
[INFO] Buffer status: 1537 data from t = 168.115 to 7834 ns  
[INFO] STS Status DAQ buffer: 788 data from t = 1002 to 2305 ns  
[INFO] RICH Status DAQ buffer: 15 data from t = 168.115 to 2289.24 ns  
[INFO] TRD Status DAQ buffer: 408 data from t = 1800 to 7834 ns  
[INFO] TOF Status DAQ buffer: 326 data from t = 1809.93 to 2317.46 ns  
[INFO] Daq: Closing Time slice [0, 10000000] ns, data: [168.115, 7834.000] ns, STS 788 RICH 15 TRD 408 TOF 326 , MC events 11  
[INFO] Daq Buffer status: empty  
[INFO] =====  
[INFO] Daq: Run summary  
[INFO] Events: 10  
[INFO] Digls: 1537 from 168.1 ns to 7834.0 ns  
[INFO] Digls ignored: 0  
[INFO] Time slices: 1 from 0.0 ns to 10000000.0 ns  
[INFO] Empty slices: 0  
[INFO] =====  
[INFO] MCEventList: 10 MC events in list  
[INFO] =====  
[INFO] CbmDigitization: Run finished.  
[INFO] CbmDigitization: Output file is /home/adriana/data/mcbmSimulations/benchmark.raw.root  
[INFO] CbmDigitization: Parameter file is /home/adriana/data/mcbmSimulations/benchmark.par.root  
[INFO] =====  
[INFO] CbmDigitization: CPU consumption  
[INFO] -I DELETING fSpectrum  
Macro finished successfully.  
Output file is /home/adriana/data/mcbmSimulations/benchmark.raw.root  
Parameter file is /home/adriana/data/mcbmSimulations/benchmark.par.root  
Real time 0.7792 s, CPU time 0.74 s
```

```
root -l '$VMCWORKDIR/macro/mcbm/mcbm_digi.C(1000,  
"/home/adriana/data/mcbmSimulations/benchmark", 1.e7, 1.e4, 0)'
```

```
adriana@Monster2: ~  
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[INFO] Daq Buffer status: 134706 data from t = 1.025e+07 to 1.05262e+07 ns  
[INFO] Daq: Closing Time slice [10250000, 10260000] ns, data: [10250000.000, 10259998.000] ns, STS 4869 RICH 23 , MC events 1  
[INFO] Daq Buffer status: 129814 data from t = 1.026e+07 to 1.05262e+07 ns  
[INFO] Daq: Closing Time slice [10260000, 10270000] ns, data: [10260000.000, 10269999.000] ns, STS 4786 RICH 22 , MC events 1  
[INFO] Daq Buffer status: 125006 data from t = 1.027e+07 to 1.05262e+07 ns  
[INFO] Daq: Closing Time slice [10270000, 10280000] ns, data: [10270000.000, 10279999.000] ns, STS 4890 RICH 19 , MC events 1  
[INFO] Daq Buffer status: 120097 data from t = 1.028e+07 to 1.05262e+07 ns  
[INFO] Daq: Closing Time slice [10280000, 10290000] ns, data: [10280000.000, 10289998.000] ns, STS 4829 RICH 19 , MC events 1  
[INFO] Daq Buffer status: 115249 data from t = 1.029e+07 to 1.05262e+07 ns  
[INFO] Daq: Closing Time slice [10290000, 10300000] ns, data: [10290000.000, 10299992.000] ns, STS 4768 RICH 23 , MC events 1  
[INFO] Daq Buffer status: 110458 data from t = 1.03e+07 to 1.05262e+07 ns  
[INFO] Daq: Closing Time slice [10300000, 10310000] ns, data: [10300000.000, 10309999.000] ns, STS 4844 RICH 22 , MC events 1  
[INFO] Daq Buffer status: 105592 data from t = 1.031e+07 to 1.05262e+07 ns  
[INFO] Daq: Closing Time slice [10310000, 10320000] ns, data: [10310000.000, 10319995.000] ns, STS 4742 RICH 28 , MC events 1  
[INFO] Daq Buffer status: 100822 data from t = 1.032e+07 to 1.05262e+07 ns  
[INFO] Daq: Closing Time slice [10320000, 10330000] ns, data: [10320000.000, 10329999.000] ns, STS 4836 RICH 27 , MC events 1  
[INFO] Daq Buffer status: 95959 data from t = 1.033e+07 to 1.05262e+07 ns  
[INFO] Daq: Closing Time slice [10330000, 10340000] ns, data: [10330000.000, 10339992.000] ns, STS 4816 RICH 27 , MC events 1  
[INFO] Daq Buffer status: 91116 data from t = 1.034e+07 to 1.05262e+07 ns  
[INFO] Daq: Closing Time slice [10340000, 10350000] ns, data: [10340000.000, 10349999.000] ns, STS 4864 RICH 16 , MC events 1  
[INFO] Daq Buffer status: 86236 data from t = 1.035e+07 to 1.05262e+07 ns  
[INFO] Daq [0.092 s] Transported digls: 82793, Buffer status: 86236 data from t = 1.035e+07 to 1.05262e+07 ns  
[INFO] StsDigitize: Finish run  
[INFO] StsDigitize: 438 signals in analogue buffers ( from 10525372.408 ns to 10526202.295 ns )  
[INFO] StsDigitize: Processing analogue buffers  
[INFO] StsDigitize: 436 digls created and sent to DAQ ( from 10525365.000 ns to 10526210.000 ns )  
[INFO] StsDigitize: 0 signals in analogue buffers  
[INFO] =====  
[INFO] StsDigitize: Run summary  
[INFO] Events processed : 100  
[INFO] Points processed / evt : 3.5  
[INFO] Points ignored / evt : 0.0  
[INFO] Signals / event : 17.07 / 17.19  
[INFO] StsDgtl / event : 51506.9  
[INFO] Digls per point : 14806.4  
[INFO] Digls per signal : 1583.41  
[INFO] Noise digls / event : 52400.7  
[INFO] Noise fraction : 1.01735  
[INFO] Real time per event : 0.0623148 s  
[INFO] =====  
[INFO] RichDigitize: Run summary  
[INFO] Events processed : 100  
[INFO] RichPoint / event : 8  
[INFO] RichDgtl / event : 216.27  
[INFO] Digls per point : 25.9006  
[INFO] Real time per event : 0.0102444 s  
[INFO] =====  
[INFO] TrdDigitize: Finish run  
[INFO] TrdDigitize: Processing analogue buffers  
adriana@Monster2: ~
```


Results

```
root [6] cbmsim->Scan("TrdMemoryUsageDigs.eventId:TrdMemoryUsageDigs.memUsage", "Entry$==1")
```

```
*****
* Row * Instance * TrdMemory * TrdMemory *
*****
1 * 0 * 0 * 699138048 *
1 * 1 * 1 * 716505088 *
1 * 2 * 2 * 730021888 *
1 * 3 * 3 * 732454912 *
1 * 4 * 4 * 739753984 *
1 * 5 * 5 * 755433472 *
1 * 6 * 6 * 768139264 *
1 * 7 * 7 * 777330688 *
1 * 8 * 8 * 792739840 *
1 * 9 * 9 * 818151424 *
1 * 10 * 10 * 819503104 *
1 * 11 * 11 * 850862080 *
1 * 12 * 12 * 851402752 *
1 * 13 * 13 * 865730560 *
1 * 14 * 14 * 871137280 *
1 * 15 * 15 * 874110976 *
1 * 16 * 16 * 895197184 *
1 * 17 * 17 * 907362304 *
1 * 18 * 18 * 912498688 *
1 * 19 * 19 * 941424640 *
1 * 20 * 20 * 947642368 *
1 * 21 * 21 * 959537152 *
1 * 22 * 22 * 967106560 *
1 * 23 * 23 * 1.001e+09 *
1 * 24 * 24 * 1.002e+09 *
Type <CR> to continue or q to quit ==>
1 * 25 * 25 * 1.002e+09 *
1 * 26 * 26 * 1.011e+09 *
1 * 27 * 27 * 1.035e+09 *
1 * 28 * 28 * 1.064e+09 *
1 * 29 * 29 * 1.066e+09 *
1 * 30 * 30 * 1.068e+09 *
1 * 31 * 31 * 1.081e+09 *
1 * 32 * 32 * 1.100e+09 *
1 * 33 * 33 * 1.106e+09 *
1 * 34 * 34 * 1.129e+09 *
1 * 35 * 35 * 1.141e+09 *
1 * 36 * 36 * 1.146e+09 *
1 * 37 * 37 * 1.150e+09 *
1 * 38 * 38 * 1.154e+09 *
1 * 39 * 39 * 1.160e+09 *
1 * 40 * 40 * 1.171e+09 *
1 * 41 * 41 * 1.176e+09 *
1 * 42 * 42 * 1.180e+09 *
1 * 43 * 43 * 1.190e+09 *
1 * 44 * 44 * 1.202e+09 *
```

```
StsDigitize [0.188 s] Points: processed 4, ignored 0, signals: 12 / 13, digis: 162520
+ RichDigitize: Event 84 at 9784264.591 ns, points: 0, digis: 635. Exec time 0.000931 s.
+ TrdDigitize: Event 84 at 9784264.591 ns, points: 16, digis: 28. Exec time 0.000613 s. MemoryUsage Trd: 1703MB
+ TofDigitize: Event 84 at 9784264.591 ns, points: 80, digis: 31. Exec time 0.000109 s.
Daq [0.000 s] Transported digis: 0, Buffer status: 4811361 data from t = 997 to 9.78429e+06 ns

DigitizationSource: Event 85 at t = 9925857.610 ns from input 0 (entry 85)
+ StsDigitize: Generated 70670 noise signals from t = 9.78426e+06 ns to 9.92586e+06 ns
StsDigitize [0.071 s] Points: processed 2, ignored 0, signals: 5 / 4, digis: 69419
+ RichDigitize: Event 85 at 9925857.610 ns, points: 0, digis: 307. Exec time 0.000590 s.
+ TrdDigitize: Event 85 at 9925857.610 ns, points: 14, digis: 64. Exec time 0.000351 s. MemoryUsage Trd: 1719MB
+ TofDigitize: Event 85 at 9925857.610 ns, points: 100, digis: 33. Exec time 0.000110 s.
Daq [0.000 s] Transported digis: 0, Buffer status: 4881184 data from t = 997 to 9.92589e+06 ns

DigitizationSource: Event 86 at t = 9960259.043 ns from input 0 (entry 86)
+ StsDigitize: Generated 17176 noise signals from t = 9.92586e+06 ns to 9.96026e+06 ns
StsDigitize [0.017 s] Points: processed 0, ignored 0, signals: 0 / 0, digis: 16884
+ RichDigitize: Event 86 at 9960259.043 ns, points: 0, digis: 80. Exec time 0.000236 s.
+ TrdDigitize: Event 86 at 9960259.043 ns, points: 6, digis: 0. Exec time 0.003436 s. MemoryUsage Trd: 1723MB
+ TofDigitize: Event 86 at 9960259.043 ns, points: 71, digis: 29. Exec time 0.000139 s.
Daq [0.000 s] Transported digis: 0, Buffer status: 4898177 data from t = 997 to 9.96028e+06 ns

DigitizationSource: Event 87 at t = 9995383.666 ns from input 0 (entry 87)
+ StsDigitize: Generated 17523 noise signals from t = 9.96026e+06 ns to 9.99538e+06 ns
StsDigitize [0.018 s] Points: processed 10, ignored 0, signals: 40 / 38, digis: 17194
+ RichDigitize: Event 87 at 9995383.666 ns, points: 0, digis: 78. Exec time 0.000212 s.
+ TrdDigitize: Event 87 at 9995383.666 ns, points: 27, digis: 0. Exec time 0.009208 s. MemoryUsage Trd: 1727MB
+ TofDigitize: Event 87 at 9995383.666 ns, points: 120, digis: 57. Exec time 0.000144 s.
Daq [0.000 s] Transported digis: 0, Buffer status: 4915506 data from t = 997 to 9.99555e+06 ns

DigitizationSource: Event 88 at t = 9997946.081 ns from input 0 (entry 88)
+ StsDigitize: Generated 1357 noise signals from t = 9.99538e+06 ns to 9.99795e+06 ns
StsDigitize [0.004 s] Points: processed 4, ignored 0, signals: 14 / 15, digis: 1347
+ RichDigitize: Event 88 at 9997946.081 ns, points: 0, digis: 6. Exec time 0.000066 s.
+ TrdDigitize: Event 88 at 9997946.081 ns, points: 11, digis: 118. Exec time 0.007107 s. MemoryUsage Trd: 1727MB
+ TofDigitize: Event 88 at 9997946.081 ns, points: 80, digis: 29. Exec time 0.000090 s.
Daq [0.000 s] Transported digis: 0, Buffer status: 4917006 data from t = 997 to 9.99797e+06 ns

DigitizationSource: Event 89 at t = 10011471.191 ns from input 0 (entry 89)
+ StsDigitize: Generated 6726 noise signals from t = 9.99795e+06 ns to 1.00115e+07 ns
StsDigitize [0.009 s] Points: processed 4, ignored 0, signals: 28 / 27, digis: 6676
+ RichDigitize: Event 89 at 10011471.191 ns, points: 0, digis: 32. Exec time 0.000114 s.
+ TrdDigitize: Event 89 at 10011471.191 ns, points: 16, digis: 63. Exec time 0.008959 s. MemoryUsage Trd: 1728MB
+ TofDigitize: Event 89 at 10011471.191 ns, points: 85, digis: 31. Exec time 0.000179 s.
Daq [0.000 s] Transported digis: 0, Buffer status: 4923808 data from t = 997 to 1.00115e+07 ns

DigitizationSource: Event 90 at t = 10114740.793 ns from input 0 (entry 90)
+ StsDigitize: Generated 51366 noise signals from t = 1.00115e+07 ns to 1.01147e+07 ns
StsDigitize [0.050 s] Points: processed 10, ignored 0, signals: 25 / 27, digis: 50466
+ RichDigitize: Event 90 at 10114740.793 ns, points: 0, digis: 229. Exec time 0.000365 s.
+ TrdDigitize: Event 90 at 10114740.793 ns, points: 29, digis: 66. Exec time 0.009053 s. MemoryUsage Trd: 1739MB
+ TofDigitize: Event 90 at 10114740.793 ns, points: 154, digis: 53. Exec time 0.000179 s.
```

Results

