

Example of the Trigger Simulation

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Main Trigger Types for the SRC experiment

FCAL & BCAL & ST (small energy thresholds for FCAL and BCAL)	bit 1
FCAL & BCAL (large thresholds)	bit 2
PS	bit 4

Trigger Simulation

- Interface with the RCDB, CCDB (retrieve parameters using run number)
- Simulate pulse shapes
- Simulate hardware performance, realistic integration window sizes, thresholds, etc
- Simulate gains, baseline fluctuating, etc.

Example of the Trigger Simulation

Use particle gun to check trigger

5 GeV photon (at 4 degrees)

File Edit View Search Terminal Help

```
=====
Event: 8
DFCALHit:
 row: column: x(cm): y(cm):  E(MeV):  t(ns):  integral over peak:
-----
 27    39   40.7   -8.0    22.702  21.637    6.000
 27    40   44.7   -8.0     8.818  20.618    6.000
 27    41   48.7   -8.0    21.890  20.472    6.000
 28    38   36.7   -4.0    87.607  21.113    6.000
 28    39   40.7   -4.0   127.957  20.756    6.000
 28    40   44.7   -4.0    77.977  21.561    6.000
 29    37   32.7   -0.0    28.986  21.047    6.000
 29    38   36.7   -0.0   357.378  21.706    6.000
 29    39   40.7   -0.0  3947.742  21.460    6.000
 29    40   44.7   -0.0   183.726  21.135    6.000
 29    41   48.7   -0.0    42.819  21.005    6.000
 30    38   36.7    4.0    32.682  21.354    6.000
 30    39   40.7    4.0   200.100  20.937    6.000
 30    40   44.7    4.0    76.547  20.489    6.000
 31    40   44.7    8.0    40.780  20.830    6.000
```

```
DLIMCTrigger:
 trig_mask: FCAL E(GeV): FCAL ADC E(cnt): FCAL ADC E(GeV): FCAL GTP E(cnt): FCAL GTP E(GeV): BCAL E(GeV): BCAL ADC E(cnt): BCAL ADC E(GeV): BCAL GTP E(cnt): BCAL GTP E(GeV): Trig Time (samp):
0x00000002      5.258          16239          4.354          15251          4.089          0.000          0          0.000          0          0.000          10
```

< Hit return for the next event (P=prev. Q=quit) >

FCAL & BCAL trigger

Example of the Trigger Simulation

5 GeV pi- (at 4 degrees)

```
File Edit View Search Terminal Help
DSCHit:
sector:    dE:      t: t_TDC: t_fADC: has_fADC: has_TDC:
-----
   1  0.001  6.170  6.170  6.170          1      1

--- Configuration Parameters ---
THREAD_TIMEOUT = 30 seconds
-----
=====
Event: 2
DFCALHit:
row: column: x(cm): y(cm): E(MeV): t(ns): integral over peak:
-----
  30    39   40.7   4.0  299.039  21.375          6.000
  31    39   40.7   8.0   88.848  21.103          6.000

DLIMCTrigger:
trig_mask: FCAL E(GeV): FCAL ADC E(cnt): FCAL ADC E(GeV): FCAL GTP E(cnt): FCAL GTP E(GeV): BCAL E(GeV): BCAL ADC E(cnt): BCAL ADC E(GeV): BCAL GTP E(cnt): BCAL GTP E(GeV): Trig Time (samp):
-----
0x00000001      0.388              1473          0.395          1449          0.388          0.000          0          0.000          0          0.000          0          0.000          7

DSCHit:
sector:    dE:      t: t_TDC: t_fADC: has_fADC: has_TDC:
-----
   1  0.002  6.108  6.108  6.108          1      1

< Hit return for the next event (P=prev. Q=quit) >
```

FCAL & BCAL & ST trigger

Example of the Trigger Simulation

6.5 GeV pi- (at 4 degrees)

```
File Edit View Search Terminal Help
30 36 28.6 4.0 13.008 21.774 6.000
30 37 32.7 4.0 114.244 21.742 6.000
30 38 36.7 4.0 285.699 20.823 6.000
30 39 40.7 4.0 3822.174 22.137 6.000
30 40 44.7 4.0 628.225 21.894 6.000
30 41 48.7 4.0 37.844 21.467 6.000
31 35 24.6 8.0 36.836 21.157 6.000
31 36 28.6 8.0 125.722 22.121 6.000
31 37 32.7 8.0 224.917 21.454 6.000
31 38 36.7 8.0 88.799 21.725 6.000
31 39 40.7 8.0 195.498 21.272 6.000
31 40 44.7 8.0 48.518 22.165 6.000
31 42 52.7 8.0 50.833 20.850 6.000
32 39 40.7 12.0 21.880 20.820 6.000
32 40 44.7 12.0 30.906 20.759 6.000
32 43 56.7 12.0 26.606 21.199 6.000
33 39 40.7 16.1 31.796 21.234 6.000

DLIMCTrigger:
trig_mask: FCAL E(GeV): FCAL ADC E(cnt): FCAL ADC E(GeV): FCAL GTP E(cnt): FCAL GTP E(GeV): BCAL E(GeV): BCAL ADC E(cnt): BCAL ADC E(GeV): BCAL GTP E(cnt): BCAL GTP E(GeV): Trig Time (samp):
-----
0x00000003 6.279 20829 5.584 19778 5.302 0.004 12643 0.278 147 0.003 7

DSCHit:
sector: E: t: t_TDC: t_fADC: has_fADC: has_TDC:
-----
1 0.002 5.753 5.753 5.753 1 1

< Hit return for the next event (P=prev. Q=quit) >
```

FCAL & BCAL & ST trigger
FCAL & BCAL trigger

Example of the Trigger Simulation

```
File Edit Options Buffers Tools Help
[Icons: Save, Undo, Cut, Copy, Paste, Find]
#include <TRIGGER/DL1MCTrigger.h>

jerror_t DEventProcessor_trigger_test::evnt(JEventLoop *loop, uint64_t eventnumber)
{
    vector<constDL1MCTrigger*>trigger;
    loop->Get(trigger);

    cout << "Trigger size = " << trigger.size() << endl;

    if(trigger.size() > 0) {
        cout << trigger[0]->trig_mask << " " << trigger[0]->fcal_en << endl;
    }

}

}
```

U:--- code_example.txt All L16 (Text)

Wrote /home/somov/l1_src_example/code_example.txt