

Current L1Mu Octant Trigger Decisions V3.0 on October 9, 2002

The tables below contain current L1Mu octant trigger decisions. These are subsequently used to form the regional trigger decisions on the MTCM (sums of sums) and the L1Mu specific triggers on the MTM. These octant trigger decisions are important as they show how "Loose" and "Tight" are currently defined using scintillator and wire hits. They are also important as they form the basis of the possible terms on the MTM. Other definitions (i.e. combinations of detector layers) can be implemented but the tables show the definitions currently used.

PT1-4 triggers are a coincidence between L1CFT tracks and scintillator hits. PT1-4 correspond to the following L1CFT P_T thresholds: PT1=2 GeV/c, PT2 = 4 GeV/c, PT3 = 7 GeV/c, PT4 = 11 GeV/c. PTX triggers are scintillator only triggers (no L1CFT tracks are used).

Type	Description
CF MTC05	Uses L1CFT tracks and/or APhi/CS scintillator hits
CF MTC10	Uses PDT wire hits and/or APhi/CS scintillator hits
EF MTC05	Uses L1CFT tracks and/or PIXEL scintillator hits
EF MTC10	Uses MDT wire centroids and/or PIXEL scintillator hits

Table 1. List of the different octant trigger decisions made.

Counter #	Description	Name
0	2-bit counter, APhi, PT1, +	PT1 Scintillator Loose for $0.0 < \eta < 1.0$
1	2-bit counter, APhi, PT1, -	
2	2-bit counter, APhi, PT2, +	PT2 Scintillator Loose for $0.0 < \eta < 1.0$
3	2-bit counter, APhi, PT2, -	
4	2-bit counter, APhi, PT3	PT3 Scintillator Loose for $0.0 < \eta < 1.0$
5	2-bit counter, APhi, PT4	PT4 Scintillator Loose for $0.0 < \eta < 1.0$
6	2-bit counter, APhi and CS, PT2	PT2 Scintillator Tight for $0.0 < \eta < 1.0$
7	2-bit counter, APhi and CS, PT3	PT3 Scint Tight for $0.0 < \eta < 1.0$
8	2-bit counter, APhi and CS, PT4	PT4 Scint Tight for $0.0 < \eta < 1.0$
9	2-bit counter, APhi, PTX	PTX Scint Loose for $0.0 < \eta < 1.0$
20	2-bit counter, CS, PTX	PTX C-Layer for $0.0 < \eta < 1.0$
11	2-bit counter, APhi and CS, PTX	PTX Scint Tight for $0.0 < \eta < 1.0$

12	2-bit counter, CFT only, PT4	CFT only PT4 for $0.0 < \eta < 1.5$
13	2 bits for testing	BOT on bit 0, debug bit on bit 1

Table 2. CF MTC05 octant trigger decisions.

Octant	PT	Quality	Layers	Anchor	Count Two
4, 7	PT1	Loose	A	A	A
4, 7	PT2-4	Loose	A	A	A
4, 7	PTX	Loose	A	A	A
4, 7	PT1	Tight = Loose			
4, 7	PT2-4	Tight	AB or AC	A	A
4, 7	PTX	Tight	AB or AC	A	A
5, 6	PT1	Loose	A	A	A
5, 6	PT2-4	Loose	A or B or C	None	All
5, 6	PTX	Loose	A or B or C	None	All
5, 6	PT1	Tight = Loose			
5, 6	PT2-4	Tight	AB or AC or BC	A	A
5, 6	PTX	Tight	AB or AC or BC	A	A

Table 3. CF MTC05 layers used in logic for octants 4-7.

Counter #	Description	Name
14	2-bit counter for monitoring	B-layer OR on bit 0, C-layer OR on bit 1
15	2-bit counter, A centroid	Wire Loose A only for $0.0 < \eta < 1.0$
16	2-bit counter, AB or AC PDT centroid (Octants 5 and 6 use AB or AC or BC)	Wire Tight for $0.0 < \eta < 1.0$
17	2 bits for testing	BOT on bit 0, debug bit on bit 1

Table 4. CF MTC10 octant trigger decisions.

Counter #	Description	Name
0	2-bit counter, A PIXEL, PT1	PT1 Scint Loose for $1.0 < \eta < 1.5$
1	2-bit counter, A PIXEL, PT2	PT2 Scint Loose for $1.0 < \eta < 1.5$
2	2-bit counter, A PIXEL, PT3	PT3 Scint Loose for $1.0 < \eta < 1.5$
3	2-bit counter, A PIXEL, PT4	PT4 Scint Loose for $1.0 < \eta < 1.5$
4	2-bit counter AB or BC PIXEL	PT2 Scint Tight for $1.0 < \eta < 1.5$

	PT2	
5	2-bit counter AB or BC PIXEL PT3	PT3 Scint Tight for $1.0 < \eta < 1.5$
6	2-bit counter AB or BC PIXEL PT4	PT4 Scint Tight for $1.0 < \eta < 1.5$
7	2-bit counter, A PIXEL, PTX	Scint only Loose for $1.0 < \eta < 1.5$
8	2-bit counter, A PIXEL, PTX	Scint only Loose for $1.5 < \eta < 2.0$
9	2-bit counter, AB PIXEL, PTX	Scint only Tight for $1.0 < \eta < 1.5$
10	2-bit counter, AB PIXEL PTX	Scint only Tight for $1.5 < \eta < 2.0$
11	2 bits for testing	BOT on bit 0, B- or C-layer OR bit 1

Table 5. EF MTC05 octant trigger decisions.

Counter #	Description	Name
12	2-bit counter, A MDT centroid	Wire Loose for $1.0 < \eta < 1.5$
13	2-bit counter, A MDT centroid	Wire Loose for $1.5 < \eta < 2.0$
14	2-bit counter, AB or BC MDT centroid	Wire Tight for $1.0 < \eta < 1.5$
15	2-bit counter, AB or BC MDT centroid	Wire Tight for $1.5 < \eta < 2.0$
16	2 bits for monitoring	Bit 0 = B layer OR, Bit 1 = C layer OR
17	2 bits for testing	BOT on bit 0, debug bit on bit 1

Table 6. EF MTC10 octant trigger decisions.

As mentioned above, the above counters are used on the MTCM to form "sum of sums" for Loose and Tight triggers. The MTCM also forms sums that are combinations of "05 and "10" triggers. Presently these combinations are "Loose, Loose", "Tight, Tight", and "Tight, Loose". Good "05" and "10" matches are required to be in the same octant. These combination sums are defined in Table 7 for the CF region and Table 8 for the EF region.

Counter #	Description
0	PT1+ Scintillator Loose and Wire Loose
1	PT1- Scintillator Loose and Wire Loose
2	PT2+ Scintillator Loose and Wire Loose
3	PT2- Scintillator Loose and Wire Loose
4	PT3 Scintillator Loose and Wire Loose
5	PT4 Scintillator Loose and Wire Loose
6	PTX Scintillator Loose and Wire Loose
7	PT2 Scintillator Tight and Wire Tight
8	PT3 Scintillator Tight and Wire Tight
9	PT4 Scintillator Tight and Wire Tight

10	PTX Scintillator Tight and Wire Tight
11	PT2 Scintillator Tight and Wire Loose
12	PT3 Scintillator Tight and Wire Loose
13	PT4 Scintillator Tight and Wire Loose
14	PTX Scintillator Tight and Wire Loose
15	Spare
16	Spare
17	Spare

Table 7. CF MTCM combination sums.

Counter #	Description
0	PT1 Scintillator Loose and Wire Loose for $1.0 < \eta < 1.5$
1	PT2 Scintillator Loose and Wire Loose for $1.0 < \eta < 1.5$
2	PT3 Scintillator Loose and Wire Loose for $1.0 < \eta < 1.5$
3	PT4 Scintillator Loose and Wire Loose for $1.0 < \eta < 1.5$
4	PTX Scintillator Loose and Wire Loose for $1.0 < \eta < 1.5$
5	PT2 Scintillator Tight and Wire Tight for $1.0 < \eta < 1.5$
6	PT3 Scintillator Tight and Wire Tight for $1.0 < \eta < 1.5$
7	PT4 Scintillator Tight and Wire Tight for $1.0 < \eta < 1.5$
8	PTX Scintillator Tight and Wire Tight for $1.0 < \eta < 1.5$
9	PT2 Scintillator Tight and Wire Loose for $1.0 < \eta < 1.5$
10	PT3 Scintillator Tight and Wire Loose for $1.0 < \eta < 1.5$
11	PT4 Scintillator Tight and Wire Loose for $1.0 < \eta < 1.5$
12	PTX Scintillator Tight and Wire Loose for $1.0 < \eta < 1.5$
13	PTX Scintillator Loose and Wire Loose for $1.5 < \eta < 2.0$
14	PTX Scintillator Tight and Wire Tight for $1.5 < \eta < 2.0$
15	PTX Scintillator Tight and Wire Loose for $1.5 < \eta < 2.0$
16	Spare
17	Spare

Table 8. EF MTCM combination sums.