Proton-Proton Triggers

Input Parameters

RHIC luminosities	proton-proton from Roser plan				
	L (average) [cm-2s-1]	L (peak) [cm-2s-1]	cross section [barns]	coll/sec (ave)	coll/sec (peak)
	1.00E+31	1.60E+31	4.20E-02	4.20E+05	6.72E+05
PHENIX limits	L1 accept rate	L1*L2 rate = archive			
	4.50E+03	1.20E+03			

Assume an N week long data taking period, a 40% duty factor for RHIC (from Roser), and 50% duty factor from PHENIX.

Number of weeks	Seconds	Collisions in PHENIX	% of archive rate for MB	MB Collisions archived
3	1.81E+06	2.44E+11	0.2	8.71E+07

Lvl1 Trigger Index	Lvl1 Trigger Name	Expected Rejection	Lvl1 Prescale*	Rate at Average	Rate at Peak	Associated Lvl2
1	MB: BBCLL1	1	500	838	1341	
2	Clock*(Yfill+Bfill)	1	999999	0	1	
3	MB && ZDCNS	1	999999	0	1	
4	ZDCNS	1	999999	0	1	
5	MUID-S-LL1: 1 deep	240	0	1750	2800	L2 MUID-MUTR match
6	MUID-N-BLT: 1 deep	240	0	1750	2800	L2 MUID-MUTR match
7	MUID-S-LL1: 1 d, 1s	2400	0	175	280	
8	MUID-N-BLT: 1 d, 1 s	2400	0	175	280	
9	EMC 2x2: Thresh 700	90	1	2333	3733	L2 2x2 Cleanup
10	EMC 4x4a:	600	0	700	1120	L2 4x4a Cleanup
11	EMC 4x4b:	1100	0	382	611	L2 4x4b Cleanup
12	ERT-electron	1	999999	0	1	
13	ERT-RICH pair	1	999999	0	1	
			Total ===>	8106	12969	
				# MUST BE <	4.50E+03	

* Note that Level1 Prescale is such that 0 means no prescale, 1 means take 50% of triggered events, etc.
** Note that Level2 Prescale is such that 0 means disable, 1 means take 100% of triggered events, 2 means take 50% of triggered events, etc.

Remember there are trigger overlaps that need to be accounted for….

List of Trigger Contraints
tie into above chart where you can and other require that they be checked for consistency

32 Level-1 Logical Triggers Maximum
32 RBIB Inputs Maximum

RBIB Input Index	RBIB Input Name
0	ZDCNS with vtx cut
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	MUID 1S - South
12	MUID 1D - South
13	MUID 1S-1D South
14	….
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	

Exp. Rejection	Lvl2 Prescale**	Rate (ave)	Rate (peak)
1	4	210	335
1	1	0	1
1	1	0	1
1	1	0	1
2	3	292	467
2	3	292	467
1	1	175	280
1	1	175	280
3	2	389	622
4	1	175	280
4	1	95	153
1	1	0	1
1	1	0	1
		1804	**2887**

# MUST BE <	**1.20E+03**