

DØ Shifters Meeting, August 7, 2001, Fermilab

Global Triggers, Prescales, etc.

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<http://www-d0.fnal.gov/~blevan/tm>

General

- Current global configuration file
`global_L1CalMuon-1.2.xml`
- All triggers filter only at Level 1
- No Level 2
- Level 3 Mark & Pass (L3 input rate limited to about 10Hz)
- One exposure group
- One global stream "all"
- All initial Trigger Prescales set to 10K in the configuration (xml) file with more realistic values stored in *.prescales text files for the ease of change

L1 Calorimeter Reference Sets

EM:

- EM5, $|\eta| < 0.8$, all ϕ
- EM5, $|\eta| < 0.8$, $0.6 < \phi < 1.2$ [CFT]
(EM5eta8phi3)
- EM8, $0.0 < \eta < 0.6$, $1.8 < \phi < 2.2$ [CAL]
(EM8eta3phi2)
- EM12, $|\eta| < 0.8$, all ϕ

JET:

- JT5, $|\eta| < 0.8$, all ϕ
- JT10, $|\eta| < 0.8$, $0.6 < \phi < 1.2$ [CFT]
(JT10eta8phi3)
- JT25, $0.0 < \eta < 0.6$, $1.8 < \phi < 2.2$ [CAL]
(JT25eta3phi2)
- JT40, $|\eta| < 0.8$, all ϕ

Hadronic veto:

- 10K, $|\eta| < 0.8$, all ϕ — i.e. effectively turned off in all triggers

L1 Triggers (1)

for L~4E30 & R~6-7Hz

[prsc/rate]

1. Zero Bias ("live_accel_bx") [2E7/<0.1]
2. Minimum Bias (ZB+"fastz") [7E5/0.1]
3. CEM(1, EM5) [2000/0.1]
4. CEM(1, EM5eta8phi3) [40/0.5]
5. CEM(1, EM8eta3phi2) [2/0.5]
6. CEM(1, EM12) [1/up to 1]

and duplicates of CEM with "fastz"

7. CJT(1, JT5) [2500/0.1]
8. CJT(1, JT10eta8phi3) [2/0.5]
9. CJT(1, JT25eta3phi2) [1/0.5]
10. CJT(1, JT40) [1/up to 1]

and duplicates of CJT with "fastz"

L1 Triggers (2)

11. mu1cmisc_fz — 1 muon with A & C layer scint coinc, Central [70/0.5]

12. mu1pixn_fz — 1 muon with A & B layer scint coinc, North [20/0.5]

13. mu1pixs_fz — 1 muon with A & B layer scint coinc, South [35/0.5]

(d0server1/users/johns/xls/mtm-terms-may-june.xls)

14. mu1cmisc_fz + JT5 [1/0.5]

15. mu1cmisc_fz + JT40 [1/-]

16. mu1cmisc_fz + JT10eta8phi3 [1/-]

17. CEM(2, EM12) — di-EM [1/up to 1]

➤ 25 Triggers (limit is 32)

➤ Try to keep Highest Et, geometry/detector-specific, and muon+jet Triggers unprescaled

Outlook

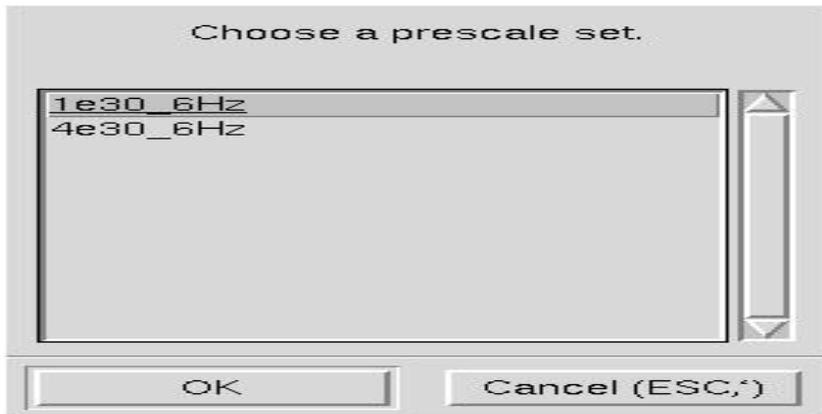
- How much longer should we keep duplicate triggers with “fastz” requirement?
- How much longer should we keep CAL specific triggers (requested by Vishnu)?
- Soon will have di-muons, then dedicate most of the bandwidth to di-EM/muon
- Try muon triggers without fastz requirement
- For timing studies at least, may need more than one exposure group
- Any more requests for MINBIAS? How many events?
- Increase number of L3 nodes from 5 to 8 (12 max)?
- Allow shifters to write to the prescales files in a new, dedicated area
- More than one data stream??

Trigger Download

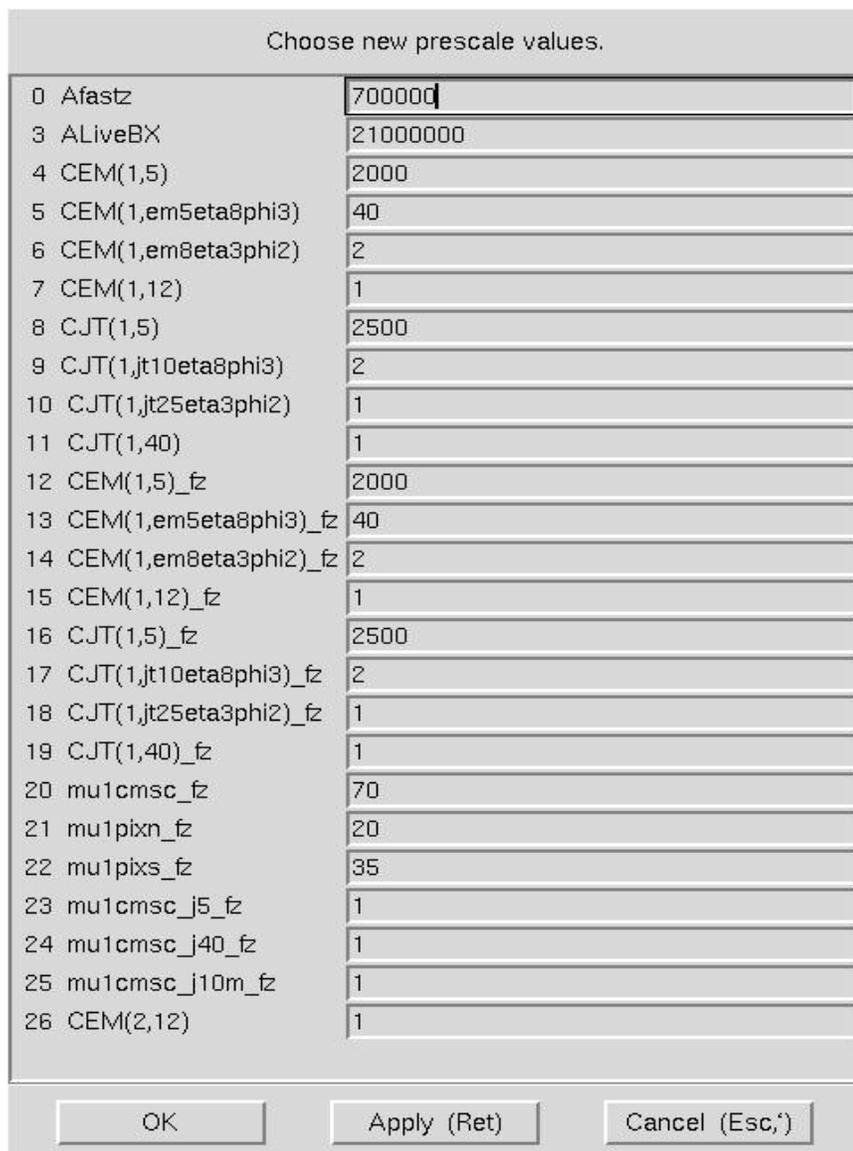
- Download Trigger from the taker
 - Modify → Change Trigger
- Always download prescales from a *.prescales file
 - Modify → Prescales Set
 - Note that otherwise all prescales would be set to 10K (!), which is the default value of all prescales in the xml...

```
File Modify Info Extensions
Status: configured Run number:
Config: official/global_L1CalHuc-12 Prescale Set: 1x30_9Hz Recording: off
Done: 11bit:005 <Coor Set SpTrg #5 Follows Exposure Group #0><Done><Coor Set SpTrg #5 Require And-Or Term(s) # 129 243 -247 255><Done><Coor Set SpTrg #5 Prescale Ra
Done: 11bit:008
Done: 11bit:009
Done: 11bit:010
Done: 11bit:011
Done: 11bit:012
Done: 11bit:013
Done: 11bit:014
Done: 11bit:015
Done: 11bit:016
Done: 11bit:017
Done: 11bit:018
Done: 11bit:019
Done: 11bit:020
Done: 11bit:021
Done: 11bit:022
Done: 11bit:023
Done: 11bit:024
Done: 11bit:025
Done: 11bit:026
Done: 11stream:001
Done: 11bit:006 <Coor Set SpTrg #6 Follows Exposure Group #0><Done><Coor Set SpTrg #6 Require And-Or Term(s) # 130 243 -247 255><Done><Coor Set SpTrg #6 Prescale Ra
Done: 11bit:007 <Coor Set SpTrg #7 Follows Exposure Group #0><Done><Coor Set SpTrg #7 Require And-Or Term(s) # 131 243 -247 255><Done><Coor Set SpTrg #7 Prescale Ra
Done: 11bit:008 <Coor Set SpTrg #8 Follows Exposure Group #0><Done><Coor Set SpTrg #8 Require And-Or Term(s) # 136 243 -247 255><Done><Coor Set SpTrg #8 Prescale Ra
Done: 11bit:009 <Coor Set SpTrg #9 Follows Exposure Group #0><Done><Coor Set SpTrg #9 Require And-Or Term(s) # 137 243 -247 255><Done><Coor Set SpTrg #9 Prescale Ra
Done: 11bit:010 <Coor Set SpTrg #10 Follows Exposure Group #0><Done><Coor Set SpTrg #10 Require And-Or Term(s) # 138 243 -247 255><Done><Coor Set SpTrg #10 Prescale Ra
Done: 11bit:011 <Coor Set SpTrg #11 Follows Exposure Group #0><Done><Coor Set SpTrg #11 Require And-Or Term(s) # 139 243 -247 255><Done><Coor Set SpTrg #11 Prescale Ra
Done: 11bit:012 <Coor Set SpTrg #12 Follows Exposure Group #0><Done><Coor Set SpTrg #12 Require And-Or Term(s) # 128 217 243 -247 255><Done><Coor Set SpTrg #12 Pres
Done: 11bit:013 <Coor Set SpTrg #13 Follows Exposure Group #0><Done><Coor Set SpTrg #13 Require And-Or Term(s) # 129 217 243 -247 255><Done><Coor Set SpTrg #13 Pres
Done: 11bit:014 <Coor Set SpTrg #14 Follows Exposure Group #0><Done><Coor Set SpTrg #14 Require And-Or Term(s) # 130 217 243 -247 255><Done><Coor Set SpTrg #14 Pres
Done: 11bit:015 <Coor Set SpTrg #15 Follows Exposure Group #0><Done><Coor Set SpTrg #15 Require And-Or Term(s) # 131 217 243 -247 255><Done><Coor Set SpTrg #15 Pres
Done: 11bit:016 <Coor Set SpTrg #16 Follows Exposure Group #0><Done><Coor Set SpTrg #16 Require And-Or Term(s) # 136 217 243 -247 255><Done><Coor Set SpTrg #16 Pres
Done: 11bit:017 <Coor Set SpTrg #17 Follows Exposure Group #0><Done><Coor Set SpTrg #17 Require And-Or Term(s) # 137 217 243 -247 255><Done><Coor Set SpTrg #17 Pres
Done: 11bit:018 <Coor Set SpTrg #18 Follows Exposure Group #0><Done><Coor Set SpTrg #18 Require And-Or Term(s) # 138 217 243 -247 255><Done><Coor Set SpTrg #18 Pres
Done: 11bit:019 <Coor Set SpTrg #19 Follows Exposure Group #0><Done><Coor Set SpTrg #19 Require And-Or Term(s) # 139 217 243 -247 255><Done><Coor Set SpTrg #19 Pres
Done: 11bit:020 <Coor Set SpTrg #20 Follows Exposure Group #0><Done><Coor Set SpTrg #20 Require And-Or Term(s) # 80 217 243 -247 255><Done><Coor Set SpTrg #20 Presc
Done: 11bit:021 <Coor Set SpTrg #21 Follows Exposure Group #0><Done><Coor Set SpTrg #21 Require And-Or Term(s) # 81 217 243 -247 255><Done><Coor Set SpTrg #21 Presc
Done: 11bit:022 <Coor Set SpTrg #22 Follows Exposure Group #0><Done><Coor Set SpTrg #22 Require And-Or Term(s) # 82 217 243 -247 255><Done><Coor Set SpTrg #22 Presc
Done: 11bit:023 <Coor Set SpTrg #23 Follows Exposure Group #0><Done><Coor Set SpTrg #23 Require And-Or Term(s) # 80 136 217 243 -247 255><Done><Coor Set SpTrg #23 P
Done: 11bit:024 <Coor Set SpTrg #24 Follows Exposure Group #0><Done><Coor Set SpTrg #24 Require And-Or Term(s) # 80 139 217 243 -247 255><Done><Coor Set SpTrg #24 P
Done: 11bit:025 <Coor Set SpTrg #25 Follows Exposure Group #0><Done><Coor Set SpTrg #25 Require And-Or Term(s) # 80 136:137 217 243 -247 255><Done><Coor Set SpTrg #
Done: 11bit:026 <Coor Set SpTrg #26 Follows Exposure Group #0><Done><Coor Set SpTrg #26 Require And-Or Term(s) # 135 243 -247 255><Done><Coor Set SpTrg #26 Prescale
Download completed.
Turning recording off.
Downloading.
Done: logoff:000
Download completed.
Start (Alt-s) Pause (Alt-p)
14:31:35 Run 126902 has ended with approximately 26901 events.
```

Setting Prescales



Choose the appropriate prescales file (Lum, L3 Input rate, etc...)



Start the Run with "recording off" and try to tune prescales values

Modify → Change Prescales

to that in the Run plan and/or in the prescales file (given in terms of % of the L3 input rate)

Tuning Prescales

According to Michael, the “Fired” rate is the actual L1 rate including prescales, deadtimes...

“And/Or Fired” on the other hand is possible maximum rate of the trigger and

“Exposed” is the exposed rate of the trigger which is “And/Or Fired” plus deadtimes and various disables

The screenshot shows the 'L1 Trigger Monitor' window with the following data table:

Trig#	Trig Name	Fired (Hz)	And/Or Fired (Hz)	Exposed (Hz)	Prescaler Disable (%)	FE Busy Disable (%)
0	Afastz	0.0	0.38706	0.0	758526.3715	9664.38521
1	11bit1	0.0	47711.73329	0.0	7585779.31218	7439246.34685
2	none	5.41878	7586176.6245	5.41878	7586279.58123	9664.38521
3	ALiveRX	0.0	1717623.17262	0.0	7585526.3715	9664.38521
4	CEM(1,5)	0.0	0.19353	0.0	7585526.3715	9664.38521
5	CEM(1,em5eta8phi3)	0.0	0.0	0.0	7585526.3715	9664.38521
6	CEM(1,em8eta3phi2)	0.0	0.0	0.0	7585526.3715	9664.38521
7	CEM(1,12)	0.0	0.0	0.0	7585526.3715	9664.38521
8	CJT(1,5)	0.0	21.28804	0.0	7585526.3715	9664.38521
9	CJT(1,jt10eta8phi3)	0.0	0.0	0.0	7585526.3715	9664.38521
10	CJT(1,jt25eta3phi2)	0.0	0.0	0.0	7585526.3715	9664.38521
11	CJT(1,40)	0.0	0.0	0.0	7585526.3715	9664.38521
12	CEM(1,5)_fz	0.0	0.0	0.0	7585526.3715	9664.38521
13	EM(1,em5eta8phi3)_fz	0.0	0.0	0.0	7585526.3715	9664.38521
14	EM(1,em8eta3phi2)_fz	0.0	0.0	0.0	7585526.3715	9664.38521
15	CEM(1,12)_fz	0.0	0.0	0.0	7585526.3715	9664.38521
16	CJT(1,5)_fz	0.0	0.0	0.0	7585526.3715	9664.38521
17	T(1,jt10eta8phi3)_fz	0.0	0.0	0.0	7585526.3715	9664.38521
18	T(1,jt25eta3phi2)_fz	0.0	0.0	0.0	7585526.3715	9664.38521
19	CJT(1,40)_fz	0.0	0.0	0.0	7585526.3715	9664.38521
20	mulcusc_fz	0.0	0.0	0.0	7585526.3715	9664.38521
21	mulpixn_fz	0.0	0.0	0.0	7585526.3715	9664.38521
22	mulpixs_fz	0.0	0.0	0.0	7585526.3715	9664.38521
23	mulcusc_j5_fz	0.0	0.0	0.0	7585526.3715	9664.38521
24	mulcusc_j40_fz	0.0	0.0	0.0	7585526.3715	9664.38521
25	mulcusc_j10w_fz	0.0	0.0	0.0	7585526.3715	9664.38521
26	CEM(2,12)	0.0	0.0	0.0	7585526.3715	9664.38521