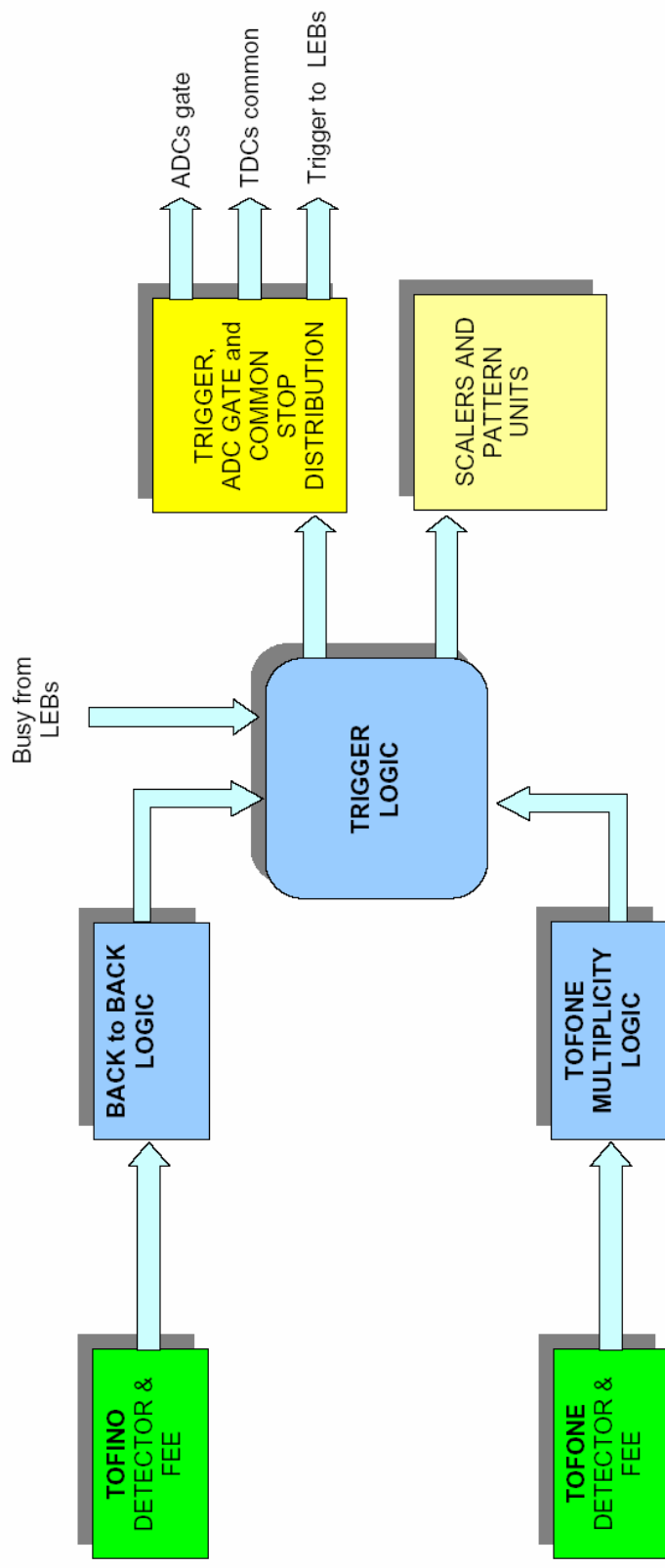


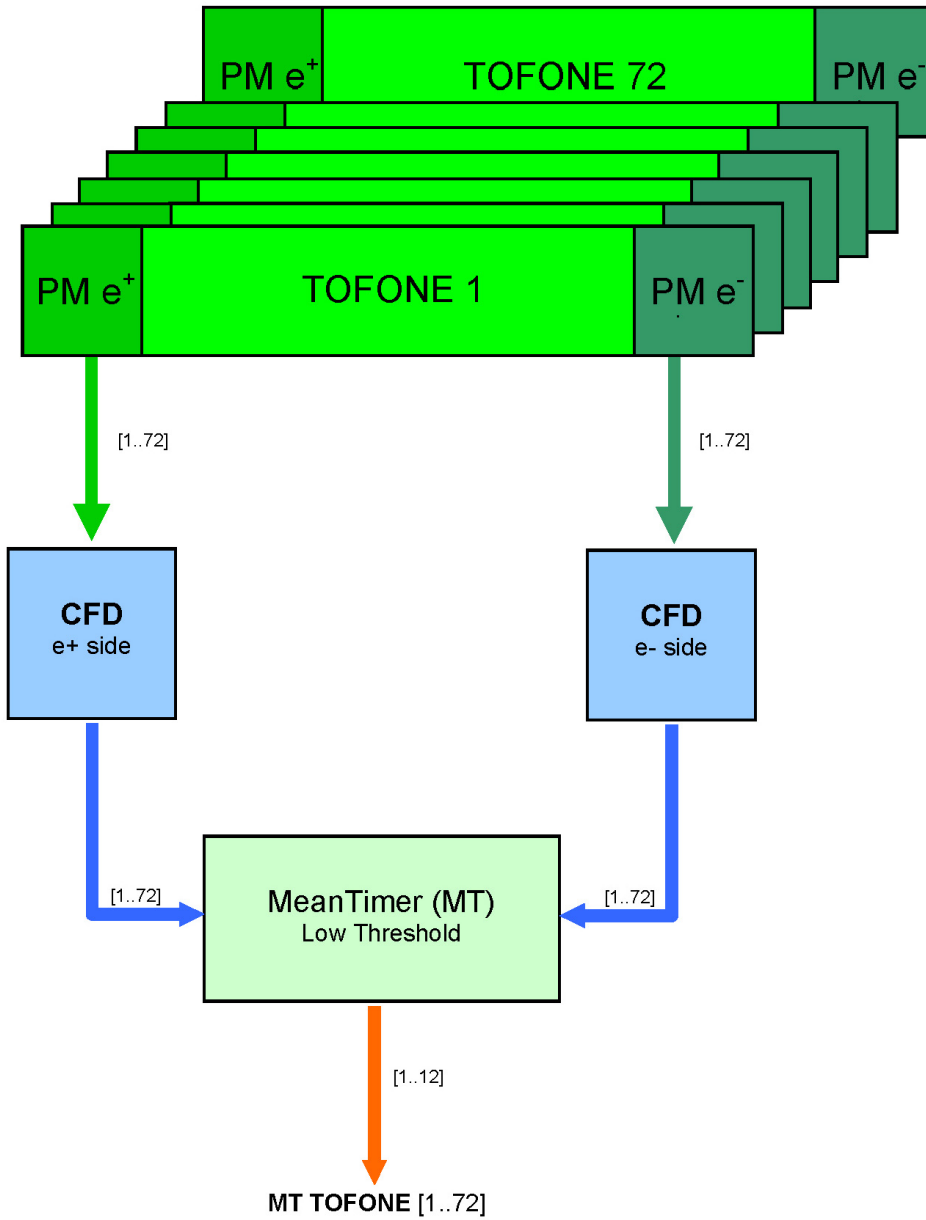
# FINUDA TRIGGER

(version 1.4 - May 14<sup>th</sup>, 2005)

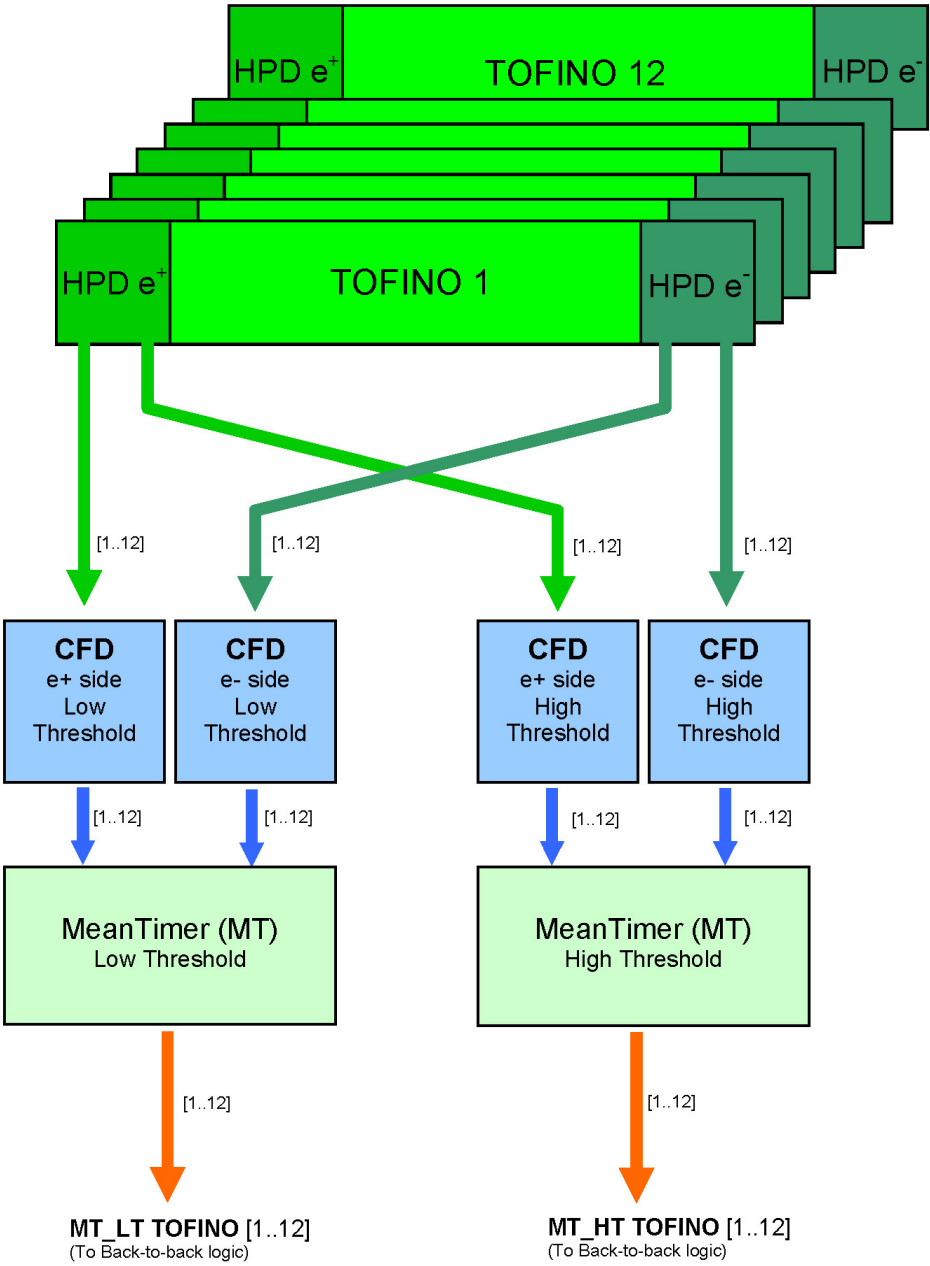
[http://www.lnf.infn.it/esperimenti/finuda/Trigger/Trigger\\_home\\_page.htm](http://www.lnf.infn.it/esperimenti/finuda/Trigger/Trigger_home_page.htm)



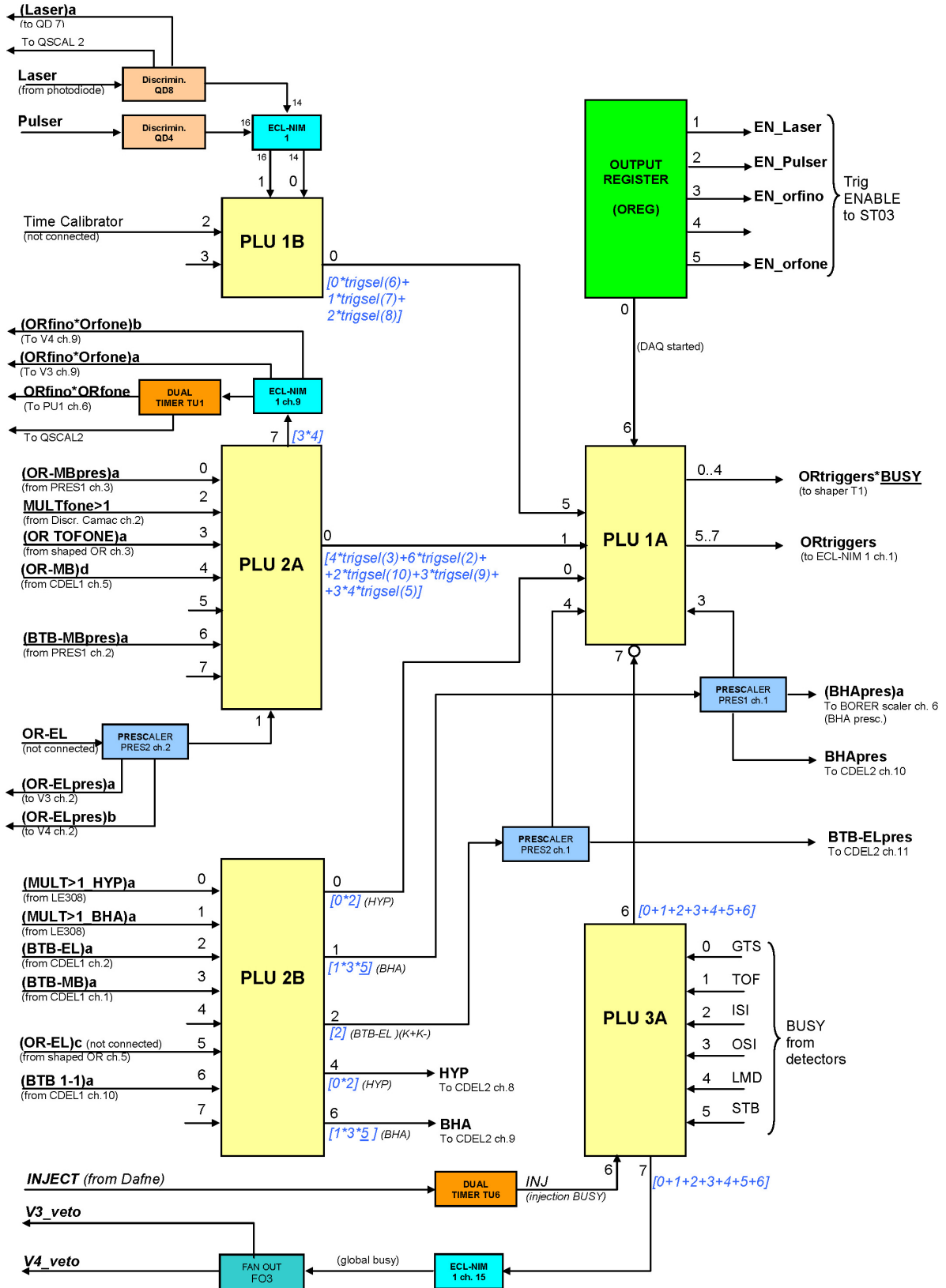
# TOFONE DETECTOR & FEE (pit)



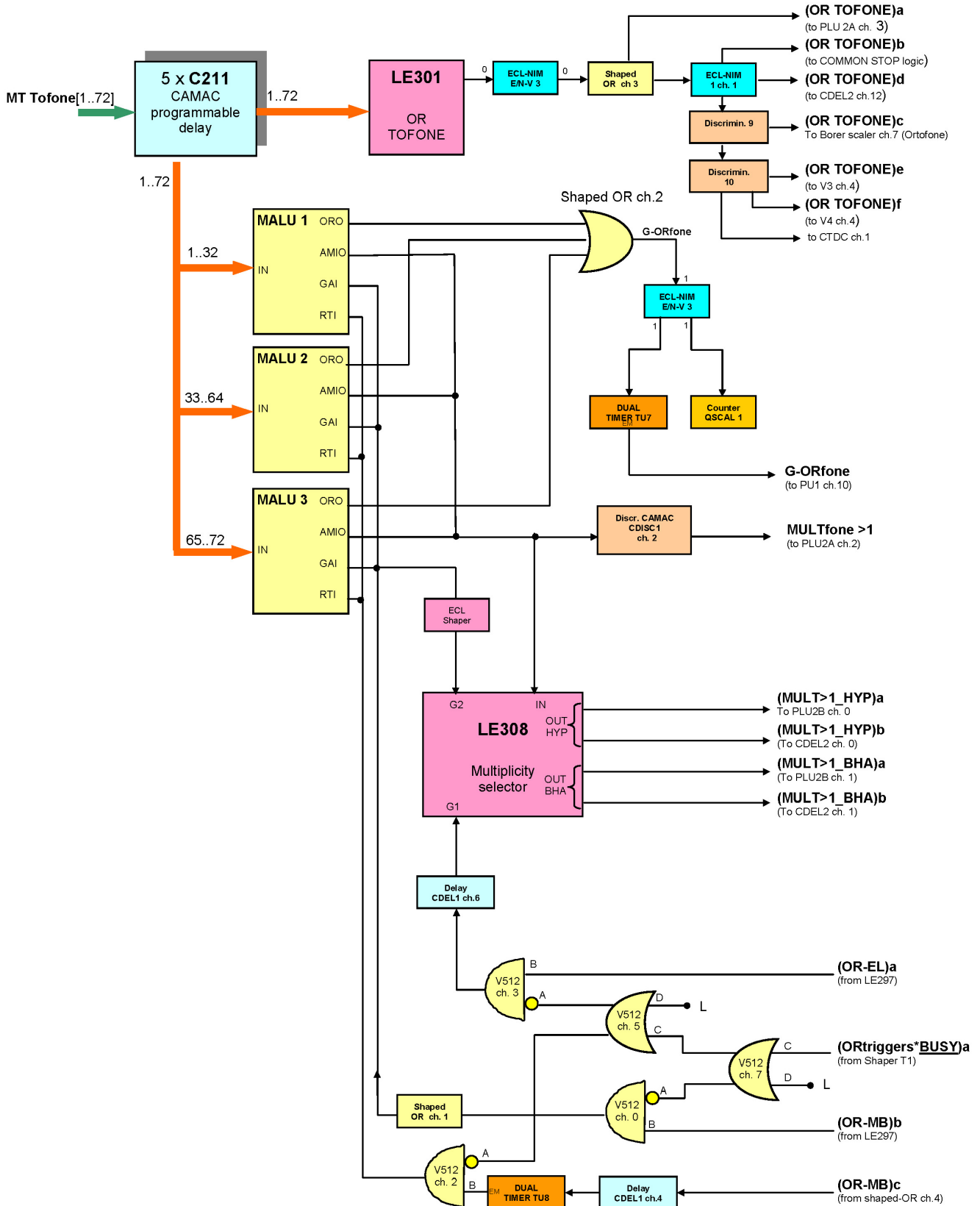
# TOFINO DETECTOR & FEE (pit)



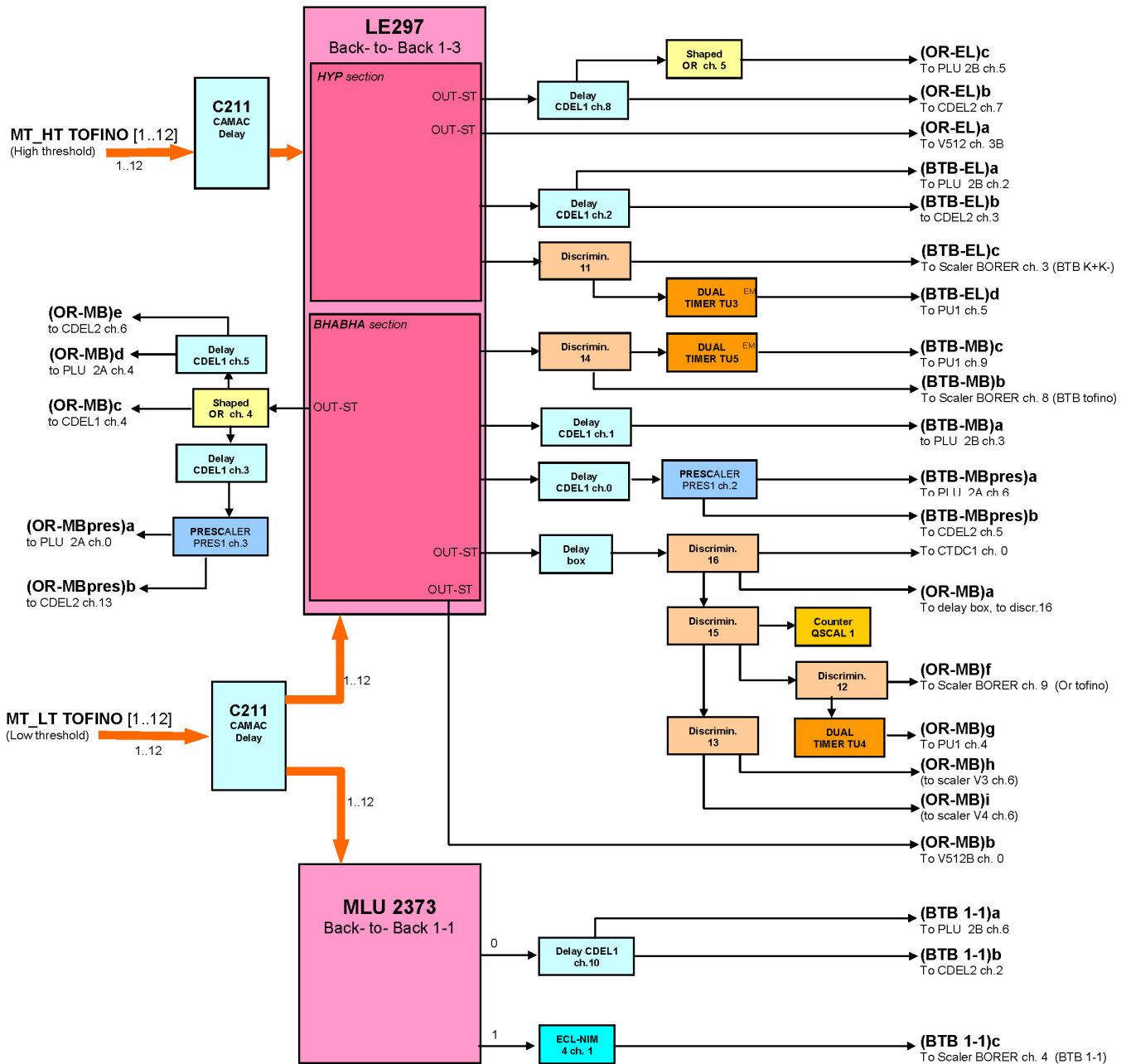
# TRIGGER LOGIC



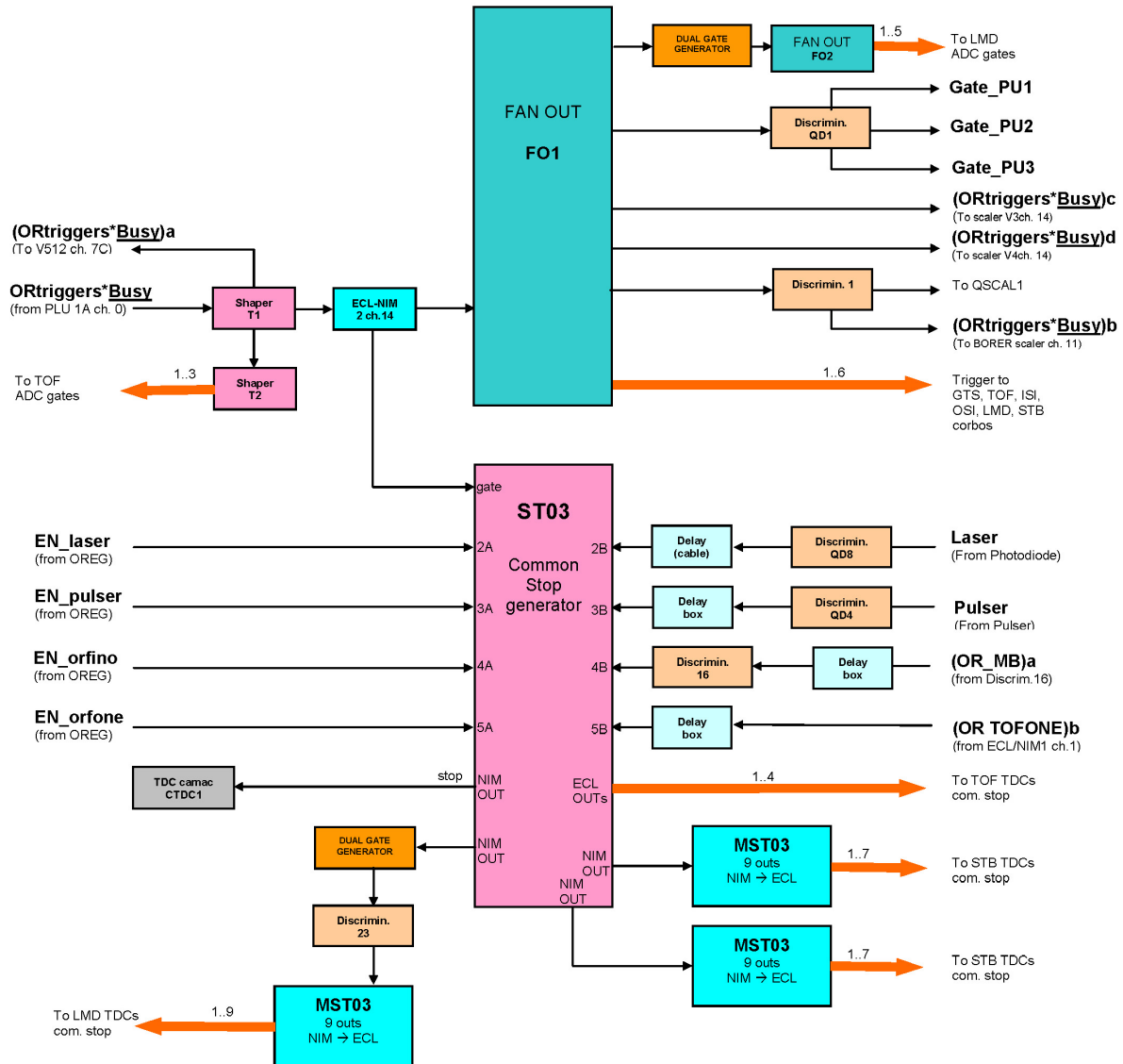
# TOFONE MULTIPLICITY LOGIC



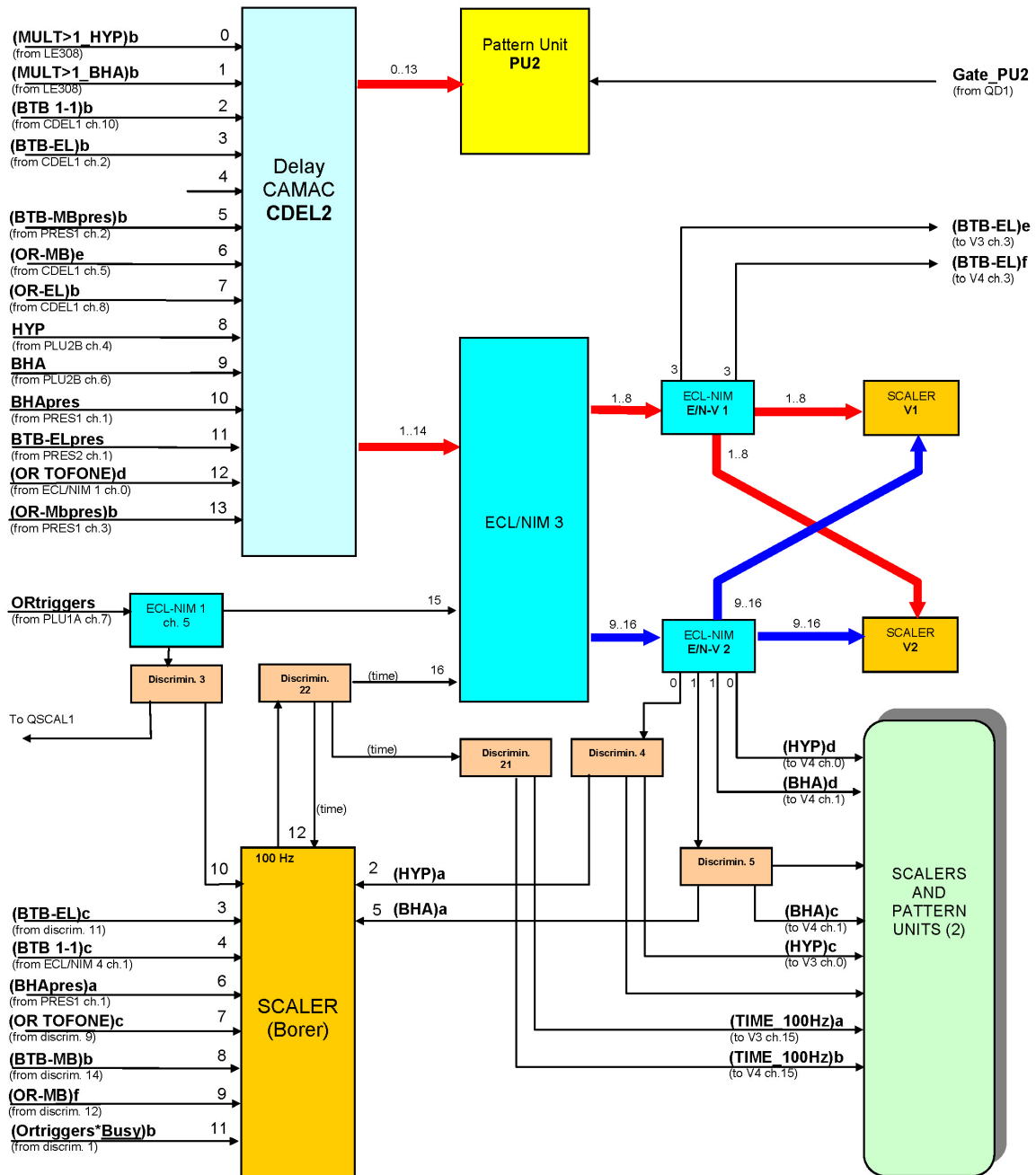
# BACK to BACK LOGIC



# TRIGGER, GATE and CS DISTRIBUTION

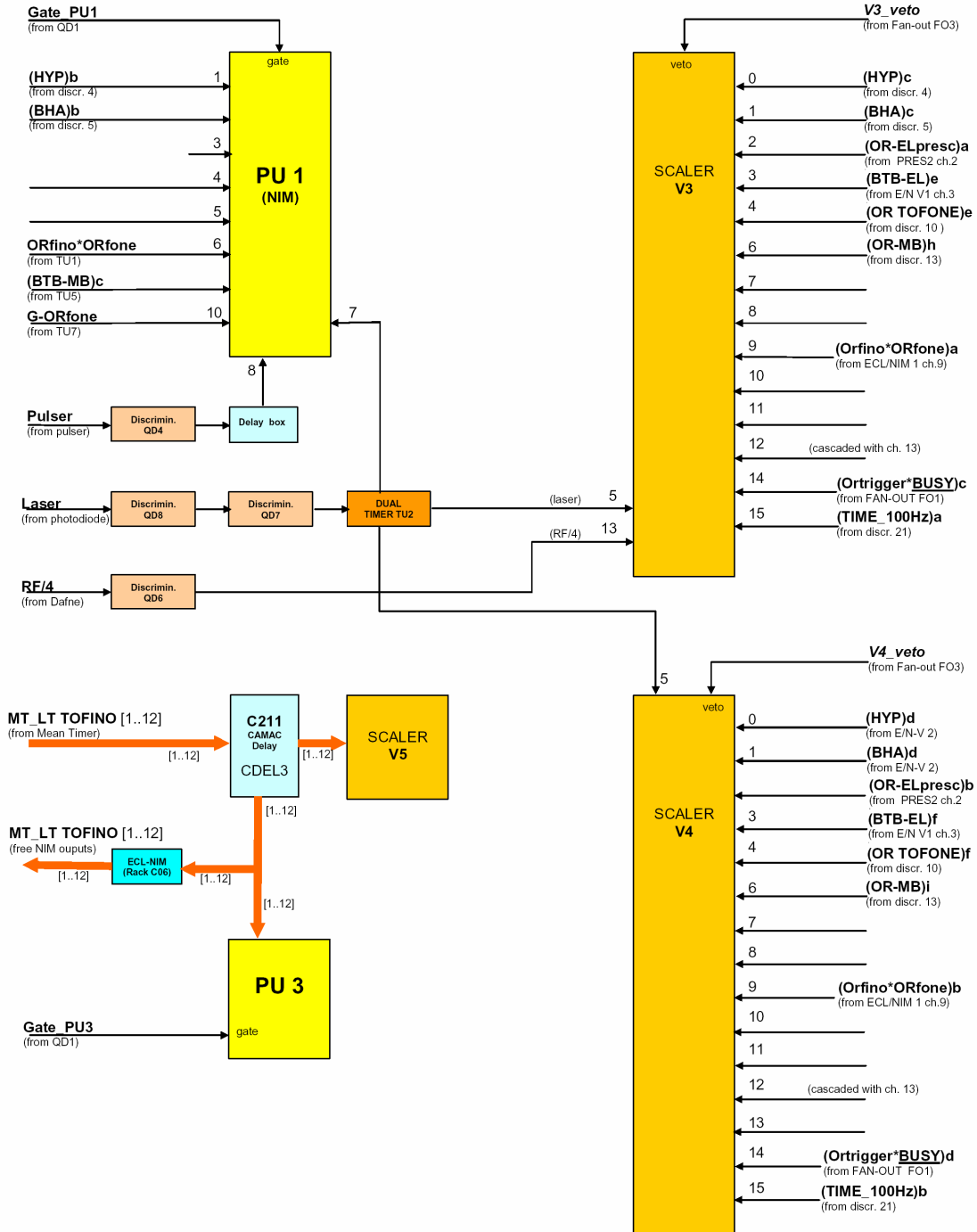


# SCALERS AND PATTERN UNITS





# SCALERS AND PATTERN UNITS (2)



TRIGGER CONFIGURATION FILE (fndrun:/home/frc/Trigger/trig\_conf050412.txt)

November 5th, 2003 (revised April 12th, 2005)

List of FRC trigger is:

trigsel

```
0 HYP
1 BHABHA      presc
2 BTB-TOFINO presc      |
3 OR-TOFINO  presc      | all of them are minimum bias trigger
4 BTB-K+K-   presc
5 ORtofone*ORtofino
6 LASER      | They are in OR
7 PULSER     |
8 TIME CALIB |
9 OR TOFONE  | They are in OR with trig 2 and trig 3
10 MULTFONE >1 |
11 BTBfino*OR-fone
```

trigsel COMMON STOP

```
0-5          OR tofino (/RF)
6          LASER photodiode
7          PULSER
8          TIME CALIB
9-10        OR tofone
11         OR tofino
```

---

PRESCALER (2 modules of 3 channels)

Trigsel

```
0          HYP          NO presc

1          BHABHA      prescal[1]  ch 1  (module 1)
2          BTB-TOFINO  prescal[2]  ch 2  "
3          OR-TOFINO   prescal[3]  ch 3  "

4          BTB-K+K-    prescal[4]  ch 1  (module 2)

5          ORtofone*ORtofino NO presc
6          LASER      NO presc
7          PULSER     NO presc
8          TIME CALIB NO presc
9          MULTFONE >1 NO presc
10         OR-TOFONE  NO presc
11         OR-EL      ch 2 (module 2)
```

---

OUTPUT REGISTER

```
15         on at START DAQ (not used now)
14
13
12
11
10
9
8
```

```
7
6   TIME CALIB
5   OR tofone
4   RF
3   OR tofino
2   PULSER
1   LASER
0   on at START DAQ (enable trigger PLU 1 sec. A)
```

---

TRIGGER PLU

---

PLU 1 A

```
CH   IN
0    hyp
1    minbias (OR-MB + BTB-MB + MULTIFONE>1 + ORTOFONE + ORTOFONE*ORTOFINO)
2    none
3    bhabha
4    btb el
5    pulser/laser/time calib
6    outreg
7    antibusy
```

CH OUT

```
0    (OR of all triggers) AND antibusy
1    "
2    "
3    "
4    "
5    OR of all triggers
6    "
7    "
```

---

PLU 1 B

```
CH   IN
0    laser*trigsel[6]
1    pulser*trigsel[7]
2    Time Calib*trigsel[8]
3
4
5
6
7
```

CH OUT

```
0    laser*trigsel[6] + pulser*trigsel[7] + time_calib*trigsel[8]
1
2
3
4
5
6
7
```

---

PLU 2 A

CH IN  
0 OR-MB (presc)  
1 OR-EL (presc)  
2 MULTfone > 1  
3 ORtofone  
4 OR-MB  
5 none  
6 BTB-MB (presc)  
7 none

CH OUT  
0 OR-MB\*trigsel[3] + BTB-MB\*trigsel[2] + MULTfone>1\*trigsel[10] +  
ORtofone\*trigsel[9] + OR-tofone\*OR-tofino\*trigsel[5]  
1  
2  
3  
4  
5  
6 OR-tofone \* OR-EL  
7 OR-tofone \* OR-tofino

---

PLU 2 B

CH IN  
0 Mult > 1 (hyp)  
1 Mult > 1 (bhabha)  
2 BTB-EL  
3 BTB-MB  
4 PromptCoinc  
5 OR-EL  
6 BTB 1tol  
7 none

CH OUT  
0 (Mult>1) \* (BTB-EL) \* PC --> Hyp  
1 (Mult>1) \* (BTB-1tol) \* (notOR-EL) --> Bhabha  
2 (BTB-EL) --> BTB K+K-  
3 none  
4 (Mult>1) \* (BTB-EL) \* PC --> Hyp NO Presc (to Scaler)  
5 none  
6 (Mult>1) \* (BTB-1tol) \* (notOR-EL) --> Bhabha NO Presc (to Scaler)  
7 none

---

PLU 3 A

CH IN  
0 gts  
1 tof  
2 isi  
3 osi  
4 lmd  
5 stb  
6 void  
7 void

```
CH    OUT
0     gts if selected by Frc
1     tof    "
2     isi    "
3     osi    "
4     lmd    "
5     stb    "
6     OR selected detectors (antibusy)
7     "      (antibusy to V512 logic for MALU GAI and RTI)
```

---

PLU 3 B Not used

```
CH    IN
0
1
2
3
4
5
6
7
```

```
CH    OUT
0
1
2
3
4
5
6
7
```

---

MLU 2373

```
CH    IN
0 Tofino MT 1
1 Tofino MT 2
2 Tofino MT 3
3 Tofino MT 4
4 Tofino MT 5
5 Tofino MT 6
6 Tofino MT 7
7 Tofino MT 8
8 Tofino MT 9
9 Tofino MT 10
10 Tofino MT 11
11 Tofino MT 12
12
13
14
15
```

```
CH    OUT
0     BTB 1to1
1     BTB 1to1
.
.
14    OR all slabs
15    OR all slabs
```

---

PLU V512

programmed logic is:

A\*B  
C+D  
AB+CD

legend:

inv = inverted here  
trigB = trigBusy  
aBUSY = antiBUSY

CH	IN A	IN B	IN C	IN D	OUT
0	trigB+aBUSY(inv)	OR-MB (GAI)	0	0	GAI (MALU)
1	0	0	0	0	0
2	trigB+aBUSY(inv)	OR-MB (RTI)	0	0	RTI (MALU)
3	trigB+aBUSY(inv)	OR-EL	0	0	G1 (Mult Sel)
4	0	0	0	0	0
5	0	0	trigB+aBUSY	0	trigB+aBUSY
6	0	0	0	0	0
7	0		TrigB	aBUSY(inv)	trigB+aBUSY

---

CAMAC DELAY (GTS slot 5) CDEL1

CH

0	BTB-MB	(presc)
1	BTB-MB	(ex trig BHABHA)
2	BTB-EL	(trig HYP)
3		
4	OR-MB	(presc)
5	OR-MB	
6	OR-EL	(to G1 Mult Selector)
7		
8	OR-EL	(anticoin trig BHABHA)
9	PC	
10	BTB 1to1	(trig BHABHA)
11		
12		
13		
14		
15		

---

CAMAC DELAY (GTS slot 3) CDEL2

CH

0	MULT 2-7 (HYP)	(to PU2 bit1)
1	MULT 2-7 (BHA)	(to PU2 bit2)
2	BTB-1to1	(to PU2 bit3)
3	BTB-K+K-	(to PU2 bit4)
4	PC	(to PU2 bit5)
5	presc BTB-MB	(to PU2 bit6)
6	OR-MB	(to PU2 bit7)
7	OR-EL	(to PU2 bit8)
8	HYP	(to PU2 bit9)
9	BHABHA	(to PU2 bit10)
10	presc BHABHA	(to PU2 bit11)
11	presc BTB-EL	(to PU2 bit12)
12	OR-Tofone	(to PU2 bit13)
13	presc OR-MB	(to PU2 bit14)
14	do not use	
15	do not use	

---

CAMAC DELAY (GTS slot 22) CDEL3

CH

0 Tofino MT 1  
 1 Tofino MT 2  
 2 Tofino MT 3  
 3 Tofino MT 4  
 4 Tofino MT 5  
 5 Tofino MT 6  
 6 Tofino MT 7  
 7 Tofino MT 8  
 8 Tofino MT 9  
 9 Tofino MT 10  
 10 Tofino MT 11  
 11 Tofino MT 12  
 12 void  
 13 void  
 14 void  
 15 void

---

PU 1 (NIM)

bit1 HYP Hypernuclei  
 2 BHA Bhabha  
 3 void  
 4 OR-MB Minimum Bias OR Tofino (at least 1 hit on Tofino)  
 5 BTB-EL Kaon selection  
 6 OR-Tofone\*OR-Tofino  
 7 LASER LASER  
 8 PULS Pulser  
 9 BTB-MB  
 10 G-ORfone OR Tofone Gated by Tofino  
 11  
 12  
 13  
 14 Void  
 15 Void  
 16 Void

---

PU 2 (ECL)

bit1 MULT 2-7 Multiplicity 2-7 in TOFONE (Hyp trigger)  
 2 MULT 2-7 Multiplicity 2-7 in TOFONE (Bhabha trigger)  
 3 BTB-1tol Back-to-back 1tol  
 4 BTB-EL Back-to-back Kaons (Energy Loss cut)  
 5 PC Prompt Coincidence (prompt pi-)  
 6 presc BTB-MB  
 7 OR-MB Minimum Bias OR Tofino (at least 1 hit on Tofino)  
 8 OR-EL OR Tofino (at least 1 hit with threshold on Energy Loss)  
 9 HYP  
 10 BHA  
 11 presc BHABHA  
 12 presc BTB-EL  
 13 OR tofone  
 14 presc OR-MB  
 15 nonsense  
 16 nonsense

in PU 2 Triggers are coded as

```
HYP = MULT>1 * BTB-EL * PC          ----> bit 9 = bit1 * bit4 * bit5
BHA = MULT>1 * BTB-MB * notOR-EL    ----> bit 10 = bit2 * bit3 * not bit8
MUPI = MULT>1 * BTB-EL * SC        ----> bit 11 = bit1 * bit4 * bit6
```

---

PU 3 (ECL)

```
bit1 Tofino MT 1
  2 Tofino MT 2
  3 Tofino MT 3
  4 Tofino MT 4
  5 Tofino MT 5
  6 Tofino MT 6
  7 Tofino MT 7
  8 Tofino MT 8
  9 Tofino MT 9
 10 Tofino MT 10
 11 Tofino MT 12
 13
 14
 15
```

---

SCALERS

BORER

```
CH
 1 void
 2 HYP
 3 BTB K+K-
 4 presc BTB K+K-
 5 BHABHA
 6 presc BHABHA
 7 OR tofone
 8 OR tofino Eloss
 9 OR tofino
10 Trigger
11 Trigger*Busy
12 TIME
```

---

VME (ECL) SCALER 1 (no inhibit) and SCALER 2 (with inhibit)

```
CH
 0 MULT 2-7 (HYP)
 1 MULT 2-7 (BHA)
 2 BTB 1to1
 3 BTB-K+K-
 4 PC
 5 presc BTB-MB
 6 OR-MB
 7 OR-EL
 8 HYP
 9 BHABHA
10 presc BHABHA
11 presc BTB-EL
```



12 OR-Tofone  
13 presc OR-MB  
14 Total Triggers  
15 TIME (100 Hz)

VME (NIM) SCALER 3 (no inhibit) and SCALER 4 (with inhibit)

ch 0 HYP  
1 BHABHA  
2 presc OR-EL  
3 BTB-K+K-  
4 OR Tofone  
5 LASER Photodiode  
6 OR Tofino  
7 SC  
8 void  
9 ORTofino\*ORTofone  
10 void  
11 void  
12 casc 12-13  
13 RF/4 (the input is 13 when cascaded)  
14 trigger\*busy  
15 TIME (100 Hz)

VME ECL SCALER 5 (no inhibit)

ch 0 Tofino MT 1  
1 Tofino MT 2  
2 Tofino MT 3  
3 Tofino MT 4  
4 Tofino MT 5  
5 Tofino MT 6  
6 Tofino MT 7  
7 Tofino MT 8  
8 Tofino MT 9  
9 Tofino MT 10  
10 Tofino MT 11  
11 Tofino MT 12  
12  
13  
14  
15