Experiment 787
Technical Note No. 314

Trigger Definitions — 1995–98

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The definitions of the various triggers used in 1995–1998. This version revised 6-June-2000. This file now supercedes `/e787d/e787/tr2/doc/trigger.definitions` on bnlku7.

Trigger	TB	AO	PS	Ref	Description
pnn(1)	4s0	A01	0-0	TB-17	$\mathtt{KB}\cdot\mathtt{IC}\cdot\mathtt{DC}\cdot\mathtt{T{\bullet}2}\cdot(6_{\rm ct}+7_{\rm ct})\cdot\overline{(19_{\rm ct}+20_{\rm ct}+21_{\rm ct})}\cdot\overline{\mathtt{BV}+\mathtt{EC}}\cdot(\mathtt{L0rr1(1)}\cdot\mathtt{US}+\mathtt{L0rr1(2)}\cdot\mathtt{DS})\cdot\mathtt{HEX}\cdot\mathtt{L1.n}$
pnn(2)	2s0	A02	0-1	T2-141	$\mathtt{KB}\cdot\mathtt{IC}\cdot\mathtt{DC}\cdot\mathtt{T{\bullet}2}\cdot 3_{\rm ct}\cdot 4_{\rm ct}\cdot 5_{\rm ct}\cdot 6_{\rm ct}\cdot\overline{(13_{\rm ct}+\cdots+18_{\rm ct})}\cdot\overline{(19+20+21)}\cdot\overline{\mathtt{BV}+\mathtt{EC}}\cdot\mathtt{L0rr2(1)}\cdot\mathtt{HEX}\cdot\mathtt{L1.n}$
Kpi2(1)	4s2	A09	2-0	TB-17	$\mathtt{KB}\cdot\mathtt{T{\bullet}2}\cdot(6_{\rm ct}+7_{\rm ct})\cdot\overline{(19_{\rm ct}+20_{\rm ct}+21_{\rm ct})}\cdot\mathtt{TBPS}$
Kpi2(2)	4s3	A06	1-1	TB-17	$\mathtt{KB}\cdot\mathtt{IC}\cdot\mathtt{DC}\cdot\mathtt{T{\bullet}2}\cdot(6_{\rm ct}+7_{\rm ct})\cdot\overline{(19_{\rm ct}+20_{\rm ct}+21_{\rm ct})}\cdot\mathtt{HEX}\cdot\mathtt{TBPS}\cdot\mathtt{L1.n}$
Kmu2(1)	4s4	A10	2-1	TB-17	$\mathtt{KB}\cdot\mathtt{T{\bullet}2}\cdot(6_{\rm ct}+7_{\rm ct})\cdot(19_{\rm ct}+20_{\rm ct}+21_{\rm ct})\cdot\mathtt{TBPS}$
Kmu2(2)	4s5	A11	2-2	TB-17	$\mathtt{KB}\cdot\mathtt{DC}\cdot\mathtt{T{\bullet}2}\cdot(6_{\rm ct}+7_{\rm ct})\cdot 21_{\rm ct}\cdot\mathtt{BV}\cdot\mathtt{TBPS}$
3gamma	5s3	A15	0-3	TB-30	$\mathtt{KB}\cdot\mathtt{DC}\cdot\mathtt{T{\bullet}2}\cdot(3_{\rm ct}+4_{\rm ct})\cdot\overline{(7_{\rm ct}+8_{\rm ct})}\cdot\overline{(9+\cdots+21)}\cdot\overline{\mathtt{EC}}\cdot\mathtt{HEX}\cdot\mathtt{NG3}$
3gamma(95)	(6s1)	(A14)	(3-2)	T2-143	$\mathtt{KB}\cdot\mathtt{IC}\cdot\mathtt{DC}\cdot\mathtt{T{\bullet}2}\cdot(6_{\rm ct}+7_{\rm ct})\cdot\overline{(11+\cdots+20)}\cdot\overline{(19_{\rm ct}+20_{\rm ct}+21_{\rm ct})}\cdot\overline{\mathtt{EC}}\cdot\mathtt{HEX}\cdot\mathtt{NG3}$
1gamma	6s1	A08	1-3	T3-104	$\mathtt{KB}\cdot\mathtt{IC}\cdot\mathtt{DC}\cdot\mathtt{T{\bullet}2}\cdot(6_{\rm ct}+7_{\rm ct})\cdot\overline{(19_{\rm ct}+20_{\rm ct}+21_{\rm ct})}\cdot\mathtt{HEX}\cdot\overline{\mathtt{EC}}\cdot\mathtt{BV}\cdot\overline{\mathtt{NG2}}\cdot\mathtt{L1.n}$
Kmu2g	5s0	(A14)	(3-2)	T2-148	$\mathtt{KB}\cdot\mathtt{DC}\cdot\mathtt{T{\bullet}2}\cdot(6_{\rm ct}\cdot 7_{\rm ct}\cdot\cdots\cdot 16_{\rm ct})\cdot\mathtt{HEX}\cdot\overline{\mathtt{EC}}\cdot\mathtt{BVh}\cdot\overline{21}\cdot\overline{\mathtt{NG2}}$
CEX	5s1	A16	3-3	TB-23	$\mathtt{KB}\cdot\overline{\mathtt{DC}}\cdot 2(\mathtt{T{\bullet}2})\cdot(6_{\rm ct}+7_{\rm ct})\cdot\overline{\mathtt{BV}+\mathtt{EC}+\pi\mathtt{B}}\cdot\overline{(19_{\rm ct}+20_{\rm ct}+21_{\rm ct})}$
prompt	5s2	A03	0-2	TB-30	$\mathtt{KB}\cdot\mathtt{C}_\pi\cdot\mathtt{T{\bullet}2}\cdot(6_{\rm ct}+7_{\rm ct})\cdot\overline{(19_{\rm ct}+20_{\rm ct}+21_{\rm ct})}\cdot\overline{\mathtt{BV}+\mathtt{EC}}\cdot\mathtt{HEX}\cdot\mathtt{L0rr1(4)}\cdot\mathtt{L1.n}$
Kpi2(3)	6s0	A07	1-2	T2-142	$\mathtt{KB}\cdot\mathtt{IC}\cdot\mathtt{DC}\cdot\mathtt{T{\bullet}2}\cdot(6_{\rm ct}+7_{\rm ct})\cdot\overline{(19_{\rm ct}+20_{\rm ct}+21_{\rm ct})}\cdot\mathtt{BV}\cdot\mathtt{HEX}\cdot\mathtt{L0rr1(3)}\cdot\mathtt{L1.n}$
minbias	6s2	A14	3-2	TB-20	$\mathtt{KB}\cdot\mathtt{IC}\cdot\mathtt{DC}\cdot\mathtt{T{\bullet}2}$
pnn1L0	4s0	A12	2-3	TB-17	$\mathtt{KB}\cdot\mathtt{IC}\cdot\mathtt{DC}\cdot\mathtt{T{\bullet}2}\cdot(6_{\rm ct}+7_{\rm ct})\cdot\overline{(19_{\rm ct}+20_{\rm ct}+21_{\rm ct})}\cdot\overline{\mathtt{BV}+\mathtt{EC}}\cdot(\mathtt{L0rr1(1)}\cdot\mathtt{US}+\mathtt{L0rr1(2)}\cdot\mathtt{DS})\cdot\mathtt{HEX}$
pnn1L0o	4s1	A13	3-0	TB-17	$\mathtt{KB}\cdot\mathtt{IC}\cdot\mathtt{DC}\cdot\mathtt{T{\bullet}2}\cdot(6_{\rm ct}+7_{\rm ct})\cdot\overline{(19_{\rm ct}+20_{\rm ct}+21_{\rm ct})}\cdot\overline{\mathtt{BV}+\mathtt{EC}}\cdot\mathtt{TBPS}$
piscat	2s2	B01	4-1	TB-16	$\pi\mathtt{B}\cdot\overline{\mathtt{DC}}\cdot\mathtt{IC}\cdot\mathtt{T{\bullet}2}\cdot(6_{\rm ct}+7_{\rm ct})\cdot\overline{(20+21)}\cdot\overline{\mathtt{BV}+\mathtt{EC}}\cdot\mathtt{HEX}$
KB	—	D02	4-0		$\mathtt{KB}$
eckmu2	—	D03	4-2		$\mathtt{KB}\cdot(\mathtt{EC}+\mathtt{CO})\mathtt{Sum}\cdot\overline{(\mathtt{T{\bullet}2}+\mathtt{BV}+\mathtt{RS}+\mathtt{prompt})}$
Xe	—	D04	—		Xe Ref PMT
pibeam	—	D06	3-1		$\pi\mathtt{B}$
cosmic	—	D10	—		$\mathtt{T{\bullet}2}\cdot\mathtt{IC}\cdot\overline{\mathtt{spill}}$ or $\mathtt{T{\bullet}2}\cdot\mathtt{IC}$ or $\mathtt{T{\bullet}2}\cdot(\mathtt{>1\ non\text{-}adj\ IC})$
pulser	—	D11	4-3		Prescaler
EOS	—	D12	—		end-of-spill gate generator
YAlO	—	D13	—		EC Xtal OR
random	—	D14	—		`BVsum`

Description of elements:

KB	Beam kaon $C_K \cdot B4 \cdot TTsum \cdot spill$
πB	Beam pion $C_\pi \cdot B4 \cdot TTsum \cdot spill$
IC	I counter hit
T•2	Concidence of 1st and 2nd layer of RS in the same sector and IC
DC	Delayed Coincidence (IC timing - KB timing $>$ 2 ns)
EC	Endcap Veto (upstream and downstream)
BV	Barrel Veto discriminated analog sum
BVh	Barrel Veto (integrated analog sum), high threshold
6	Hit in 6 layer of RS
6_{ct}	Hit in 6 layer of RS, associated with a T•2 ("charged track")
HEX	1 or 2 adjacent hit hextants
L0rr1(i)	pnn(1) Refined Range using MLU mask, bit i
L0rr2(i)	pnn(2) Refined Range using MLU mask, bit i
US, DS	L0z sign bit: upstream, downstream
NG3	Number of photon clusters must be greater than 2
NG2	Number of photon clusters must be greater than or equal to 2
NTG	Number of hit target elements
TBPS	Trigger board by-16 prescaler; bypassable using EXTCON 24=H
RS	OR of 6 hextant discriminators
prompt	used to veto prompt IC-KB coincidence
L1.n	L1.1 and/or L1.2
L1.1	TD area vs. height cut; select pion
L1.2	FERA energy cut in stopping HEX and Lay(n+1) and/or bad SCF and/or HEX afterburner

Notes:
- — TB = trigger board and channel. Each board is numbered, channel: 0–5.
- — AO = and-or board channel = Lev 0 trigger bit: 0–15; or BD board channel
- — PS = prescaler board: 0–4 starting at right, and channel: 0–3.
- — the IC requirement was added to T•2 in 1996.
- — L0rr2 mask was all "pass" until 6/96; then cut NTG=15 only.
- — ( ) around TB-AO-PS means that slot is now used for something else.
- — pmm trigger has never been used in Trigger 2.

References:
- — TB = TB2A logbook
- — Tn = Trigger 2 main logbook, volume n