

## Bits to 32-bit Scalers - 2013, 500 GeV

Six 32-bit boards will be online for run-14; board 1 will serve local-polarimetry with the ZDC-SMD, and boards 2 and 3 will count hits in BBC individual tiles. Boards 4 and 5 will serve relative luminosity measurements. The bit-mapping may be found at the trigger subsystem page, <http://www.star.bnl.gov/public/trg/>, under Run2013 as the ScalerRouterMap link.

The 7-bit bunch-crossing counter will occupy inputs/bits 25-31 in each 32-bit board:

BX202IN	0	SCA2BDXHI	1
BX202IN	1	SCA2BDXHI	2
BX202IN	2	SCA2BDXHI	3
BX202IN	3	SCA2BDXHI	4
BX202IN	4	SCA2BDXHI	5
BX202IN	5	SCA2BDXHI	6
BX202IN	6	SCA2BDXHI	7

Local polarimetry board 1 is mapped as follows:

QTSMDIN	0	SCA2BD1LO	0	) Horizontal SMD strips ZDC-W
QTSMDIN	1	SCA2BD1LO	1	) .
QTSMDIN	2	SCA2BD1LO	2	) .
QTSMDIN	3	SCA2BD1LO	3	) Vertical SMD strips ZDC-W
QTSMDIN	4	SCA2BD1LO	4	) .
QTSMDIN	5	SCA2BD1LO	5	) .
ZD101IN	3	SCA2BD1LO	6	) Truncated ADC-sum ZDC-W
ZD101IN	4	SCA2BD1LO	7	) .
ZD101IN	5	SCA2BD1LO	8	) .
ZD101IN	14	SCA2BD1LO	9	) Front ADC ZDC-W > th0
ZD101IN	15	SCA2BD1LO	10	) Back ADC ZDC-W > th0
ZD101IN	7	SCA2BD1LO	11	) Good TAC ZDC-W
QTSMDIN	6	SCA2BD1LO	12	) Same as above for ZDC-East
QTSMDIN	7	SCA2BD1LO	13	) .
QTSMDIN	8	SCA2BD1LO	14	) .
QTSMDIN	9	SCA2BD1LO	15	) .
QTSMDIN	10	SCA2BD1LO	16	
QTSMDIN	11	SCA2BD1LO	17	
ZD101IN	0	SCA2BD1LO	18	
ZD101IN	1	SCA2BD1LO	19	
ZD101IN	2	SCA2BD1LO	20	
ZD101IN	12	SCA2BD1LO	21	
ZD101IN	13	SCA2BD1LO	22	
ZD101IN	6	SCA2BD1LO	23	) .

BBC board 2 will count (primarily) hits in the individual tiles of the East BBC as follows:

BBCEIN	0	SCA2BD2LO	0	) PMT 1, tile 1 (top)
BBCEIN	1	SCA2BD2LO	1	) PMT 7, tile 7 and 9
BBCEIN	2	SCA2BD2LO	2	) PMT 8, tile 8

BBCEIN	3	SCA2BD2LO	3	) PMT 2, tile 2
BBCEIN	4	SCA2BD2LO	4	) PMT 3, tile 3
BBCEIN	5	SCA2BD2LO	5	) PMT 9, tile 10
BBCEIN	6	SCA2BD2LO	6	) PMT 10, tile 11
BBCEIN	7	SCA2BD2LO	7	) PMT 11, tile 12
BBCEIN	8	SCA2BD2LO	8	) PMT 4, tile 4 (bottom)
BBCEIN	9	SCA2BD2LO	9	) PMT 12, tile 13 and 15
BBCEIN	10	SCA2BD2LO	10	) PMT 13, tile 14
BBCEIN	11	SCA2BD2LO	11	) PMT 5, tile 5
BBCEIN	12	SCA2BD2LO	12	) PMT 6, tile 6
BBCEIN	13	SCA2BD2LO	13	) PMT 14, tile 16
BBCEIN	14	SCA2BD2LO	14	) PMT 15, tile 17
BBCEIN	15	SCA2BD2LO	15	) PMT 16, tile 18
BBCWIN	0	SCA2BD2LO	16	) 6 inner West small tiles
BBCWIN	3	SCA2BD2LO	17	) . as defined below
BBCWIN	4	SCA2BD2LO	18	) .
BBCWIN	8	SCA2BD2LO	19	) .
BBCWIN	11	SCA2BD2LO	20	) .
BBCWIN	12	SCA2BD2LO	21	) .
BB101IN	14	SCA2BD2LO	22	) BBC East hit
BB101IN	15	SCA2BD2LO	23	) BBC West hit
VT201IN	0	SCA2BD2HI	0	) BBC East & West in TAC

where six of the ‘free’ bits have been used to count hits in the six innermost small tiles of the West BBC so as to allow various combinations of 1-arm and 2-arm luminosity measurements. The remaining inputs count BBC East and West, and the (needed) VT201/0 coincidence.

BBC board 3 will count (primarily) hits in the individual tiles of the West BBC as follows:

BBCWIN	0	SCA2BD3LO	0	) As above for BBC West
BBCWIN	1	SCA2BD3LO	1	) .
BBCWIN	2	SCA2BD3LO	2	) .
BBCWIN	3	SCA2BD3LO	3	
BBCWIN	4	SCA2BD3LO	4	
BBCWIN	5	SCA2BD3LO	5	
BBCWIN	6	SCA2BD3LO	6	
BBCWIN	7	SCA2BD3LO	7	
BBCWIN	8	SCA2BD3LO	8	
BBCWIN	9	SCA2BD3LO	9	
BBCWIN	10	SCA2BD3LO	10	
BBCWIN	11	SCA2BD3LO	11	
BBCWIN	12	SCA2BD3LO	12	
BBCWIN	13	SCA2BD3LO	13	
BBCWIN	14	SCA2BD3LO	14	
BBCWIN	15	SCA2BD3LO	15	) .
BBCEIN	2	SCA2BD3LO	16	) 6 selected outer East small tiles
BBCEIN	5	SCA2BD3LO	17	) LR and TB symmetric,
BBCEIN	7	SCA2BD3LO	18	) as defined above
BBCEIN	10	SCA2BD3LO	19	) .
BBCEIN	13	SCA2BD3LO	20	) .

BBCEIN	15	SCA2BD3LO	21	) .
BB101IN	14	SCA2BD3LO	22	) BBC East hit
BB101IN	15	SCA2BD3LO	23	) BBC West hit
VT201IN	0	SCA2BD3HI	0	) BBC East & West in TAC

which thus allow further combinations of 1-arm and 2-arm luminosity measurements. The remaining inputs count BBC East and West, and the (needed) VT201/0 coincidence.

Board 4 will serve luminosity measurements:

BB101IN	14	SCA2BD4LO	0	) ADC-sum BBC East > th0
BB101IN	15	SCA2BD4LO	1	) ADC-sum BBC West > th0
BB102IN	14	SCA2BD4LO	2	) hit in large tiles BBC East
BB102IN	15	SCA2BD4LO	3	) hit in large tiles BBC West
VP101IN	14	SCA2BD4LO	4	) ADC-sum VPD East > th0
VP101IN	15	SCA2BD4LO	5	) ADC-sum VPD West > th0
ZD101IN	12	SCA2BD4LO	6	) ADC-sum Front ZDC East > th0
ZD101IN	14	SCA2BD4LO	7	) ADC-sum Front ZDC West > th0
ZD101IN	13	SCA2BD4LO	8	) ADC-sum Back ZDC East > th0
ZD101IN	15	SCA2BD4LO	9	) ADC-sum Back ZDC West > th0
ZD101IN	10	SCA2BD4LO	10	) ADC-sum ZDC East > th0
ZD101IN	11	SCA2BD4LO	11	) ADC-sum ZDC West > th0
VT201IN	6	SCA2BD4LO	12	) ZDC East & West in TAC
VT201IN	0	SCA2BD4LO	13	) BBC East & West in TAC
VT201IN	0	SCA2BD4LO	14	) .
VT201IN	0	SCA2BD4LO	16	) .
VT201IN	0	SCA2BD4LO	17	) .
VT201IN	0	SCA2BD4LO	18	) .
VT201IN	0	SCA2BD4LO	19	) .
VT201IN	0	SCA2BD4LO	20	) .
VT201IN	0	SCA2BD4LO	21	) .
VT201IN	0	SCA2BD4LO	22	) .
VT201IN	0	SCA2BD4LO	23	) .
VT201IN	0	SCA2BD4HI	0	) BBC East & West in TAC

where the duplicative VT201/0 inputs will be updated with inputs counting detector live.

Board 5 will serve luminosity measurements:

BBCWIN	5	SCA2BD5LO	0	) BBC West PMT 9, tile 10
BBCWIN	7	SCA2BD5LO	1	) BBC West PMT 11, tile 12
BBCWIN	13	SCA2BD5LO	2	) BBC West PMT 14, tile 16
BBCWIN	15	SCA2BD5LO	3	) BBC West PMT 16, tile 18
BBCEIN	5	SCA2BD5LO	4	) As immediately above for BBC East
BBCEIN	7	SCA2BD5LO	5	) .
BBCEIN	13	SCA2BD5LO	6	) .
BBCEIN	15	SCA2BD5LO	7	) .
VPDWIN	0	SCA2BD5LO	8	) VPD West PMT 1
VPDWIN	3	SCA2BD5LO	9	) VPD West PMT 4

VPDWIN	4	SCA2BD5LO	10	) VPD West PMT 7
VPDWIN	14	SCA2BD5LO	11	) VPD West PMT 10
VPDEIN	0	SCA2BD5LO	12	) As immediately above for VPD East
VPDEIN	3	SCA2BD5LO	13	) .
VPDEIN	4	SCA2BD5LO	14	) .
VPDEIN	14	SCA2BD5LO	15	) .
ZD101IN	12	SCA2BD5LO	16	) ZDC-sum Front ZDC East > th0
ZD101IN	14	SCA2BD5LO	17	) ZDC-sum Front ZDC West > th0
ZD101IN	13	SCA2BD5LO	18	) ZDC-sum Back ZDC East > th0
ZD101IN	15	SCA2BD5LO	19	) ZDC-sum Back ZDC West > th0
VT201IN	0	SCA2BD5LO	20	) BBC East & West in TAC
VT201IN	0	SCA2BD5LO	21	) .
VT201IN	0	SCA2BD5LO	22	) .
VT201IN	0	SCA2BD5LO	23	) .
VT201IN	0	SCA2BD5HI	0	) BBC East & West in TAC

where the duplicative VT201/0 inputs will be updated with inputs counting detector live. This board thus allows 1-arm and 2-arm luminosity measurements with the BBC and VPD. The BBC tiles are purposely chosen so as to allow direct cross-comparison with board 3.