

TPC Readout Mask Selection

11_dq301_2014_a.rbt

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Change Log:

Date	Description
November 13, 2013	DQ301 tuning algorithm created.

This algorithm is used to generate a bitmask that is used by the TPC gated-grid driver to determine which TPC sectors are read out. Up to 3 incoming bitmasks are available. Currently they are provided by the EMC, MTD and TOF branches of the DSM tree. The final mask that is sent to the gated-grid driver is generated by OR'ing together whichever of the incoming masks the user selects. There are two ways for the user to define the selection:

- 1) The algorithm receives a 4-bit word from the TCU that can be used to change the selection on an event-by-event basis.
- 2) There is a 4-bit register that can override the TCU input and allow the user to specify that a particular incoming mask should always be selected.

If the most significant bit of the 4-bit word (or register) is set then the DQ301 algorithm automatically generates an output bitmask that has all 24 TPC sectors turned on.

RBT File: 11_dq301_2014_a.rbt

Users: DQ301

Inputs: Ch 0/1 = EM202
Ch 2/3 = MT201
Ch 4/5 = TF202
Ch 6/7 = Unused
Ch 8 = TCU
Ch 9 = Unused

From EM202, MT201 and TF202
(0-23) 24-bit TPC sector readout mask

From TCU
(0) Select Ch 0/1 (EM202)
(1) Select Ch 2/3 (MT201)
(2) Select Ch 4/5 (TF202)
(3) Generate mask to readout all TPC sectors

LUT: 1-to-1

Registers:

R0: TCU_select_enable (1 bit)

0 = Ignore TCU input, 1 = Use TCU input

R1: DAQ10k_Mask_Select (4 bits)

The 4 bits have the same definition as the 4 bits from the TCU

Action

1st Latch incoming bitmasks

2nd If R0 = 1 then
switches = data from TCU

else

switches = data from R1

For each of the 3 data inputs (X = 0:2 = EMC, MTD and TOF):

Zero out the input bitmask if switches(X) = 0

If switches(3) = 1 then

generate a 24-bit mask with all bits on

else

generate a 24-bit mask with all bits off.

3rd Combine (OR) all 4 masks, including the internally generated one:
Output = mask(0) or mask(1) or mask(2) or generated mask(3)

4th Latch Output

Output to TPC Gated-grid Driver Board:

Bit	Name	Description
Bit 0:11	TPC_1-12	Mask for TPC sectors 1:12
Bit 12:15	Unused	Unused
Bit 16:27	TPC_13-24	Mask for TPC secotors 13:24
Bits 28:31	Unused	Unused