

Recent Test Runs with Beam for L2 PULSAR Muon Path

Goal: To establish the feasibility of using Pulsar board to send Muon data to L2 alpha processor.

Runs: 168561 (~50min, L~20E30), PHYSICS_1_05[7,334,400]
168601 (~2 hrs, L~15E30), PHYSICS_1_05[8,341,402]

Identical to current default physics table, with modification to the alpha code to handle muon data.

Readiness for beam:

Before we requested beam time, we have extensively checked out the full Pulsar muon system in our test-stand as well as in no-beam cosmic and L2 torture runs. **We tested the system to the extreme!**

Even then, we ran into problem in our earlier beam runs → the now infamous “reformatter error”. For some strange reason, the Pulsar DAQ cannot co-exist with silicon DAQ readout. DAQ experts are working on this problem.

For the recent test runs, we have disabled Pulsar DAQ readout. Pulsar readout is for diagnostic purposes, not really needed for the test runs.

Test Run Configuration

- Pulsar muon board receives data from L1 muon trigger and L1 XTRP.
- The muon data is zero-suppressed in the Pulsar board and reformatted to look like XTRP data.
- The muon data is appended at the end of the XTRP data and sent to the L2 TrkList board. As far as TrkList board is concerned, the muon data looks like tracks and is happy to pass it on to the alpha processor over the magicbus.
- A special version of alpha code is used to unpack the track and muon data in the Alpha processor.

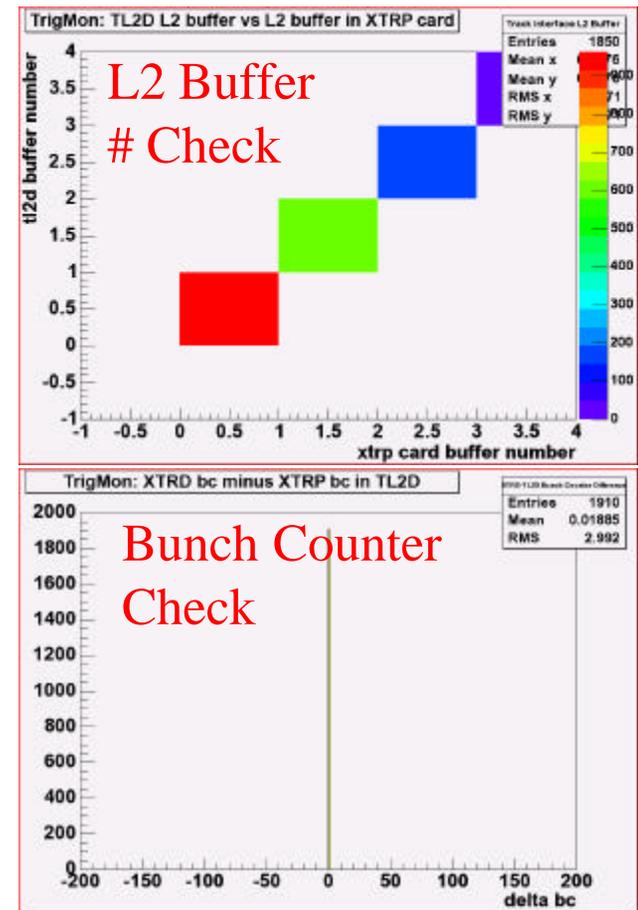
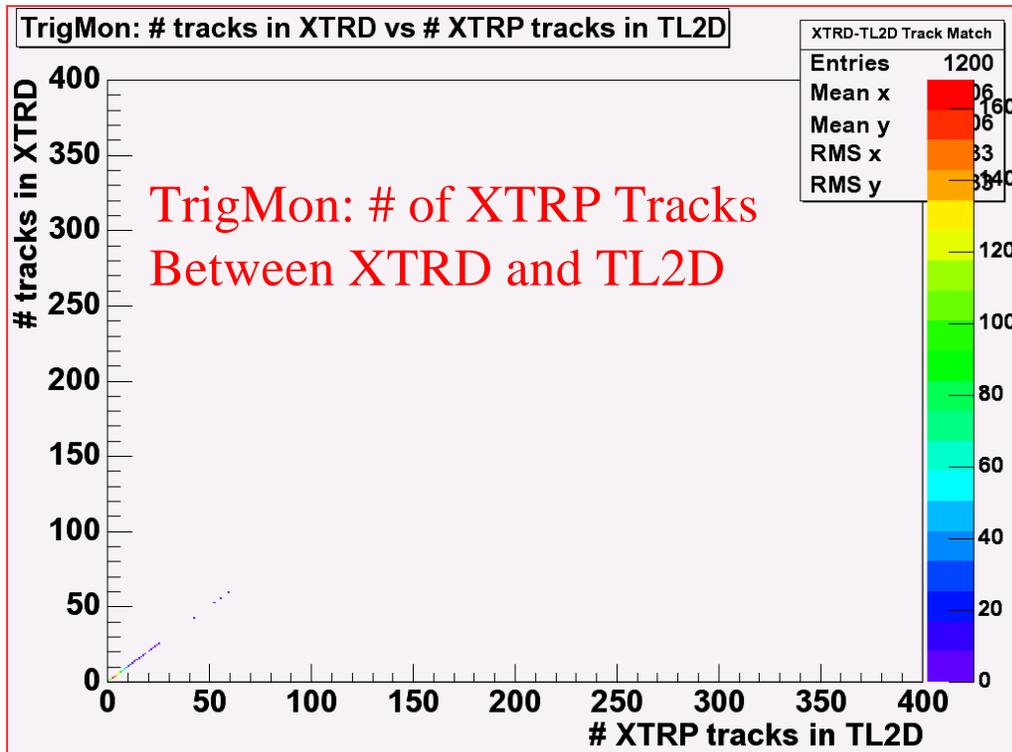
To validate that the system is working and the data is not corrupted, we compare:

- Track data sent from L1 (XFLD,XTRD) vs. track data received by the alpha board (TL2D),
- Muon data sent from L1 (TCMD) vs muon data received by the alpha board (TL2D)

Test Run Results

Run 168561:

We checked D stream data (~3K events) in the look area → **perfect agreement between L1 and L2 xtrp+muon data**. No single reformatter error either (better not have any with Pulsar DAQ disabled).



Results of 1st Test Run

Run 168601 (~2hrs beam run):

I have checked all the files in the look area → **perfect agreement between L1 and L2 xtrp+muon data**. When the data is available, I will run through all the data to look for data corruption.

Stream (in look area)	# of events	# of error
A	~6.8K	0
B	~6.5K	0
C	~7.1K	0
D	~3.0K	0
E	~6.6K	0
G	~6.8K	0
H	~6.8K	0
J	~6.3K	0

The trigger table for this test run (168601) is built from the latest default.
The data from this test run is perfectly good for physics analysis.

Pulsar Beam Operation

STORE 2985 2003/09/03 21:49 2003/09/04 14:51

run	L3A	Lumi_live (nb-1)	max. rate L1 L2 L3	avg. rate L1 L2 L3	inst.Lumi start/end
168766	335,930	196.220	15.0k/268/58	13.3k/255/53	35.0/30.2
168767	155,974	85.949	13.7k/240/53	13.0k/230/50	29.5/28.0
168775	596,981	258.197	12.5k/190/45	10.6k/169/39	19.7/15.8

L = 2.6 pb-1
#L3A = 3.4M

L1 rate = 16.5kHz
L2 rate = 300Hz

STORE 2988 2003/09/04 21:26 2003/09/05 10:21

run	L3A	Lumi_live (nb-1)	max. rate L1 L2 L3	avg. rate L1 L2 L3	inst.Lumi start/end
168819	90,076	76.570	16.5k/148/30	13.8k/132/27	24.7/23.1
168820	1,101,959	471.469	14.7k/235/50	12.0k/193/47	22.7/14.8
168821	166,146	114.954	9.6k/ 94/22	8.6k/ 86/20	14.5/13.2
168822	121,685	50.591	8.4k/134/34	7.3k/121/30	13.2/12.6

Smooth operation

Check of
- all online events
- 500k offline

STORE 2997 2003/09/06 20:54 2003/09/07 14:45

run	L3A	Lumi_live (nb-1)	max. rate L1 L2 L3	avg. rate L1 L2 L3	inst.Lumi start/end
16889	2,816,155	1,359.049	15.5k/300/60	12.2k/205/45	40.0/13.7

No Problems

PULSAR Crate (b012pu00) Configuration In Trigger Room

Pulsar Muon Board

Input Options

L1 Muon
(16 hotlink fibers)
and/or
L1 XTRP Cable

OR

Pulsar muon+xtrp
data transmitter

Output Options

Pulsar Receiver

OR

L2 TrkList Board
in b012de00

