The ALICE TPC ReadOut Bus – status report

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this presentation is available on the website http://cern.ch/ep-ed-alice-tpc/
OUTLINE

• System Overview

• Technology and Measurements

• Conclusions
Arrangement of the Front End Cards and Bus Cable

The bus is routed in 2 cables (30 AWG, 0.635 mm pitch, halogen-free ribbon cables)
Front-end electronics system architecture

Each TPC Sector is served by 6 Readout Subsystems

Overall TPC: 4356 Front End Card  216 Readout Control Unit

ALTRO bus requirements:

- 7 control lines
- 4 dedicated lines (distribution of L1 and L2 trigger + read-out and ADC clock)
- 40 bi-directional lines (data, addresses and instruction code)
- Signal frequency: up to 40 MHz
The GTL technology

GTL is a low swing input/output technology
Commercial drivers require 3.3 V supply

We have characterized some of them at 2.5 V to use a single digital power-supply in the FEC (ALTRO requires 2.5V)
ALTRO bus Test set-up

Test configuration:

- 10 FECs light-prototype equipped with GTL transceivers (Philips 16612DGG) supplied at 2.0 to 3.3 V
- Test signal: 20 MHz to 100 MHz square-wave
- Cable length: ~ 80 cm
Signal Distribution Scheme

Test conditions:

- Termination Cards
  - Vtt: 1.3V
  - $R_T$: 70 ohm, $C$: 20 pF

- Load for LVTTL bus
  - 20//20 kohm $\rightarrow$ 10 Kohm
  - 10//10 pF $\rightarrow$ 20 pF
Measurements

Measurements performed with
20MHz (40 Mbit/s) input signal:
- GTL signals on CARD 2
- GTL signals on CARD 10
- LVTTL on ALTRO 1 (card 10)
- LVTTL on ALTRO 8 (card 10)

Signal amplitude: 2.35 V
Overshoot: 0.85 V
Undershoot: 1.95 V
(The measurement shows that the FEC internal bus has to be optimized to reduce under/over-shoots)
Conclusions

- GTL transceivers can be operated at 2.5 V

- Tests have shown that the Front End bus can be operated up to 100 MHz

- The use of 2 ribbon cables represents a good compromise between mechanical and electrical requirements

The ALICE TPC ReadOut bus documentation is available at:
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