SL7+git Setup Status at Goettingen

- SL7 + git lab pc (pcbellepxd) installed and running
 - ADC measurements scripts (DHE and Gate source) working
 - ADC analysis scripts working
 - switcher sequence generator and upload working
 - configDB working
 - adjusted DCD4 opi (script paths), pushed to git
- open questions, who does what?
 - gated mode scripts (Philipp Leitl?, Eddi?)
 - DCD waveform measurements scripts (Botho?)
 - sampling point curves scripts (Harrison?)
 - install script
 - location of configDB script? add to install script (Philipp Wieduwilt)

Hybrid5 DCD4.x Testing Follow-up

High INL and ADC Gain Spread

Harrison Schreeck, Philipp Wieduwilt, Benjamin Schwenker

ADC Gain Spread Analysis

• situation:

- saw high INL channels for DHE measurements on Hybrid5.0.14 (DCD4.2 with matrix)
- high INL not caused by bit errors or long codes (detected separately)
- rather wobbling curves with varying local slopes
 - \rightarrow Q: what INL value is still acceptable?
- idea: determine local variation of ADC curve slope (gain spread)
 - more physics related quantity, can put reasonable constraints on
 - assume a threshold for maximal gain variation of 5 % for now
 - need to check if efficiency and spatial resolution are degraded

- choose ~100 random pedestal values in expected pedestal range
- for each pedestal value compute local gain (slope) via linear fit
- histogram all gain values
 - get mean of gains
 - get RMS of gains
 - gain spread = RMS/mean
- plot mean vs channel
- can use gain spread value as optimization criterion

channel095_dacifbpbias-070__INLpp_10.19__INLpp_middle_10.19



10¹

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gain spread (dacifbpbias=70)

example of high INL/high gain spread measurement due to bad VNSubIn setting

Gain spread–INL correlation



→ requiring a gain spread <= 5 % we conclude that **INLpp values up to 7-8 are still ok**, matrix channels show higher gain spread

VNSubIn Dependence of DHE Source Measurements







- INLpp very sensitive to VNSubIn,
- optimal VNSubIn increases
- high INL values not seen in Bonn for Hybrid with DCD4.2 and matrix
 - can Bonn confirm this dependece?

VNSubIn Dependence of Gate Source Measurements







- VNSubIn dependence much less pronounced
- apparently more long codes for low gain (En60) compared to high gain (En30)



BACKUP

Gain Spread at different Gain Settings (En30 vs En60)



- have to increase VNSubIn value for DHE source measurements for smaller gain (En30 \rightarrow En60)
- non-matrix channels are not changing
- gain spread increasing with smaller gain