Test Report from Goettingen

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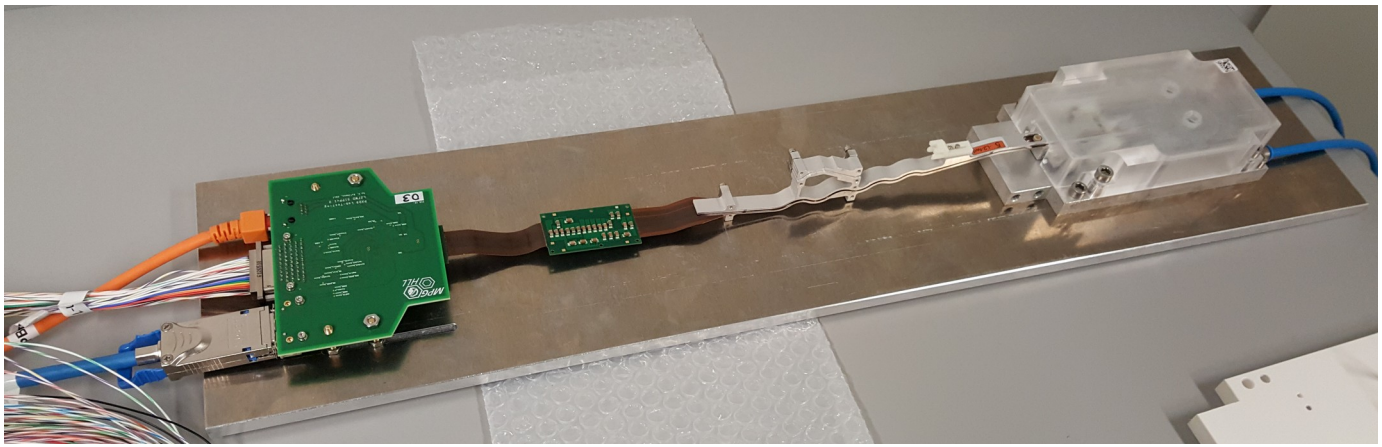
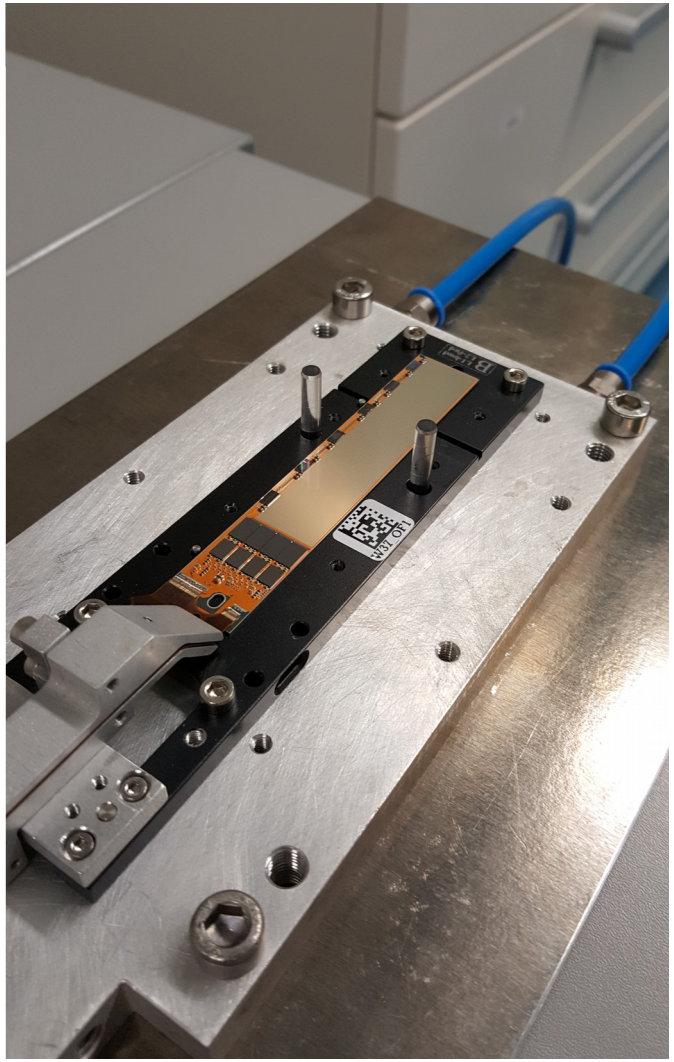
W37_OF1

Module Setup

- clamp attached
- inner and outer cover in place
- cooling with chiller at 20°C
- no vacuum
- ConfigDB and DHH Sequence used for controlling the system





Module Temperatures

- measured via DHP temperature diode
- all covers, with clamp, chiller @ 18°C
    - only DHPs powered
        - 25-30
    - DHPs and DCD powered, but DCD analog OFF
        - 30-35

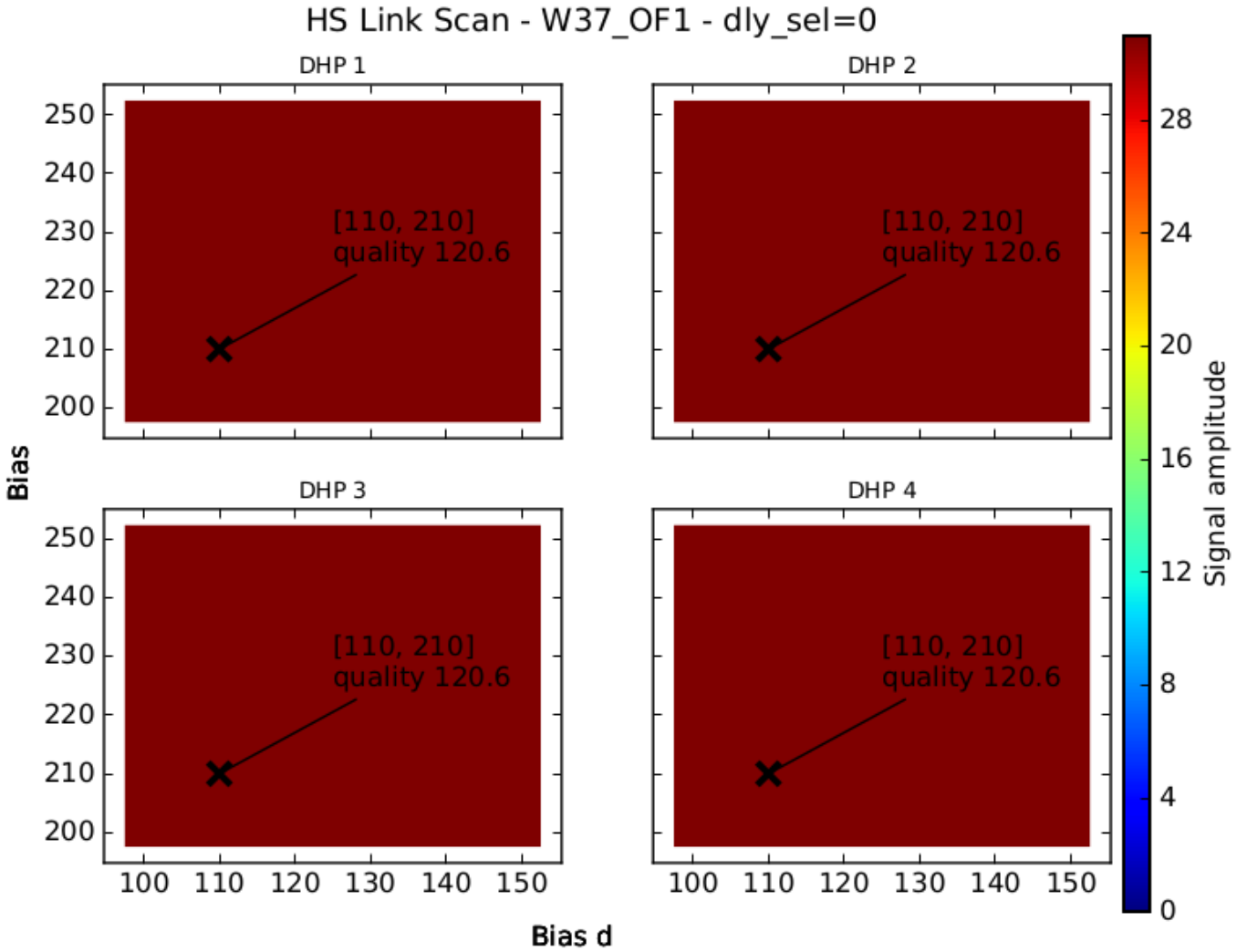
--> for both W37_OF1 and EMCM

- DHPs and DCDs powered and DCD analog ON
    - 50-58
- all powered (DCDs analog ON and matrix)
    - 55-60

- calibration?
    - even with only DHPs powered: 5-10 spread between DHP temperatures

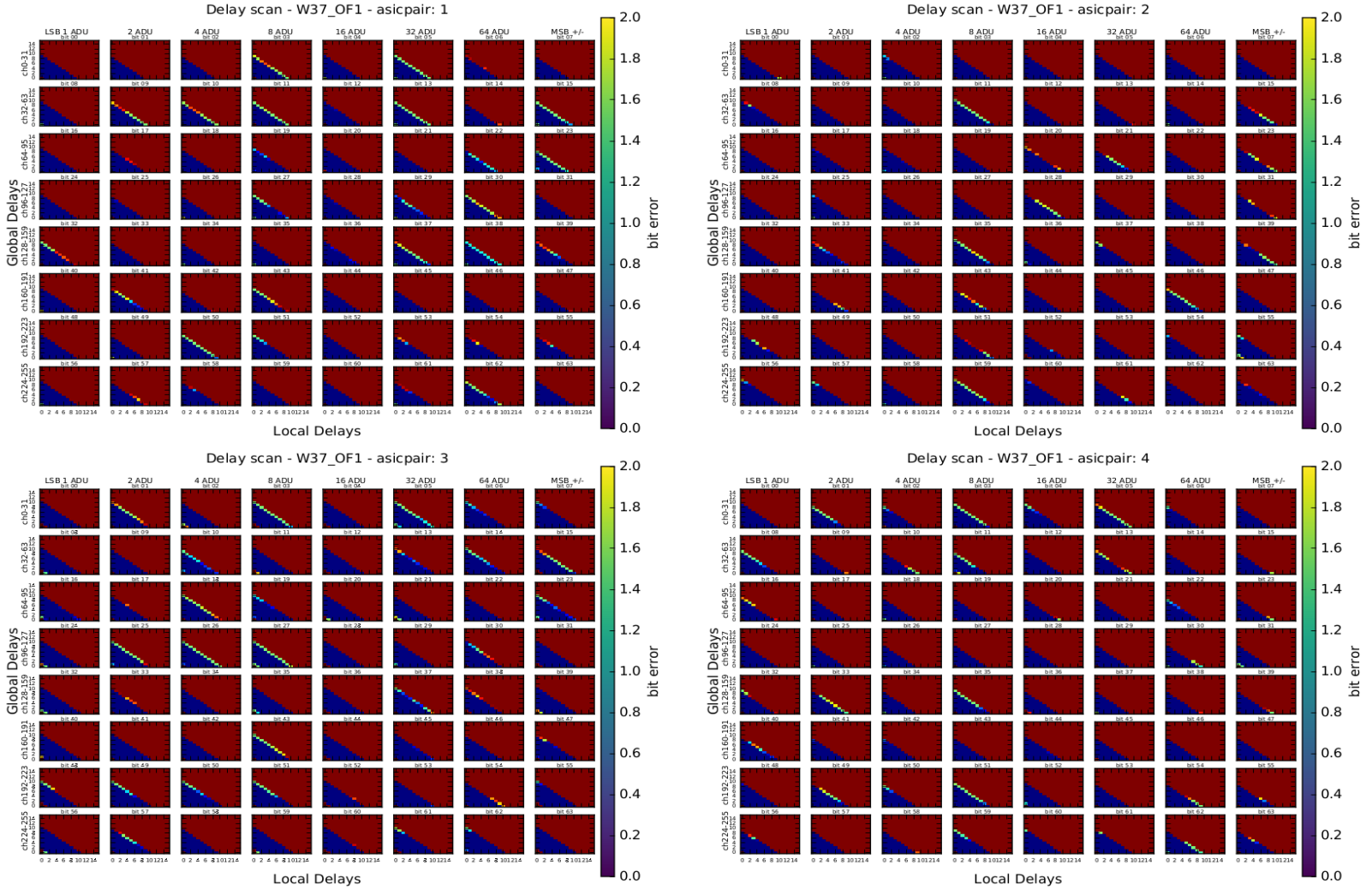
HS Link Optimization

- Scan: https://elog.belle2.org/elog/PXD-Mass-Testing/170
- Analysis: https://elog.belle2.org/elog/PXD-Mass-Testing/171

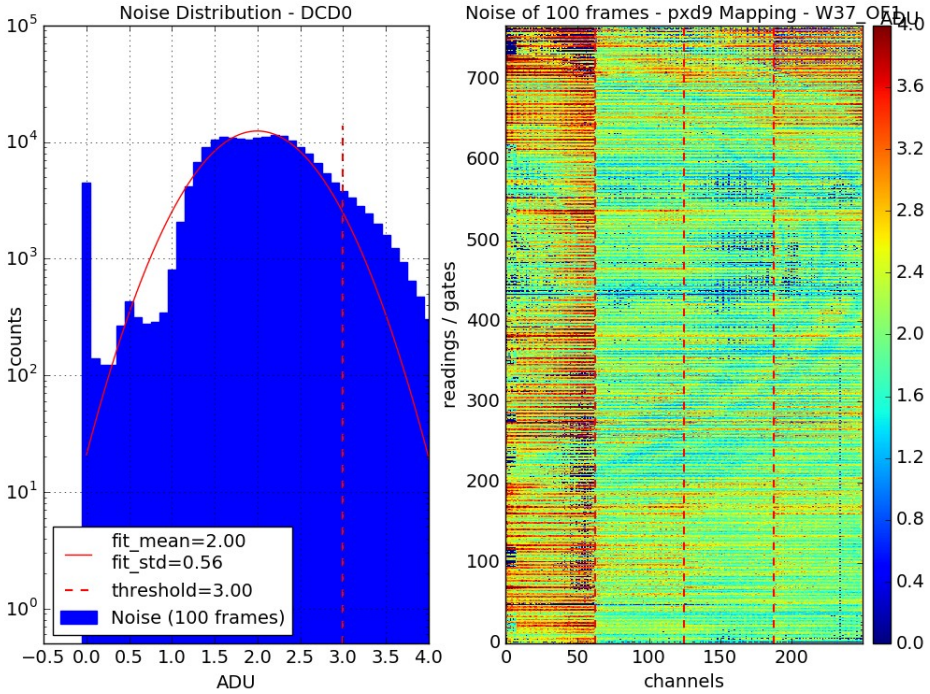


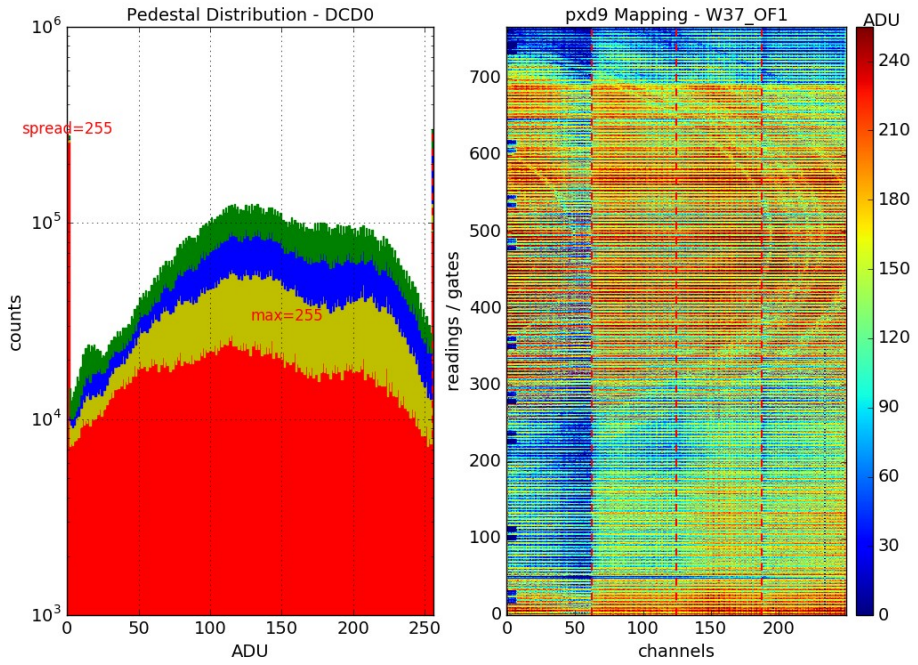
Delay Optimization

- Scan: https://elog.belle2.org/elog/PXD-Mass-Testing/147
- Analysis: https://elog.belle2.org/elog/PXD-Mass-Testing/148



Pedestal and Noise

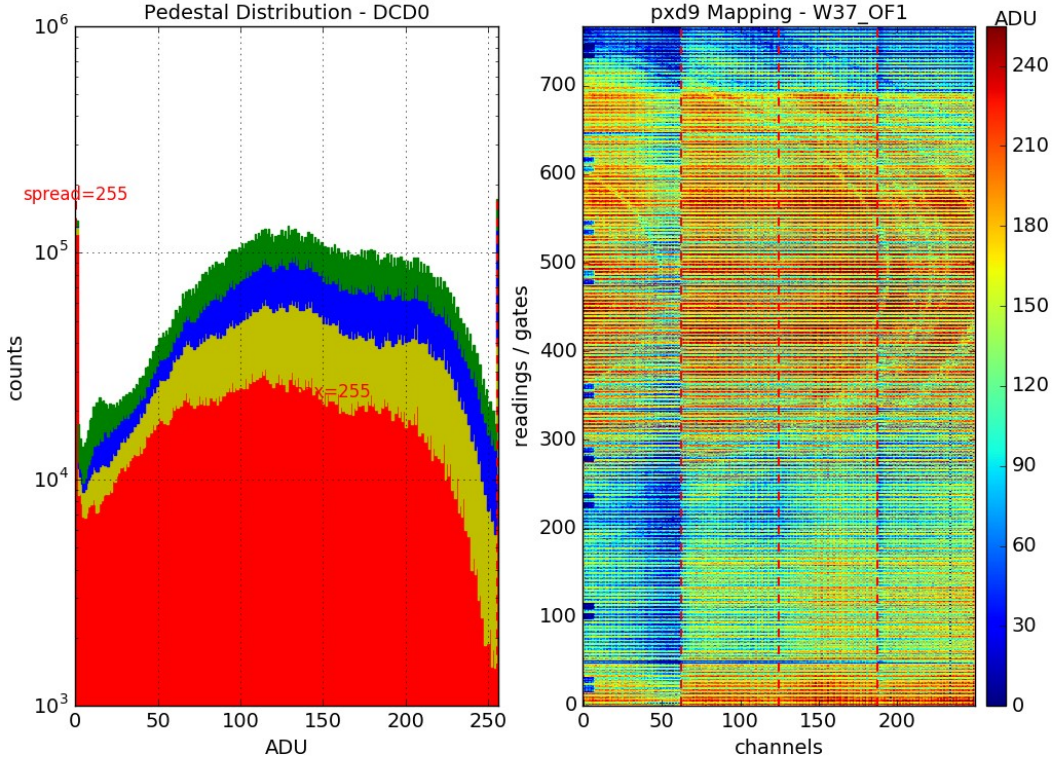




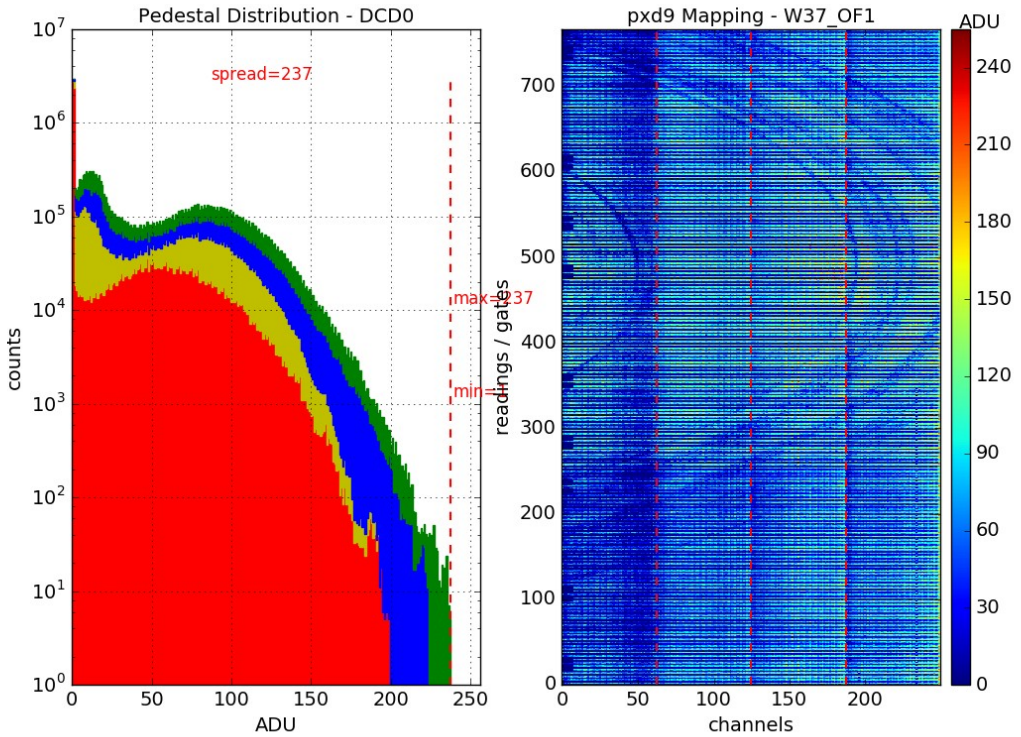
Pedestals with optimized VNSubIn (22 – 22 – 24 – 24) and GateOn voltages (-1500mV, -1600mV, -1700mV)

ACMC

- ACMC off: https://elog.belle2.org/elog/PXD-Mass-Testing/229
- ACMC on: https://elog.belle2.org/elog/PXD-Mass-Testing/228

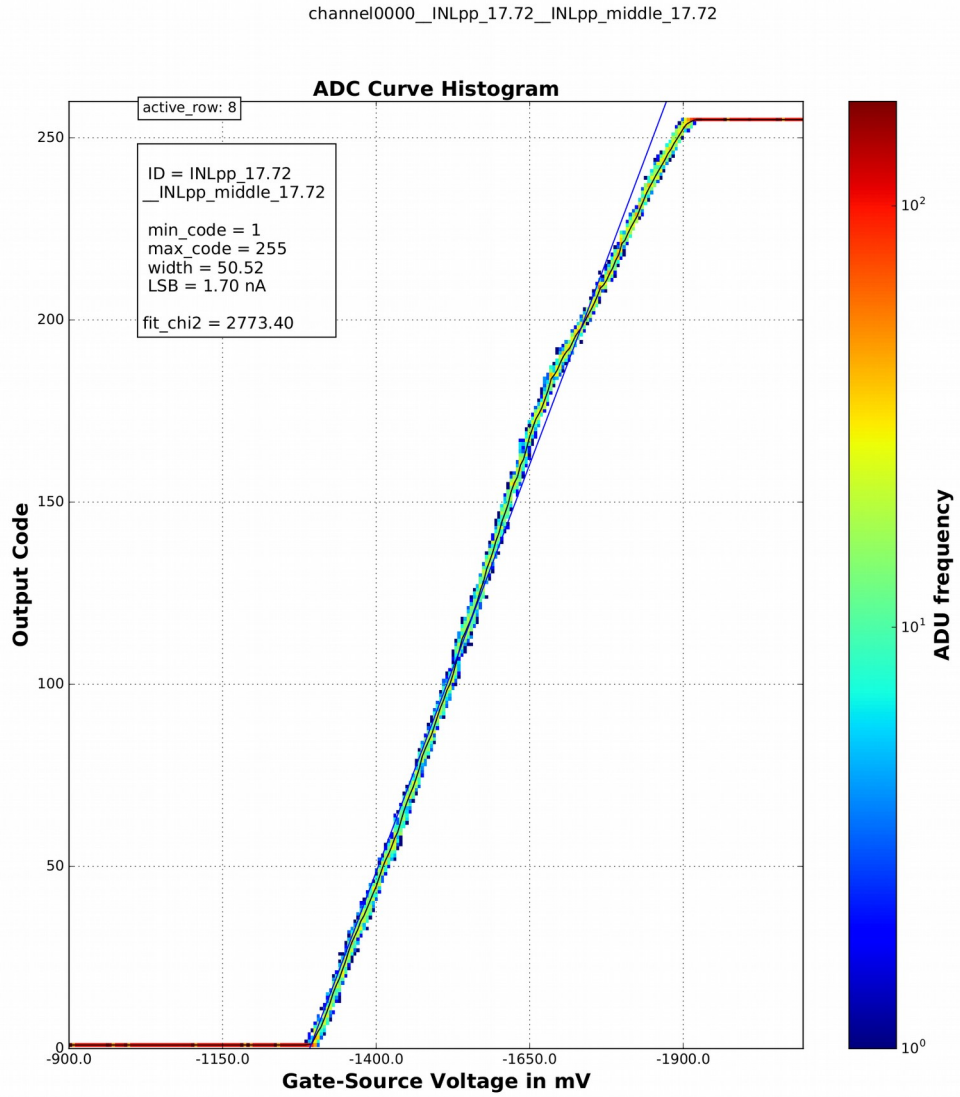


ACMC off



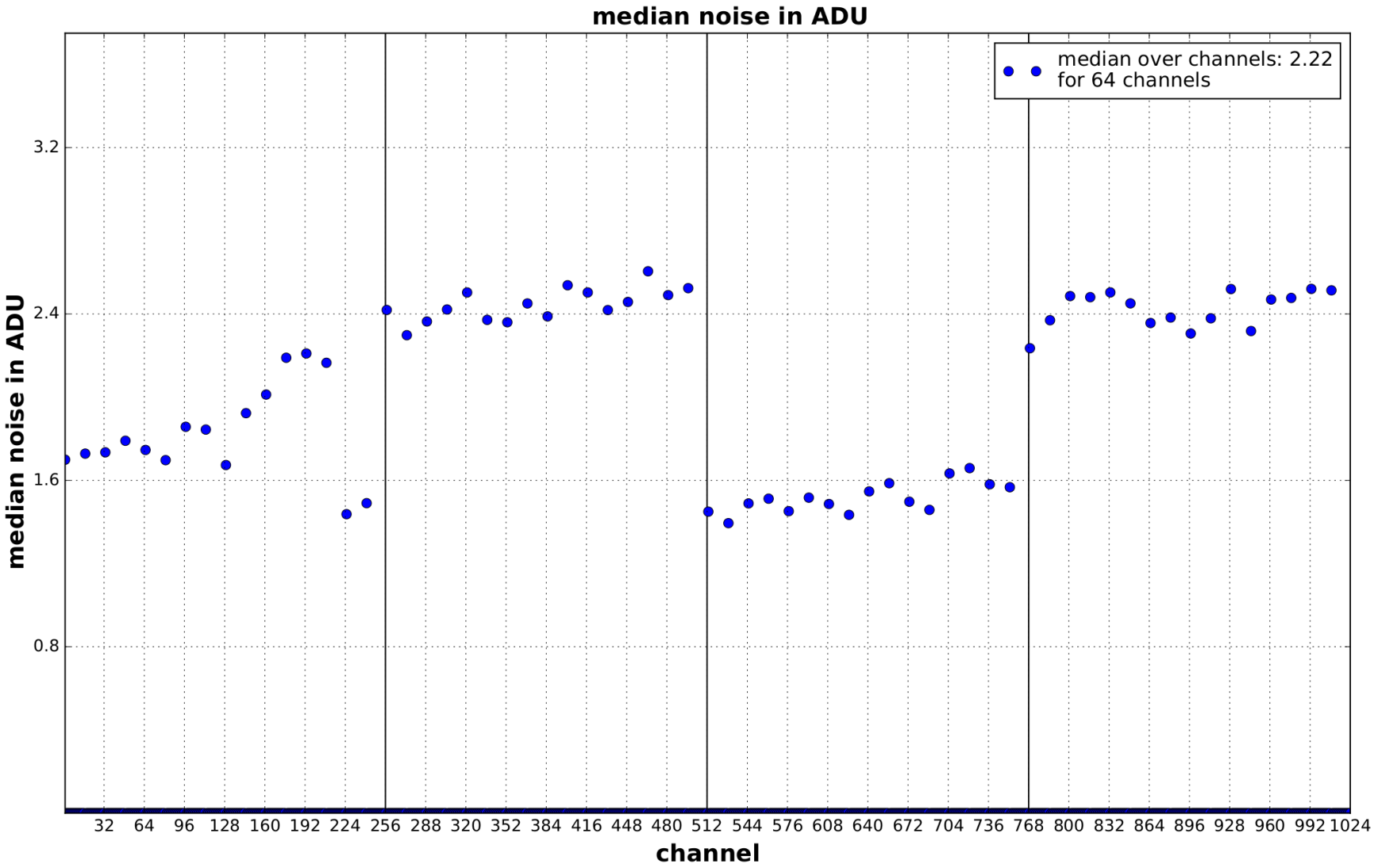
ACMC on

ADC Curves



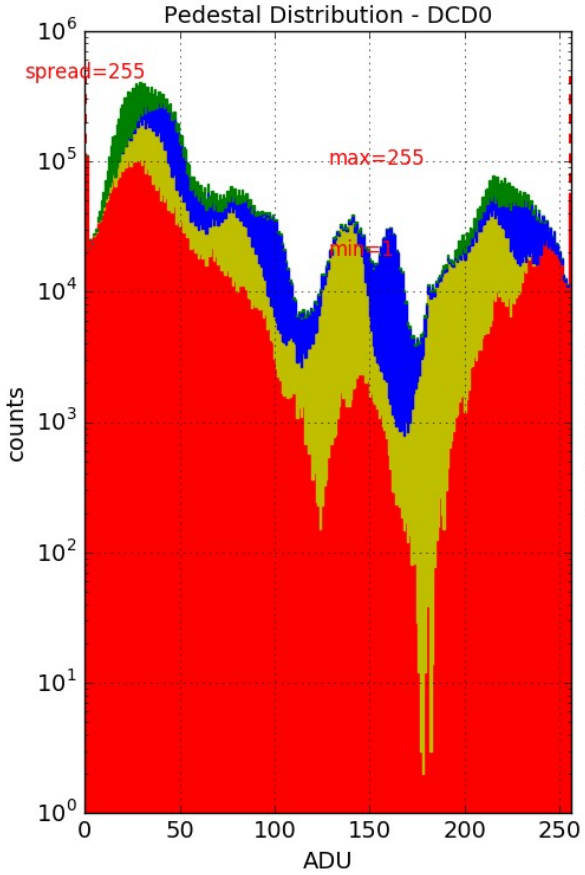
- Only gate source measurements possible
- ADC curves quite noisy
- high INL

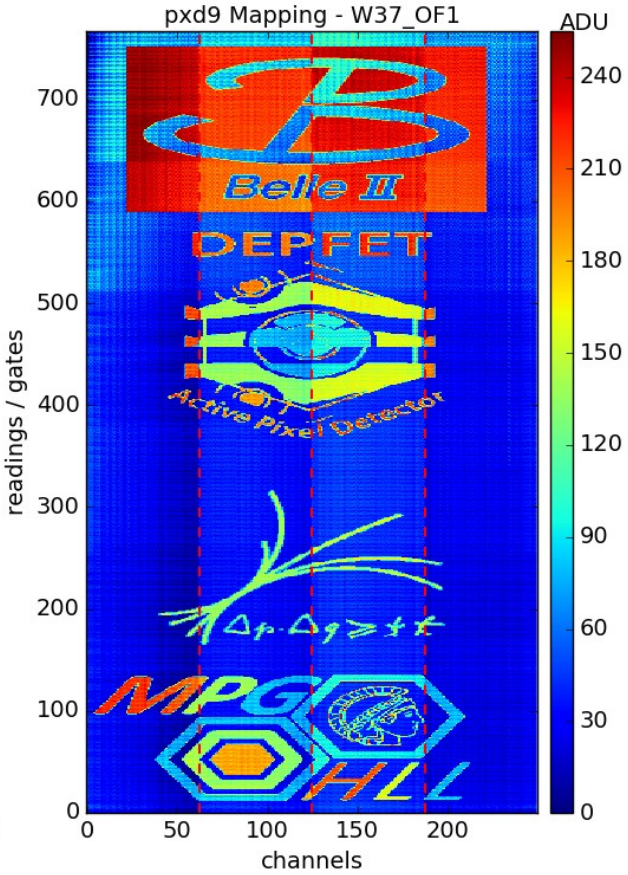
ADC Curves

- 
median noise in ADU
median over channels: 2.22
for 64 channels
median noise in ADU
3.2
2.4
1.6
0.8
32 64 96 128 160 192 224 256 288 320 352 384 416 448 480 512 544 576 608 640 672 704 736 768 800 832 864 896 928 960 992 1024
channel

Offset Delays

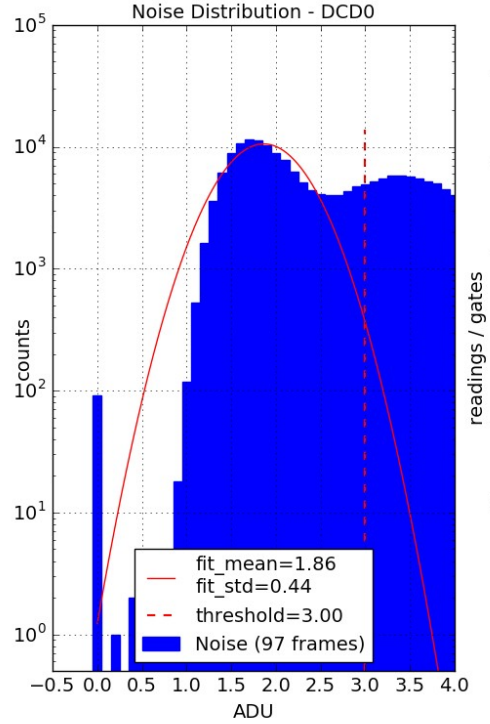
- Matrix blocked (2000 mV) and delay optimization performed
- Local delays set to [3,4]

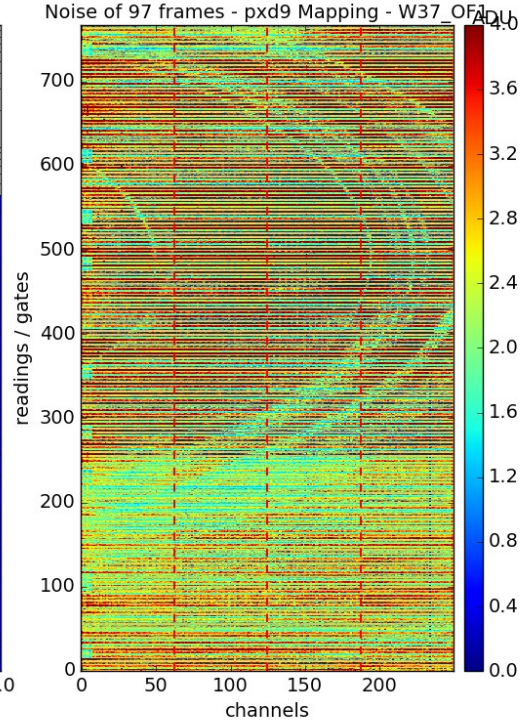


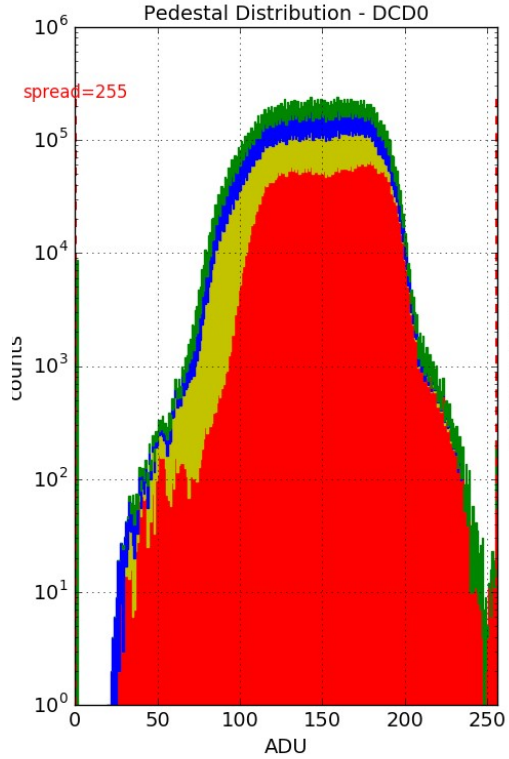


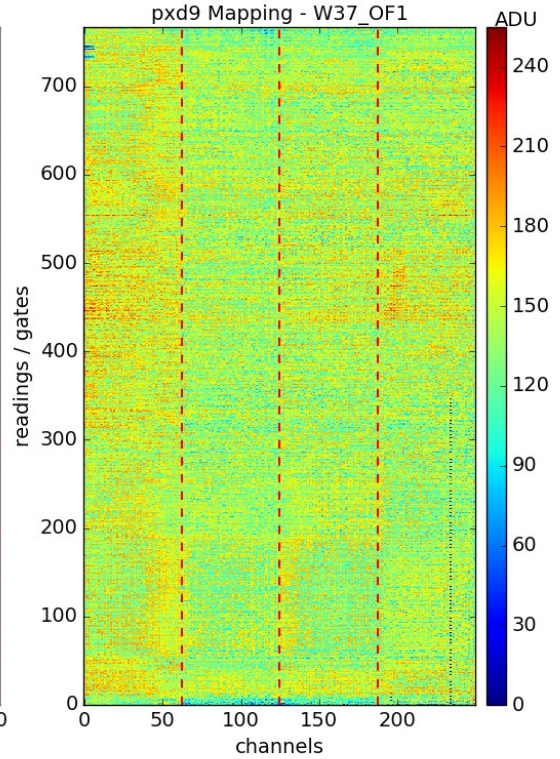
Offset Calibration

- Scan: https://elog.belle2.org/elog/PXD-Mass-Testing/288
- Analysis: https://elog.belle2.org/elog/PXD-Mass-Testing/289





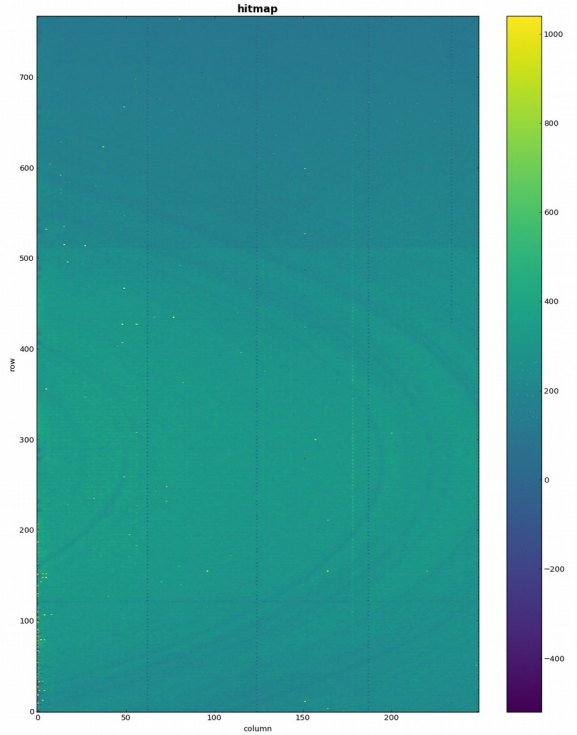


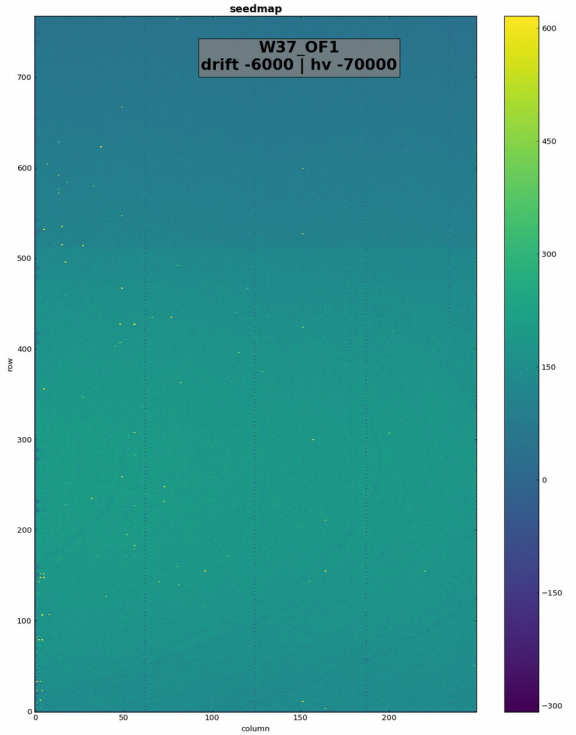


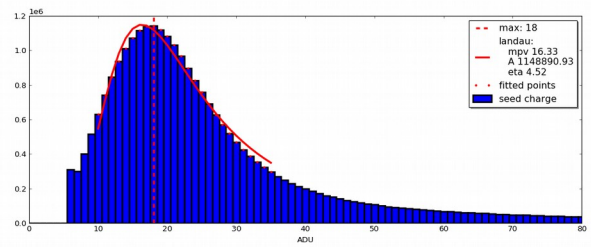
Pedestals with offset correction enabled

Source Scans

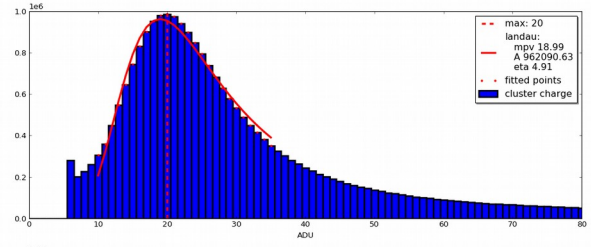
- Scan: Performed manually @MPP in Munich
- Analysis: https://elog.belle2.org/elog/PXD-Mass-Testing/341
- Sr90 source (emitting beta radiation) with an activity of 1.00 Mbq
- Hitmaps show ring structure, which varies with HV/DRIFT voltage
- Sweeped HV from -50000 to -70000 (with step -2000)
  Sweeped DRIFT from -6000 to -6000 (with step -1000)
- Todo: Implement automatic ring detection (requires clear definition of rings)



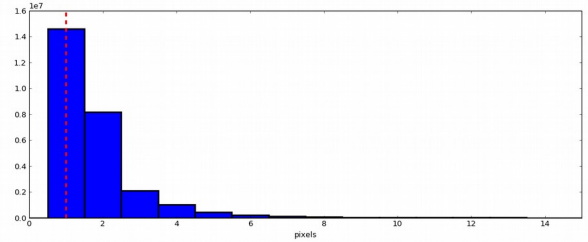




Seed charge



Cluster charge



Cluster size

Summary

- DHPT HS Links
  - stable links found ✓
- Delays
  - delays optimized ✓
- ADCs optimization using small parameter space
  - only allchannel scan performed ✗
- 2bit offset (delay and current source optimization)
  - optimization succesfully performed ✓
- DCD analog common mode correction
  - functionality confirmed ✓
- Source measurement different regions
  - Measurement and preliminary analysis performed ✓
- Gated mode: simplified test using manual switch for the VETO and standard DHH firmware
  - not yet performed ✗

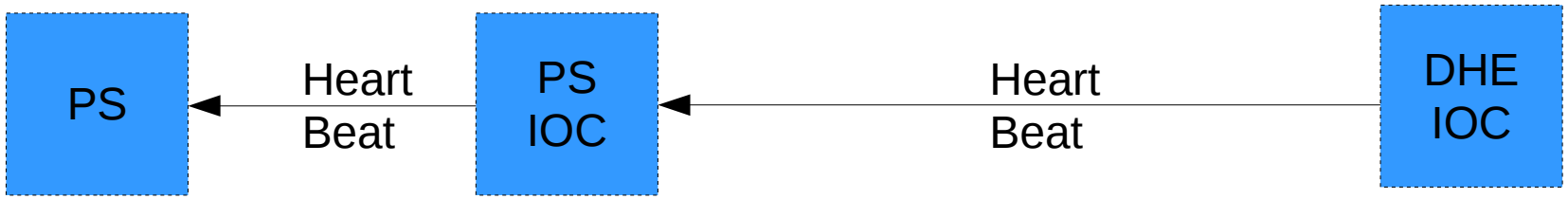
Utility IOC and Temperature Interlock

Features

- Configuration like config-server(-db):
  - Allows to configure each ASIC individually or groups of ASICS (all DHPs for example)
  - Can configure the DHE
- Can be used easily with multiple DHEs in contrast to config-server(-db)
- Uses logging from log_utils
- Provides TRG PVs to upload switcher sequence, pedestals and offsets
- Provides PVs for DHP temperatures:
  - manual measurement
  - continuous measurement
- Can activate/deactivate ACMC for the DCDs

Temperature Interlock

- Utility IOC can monitor the DHP temperatures and trigger an emergency shutdown
- Utility IOC is a temporary solution for lab setups and will not be used in the final experiment
- Heartbeat between PS Seq IOC and DHH IOC required for a stable and save solution
    - This requires some work on both IOCs, to produce/receive the heartbeat and perform the temperature measurement



ELOG

Status

- Automated elog entries integrated in most measurement scripts (adc, hs link, delays, source scans, sampling point curves).
  Missing are:
  - Pedestals
- PXD-Mass-Testing elog hosted @DESY
  - https://elog.belle2.org/elog/PXD-Mass-Testing/
- Multiple level of elog entries:
  - **Measurements/Scans:** Documentation of settings during the scan and location of saved files
  - **Analyses:** Results of the analysed data with plots
  - **Module Summaries:** Short summaries for one module, which lists all performed (and missing) measurements with links to their elog entries
  - **Grand Summary:** One central summary, that lists all modules and the status of the performed/missing tests

Module Summary

- Collection of all performed scans
- Condensed results
  - multiple value per Scan e.g. number of stable links, or INL and Noise for ADC curves
- Summary is updated after each measurement

Message ID: **440**	Entry time: **2017/09/27 Wed 11:07 UTC**
Author:	bellelab01
Category:	Summary
Type:	Other
Device:	pxd9
Module:	W37_OF1
Moduletype:	of
CommitID:	-1

Summary for Module W37_OF1

Legend:

Scans:
Done: Measurement performed.
Todo: Measurement not yet performed.

Analyses:
Passed (A): Test passed, everything fine.
Passed (B): Test passed, minor issues.
Failed (F): Test failed.
Done (-): Test completed, but grading unknown.
Todo: Test not yet performed

Click on Test Status, to get to the corresponding elog entry.

Testing Locations	Last Update	Probe Card Scan	HS Link Scan	HS Link Analysis	Delay Scan	Delay Analysis	Pedestal Scan	ADC Scan	ADC Analysis	Sampling Point Curve Scan	Sampling Point Curve Analysis	Source Scan	Source Analysis
Goettingen/Munich	2017/09/20 (Probe Card Scan)	Done	Done	Passed (A)	Done	Passed (A)	Done	Done	Todo	Done	Todo	Todo	Done (-)

Results:

HS Link Analysis	Delay Analysis
Working_Links	Optimized_Links
4	4

„Grand Summary“

- Idea: Have one elog entry that lists all produced modules and the status of the tests that have been performed or are missing

PXD-Mass-Testing | PERSY | Beast-II-Commissioning

ELOG for PXD mass testing

List | New | Edit | Delete | Reply | Duplicate | Find | Logout | Help

Message ID: **442** Entry time: **2017/09/27 Wed 11:28 UTC**

Author:	bellelab01
Category:	Grand Summary
Type:	Other
Device:	
Module:	
Moduletype:	
CommitID:	-1

Legend:

Scans:
Done: Measurement performed.
Todo: Measurement not yet performed.

Analyses:
Passed (A): Test passed, everything fine.
Passed (B): Test passed, minor issues.
Failed (F): Test failed.
Done (-): Test completed, but grading unknown.
Todo: Test not yet performed

Module	Summary Link	Testing Locations	Last Update	Probe Card Scan	HS Link Scan	HS Link Analysis	Delay Scan	Delay Analysis	Pedestal Scan	ADC Scan	ADC Analysis	Sampling Point Curve Scan	Sampling Point Curve Analysis	Source Scan	Source Analysis
W01_IB	387	Munich	2017/07/07 (Probe Card Scan)	Done	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo
W02_IB	359	Munich	2017/09/19 (Delay Analysis)	Done	Done	Passed (A)	Done	Done (-)	Todo	Todo	Todo	Todo	Todo	Todo	Todo
W02_IF	388	Munich	2017/08/30 (Probe Card Scan)	Done	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo
W03_IB	389	Munich	2017/08/30 (Probe Card Scan)	Done	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo
W03_IF	390	Munich	2017/08/30 (Probe Card Scan)	Done	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo
W05_IF	391	Munich	2017/08/30 (Probe Card Scan)	Done	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo
W08_IF	392	Munich	2017/09/21 (Probe Card Scan)	Done	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo	Todo
			2017/09/21 (Probe												