

Onilne Calibration

Threshold Scan

- Fully unmasked ASIC matrix
- Readout in different thresholds
- Count noisy pixels Vs Threshold
- Mask patterns of noisy pixels per threshold

Noise Scan

- Apply mask patterns per threshold
- Readout in different thresholds for a specified time
- Count event numbers per threshold
- Decide/Confirm Threshold
- If low number of noisy pixels (around 50) in the desirable threshold: mask them
- If more noisy pixels, choose another threshold

Working Point selection

- Apply threshold and the corresponding masking pattern
- Apply the initial working point
- Mask the whole ASIC
- Unmask a few pixels (i.e. one pattern of the rolling mask pattern)
- Change relevant parameters in a small specific range (stable fdb = 40 , load = 10-20)
- Acquire for all the cases in the whole testpulse range, with the rolling mask pattern code (i.e. for one pattern)
- Quantify ADC response per charge
- Choose the working point
- Redo acquisition from threshold and noise scan for the new working point and threshold
- Mask noisy pixels if any
- Refine sampling technique in case the ADC range is very different from the rest

Data Acquisition- Rolling mask pattern

- Apply defined threshold and working point
- Apply the defined mask pattern
- Mask matrix
- Unmask specific rolling mask pattern
- Start charge injections with the specified sampling technique
- Roll the rolling mask pattern one pixel below and inject all the selected charges
- Repeat until finish the whole ASIC matrix

Charge Claibration

- Convert data in root
- Map Q-ADC
- Return: ADC, calibrated charge, pixel position

Offline Calibration

- Receive Charge ADC values from ASIC characterization
- Import in the simulation
- Map the simulated charge in an ADC value
- Create calibration curves per pixel
- Calibrate the ADC value per pixel
- Return ADC, calibrated charge, simulated charge

Working Point of the ASIC

- bias_preamp = 20 or 10
- bias_fdb = 40 - 30
- disc = 1
- LVDS = 110
- bias_load = 10-20
- idle = 255
- bandgap_config = 65
- threshold_set=0
- threshold_offset=>85
- bias_pixel_data
- testpulse_delay = 127
- config_global = 254
- readout_config = 255
- TDC_config = 200
- Testpulse -> sampling_technique

Sampling Technique for charge acquisition

- Testpulse values needed to be acquired for optimal calibration results:
 - 1,2,3,4,5,6,7,8,9,11,12,13
 - 14,15,15,17,18,19,20
 - 21,22,23,24,25,26,27,28,29,30,31,32
 - 33,34,35,36,37,38,39,40
 - 41,42,43,44,45,46,47,48,49,
 - 50,51,52,53,54,55,56,58,60,
 - 63,65,67,68,70,73,75,77,
 - 80,83,85,90,95,100,105,110
 - (150, 200)