Measurements on bare ASIC and full detector.

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- Tests on bare asics v2.
- Tests on full detector.

Characterization overview.

Testing	
Sensor electrical test	I-V measurement
Front-end tuning	Threshold
	Shaper
	Calibration
Front-end electrical test:	Noise and noisy channels
	Cross-talk
	Timewalk and jitter
Detector performance	Charge collection efficiency
	Signal-over-noise

ASIC	
CMOS process	AMS 0.35 μm
Power consumption	$<$ 1.5 W/ASIC
Channels per chip	128
Data rate	$<$ 5 kHz/channel
Energy range	0-50 MeV
Time stamp	100 MHz

Sensor	
Type	double sided
Bulk doping	n-type
Bulk thickness	300 μm
Strip pitch	50 μm
Strip width	38 μm
Strip stereo angle	16.2^o
Leakage current per strip	3.25 nA/cm ($<$100 nA)
Strip capacitance	2.3 pF/cm ($<$80 pF)

Test on bare asic:

- Standard tests are completed on second board using asic v2: e-mode and h-mode.
- e-mode tests presented on 21 July 2014.
- h-mode tests present today, see my other set of slides.
- Board 2 did not show any particular signal of fault.
- It also never locked up (improvement w.r.t. board1).

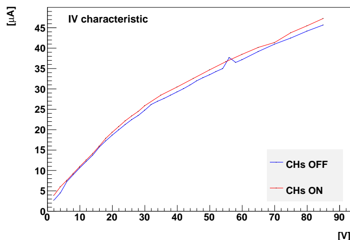
Tests on full detector:

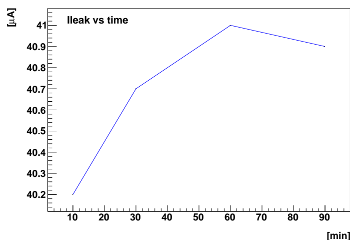
- Detector received at DL on Thursday.
- Detector is connected and sits in air (lab.T9).
- Electrical tests are ongoing: IV and noise vs channel.
- Memory of DAQ allows for test of 1 side only: n side (or even-side).
- Detector is working with E-th at 0xe0.

Other:

- New test has been implemented.
- Measures time-stamp (TS) jitter as a function of the threshold of TS discriminator.
- Need practice to possible optimization.

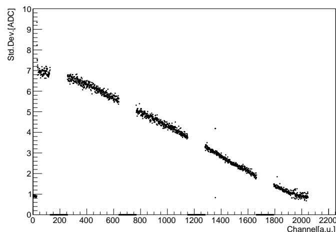
Full-detector tests: IV

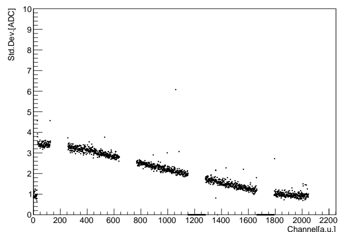


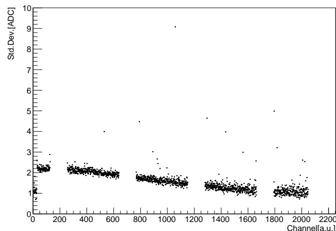


- IV different from that measured at Liverpool.
- It shows an increased ohmic behavior.
- Temperature effect: 30deg (from pt100), 43deg (from Ileak).
- If temperature effect then pt100 is not measuring the right temperature.
- Other possibility would be mechanical damaging of sensor.
- No thermal run away.

Full-detector tests: noise vs strip length.



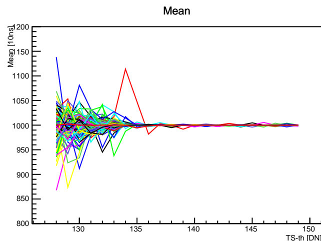


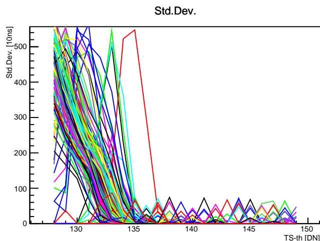


- Input capacitance $\propto$ strip length.
- I_leak $\propto$ strip length.
- Noise increase for longer strips.
- Increasing shaping time makes the noise lower and homogenus across the channels.

N.B. chain 1 (n side) is not working.

New test: time-stamp jitter.





- GOAL: measure the time-stamp jitter.
- MEASUREMENTS: Loops over all the channels.
  Only one channel is powered up at each time.
  For this channel, loop over the time-stamp threshold.
  Inject N pulses for each time-stamp threshold.
  Each time calculates pulse period: time_stamp_new - time_stamp_old .

N.B. At the moment, the mean is not the value of the real period. It requires to add an offset.

TEST OUTCOME:
Std.Dev. decreses by increasing the threshold: expected.
As a default value we use 144dec (0x90).