Test Results of the Anode Preamp Chips CMP16F

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- **Selection criteria**
- **Minimum thresholds**

Selection criteria

- **Test of 90 boards with CMP16F chips**

  - was done on the ASIC test stand
  - the goal is to certify the boards
  - measured threshold, noise,gain time resolution, slewing time
  - choice of selection criteria for the mass production test
  - how many passed the selection
  - 150 boards are under test now including temperature test

- **Criteria**
  - no dead or oscillating channels
  - good fit of the threshold curve (Chi2/NDF <10)
  - the channel parameters must be uniform within the chip
  - residual (deviation from mean) almost Gaussian, use it as the cut
  - two side cuts on Qthr, Mean time, one side (high) cut on noise,time resolution and slewing time
  - statistics + real life

Table 1. Parameters of anode front end boards AD16 with CMP16F chips at Ud=1400 mV, Cdet=180 pF (ASIC test stand, Fermilab).
(Mean and Sigma are from Gaussian fit).

Parameter	Mean	Sigma
Qthr	17.3 fC	2.6 fC
Qthr residual	-	1.3 fC
Noise	2.1 fC	0.1 fC
Noise residual	-	0.08 fC
Time resolution at Qin = 100 fC	0.7 ns	0.08 ns
Mean time	124 ns	1.2 ns
Mean time residual	-	0.4 ns
Slewing time (50 fC $<$ Qin $<$ 600 fC)	3.1 ns	0.6 ns
Slewing time residual	-	0.35 ns

Table 2. Board failures in 90 tested boards.

Board ##	Comment
58 59 77	Dead or oscillating channels
36 69 87	One dead channel
61	High noise of 4.5 fC (at 2.09 ± 0.08 fC nominal) in ch 3,4
18	Ch. 7 has Chi2/NDF=10, higher noise (2.6 fC) and low mean time (by 5 nsec)
8 boards	Subtotal
20 32 35	Large slewing time ($>$ 5 ns, all channels)
42 52 54	Irregular time resolution vs Qin in one channel
6 boards	Subtotal
14 boards	Total (16%)

Minimum thresholds

- **Goal and conditions**

  - how low we can go with threshold before to get board oscillated
  - study done during CSC validation test on the cosmic muon stand at Fermilab
  - boards with CMP16F on CSC ME234/2 + ALCT + Cathode Front End
  - HV off, no input test pulse, trigger from pulser

- **Procedure and results**

  - set 'zero' thresholds to get boards oscillated, then raise threshold by 1-1.5 fC, take 1000 events run,repeat
  - count all noise hits in 32 μs TDC gate (16 hits max.) and noise hit in 0.4 μs ALCT gate
  - Qthr$\sim$10 fC is a min. oscill. free threshold
  - compare two setups, with and without TDC cables, see no difference in noise