

# Omega



## SKIROC2 issues

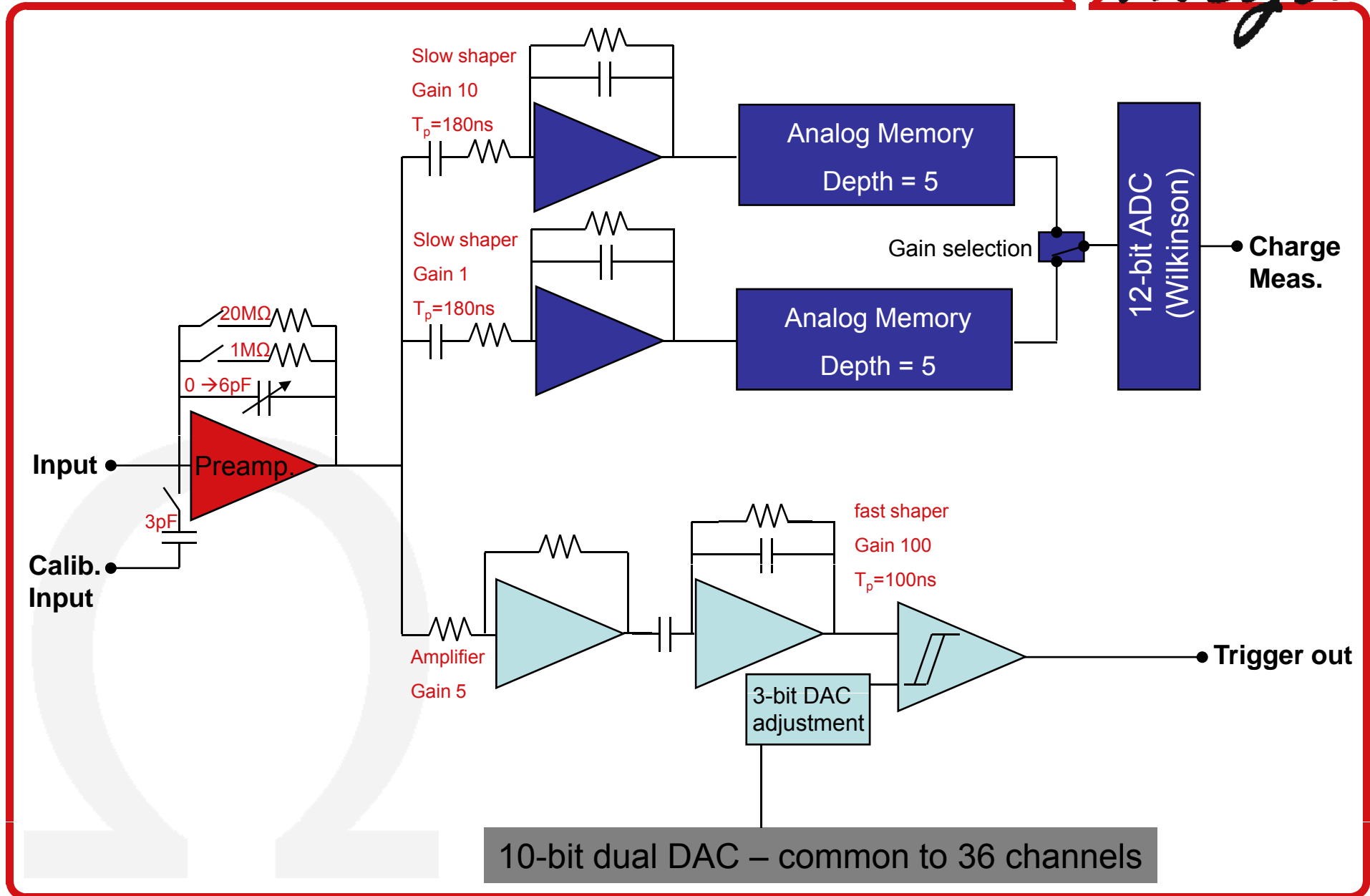
9 September, 2008

*Orsay MicroElectronics Group Associated*

- SKIROC 1 performances and limits
- SPIROC in SKIROC mode
- Expectations for EUDET
- SKIROC 2 proposal
- **Bonus** : ROC chips in test beam

# SKIROC1 One channel block scheme

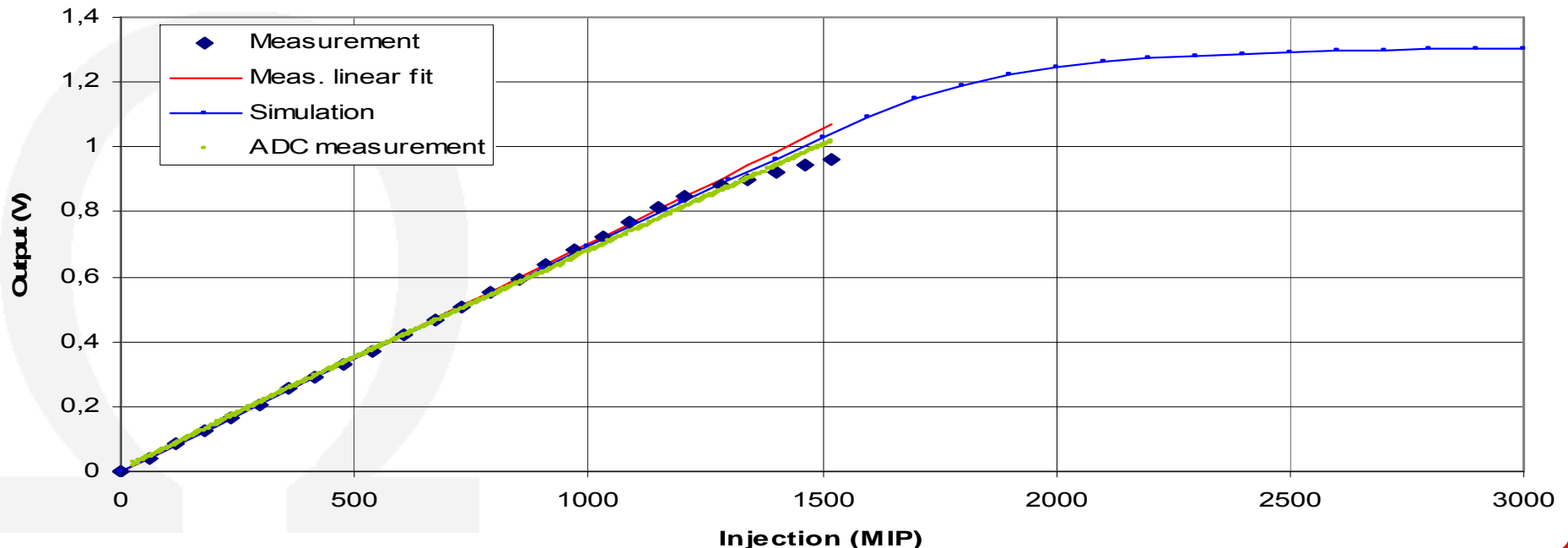
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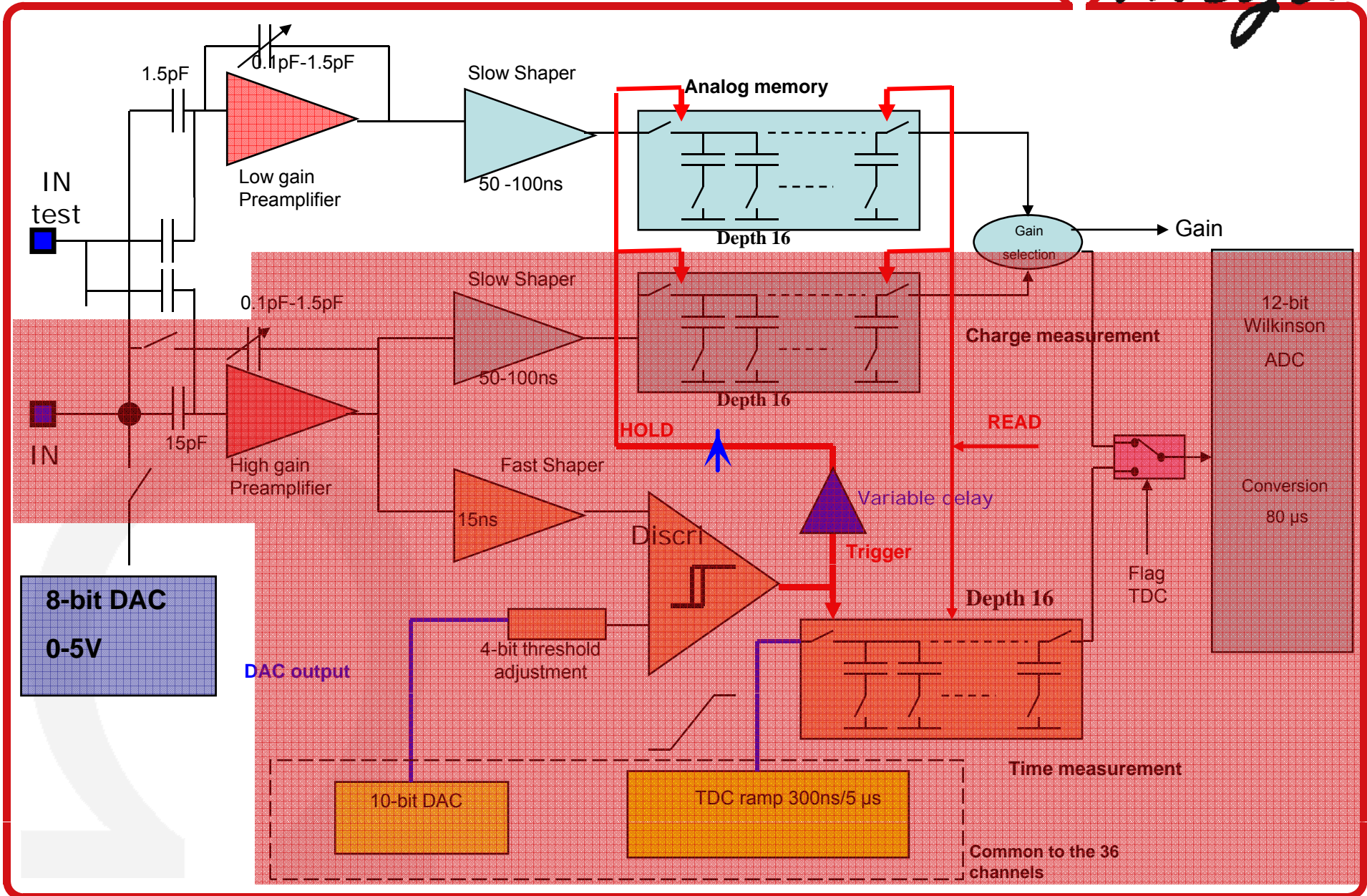
# SKIROC 1 design limits

- Most critical issue : Too much dynamic range in the charge preamplifier
  - Max input signal : 2000 MIP
  - Noise floor : 0.15 MIP
- Preamplifier gain too small
- Huge gain in the trigger path to be able to trig on  $\frac{1}{2}$  MIP

SKIROC linearity results



# SPIROC used in SKIROC mode



- Dynamic range :
  - 500 MIP/cell → same as physics prototype
- Number of channels :
  - 36 instead of 64

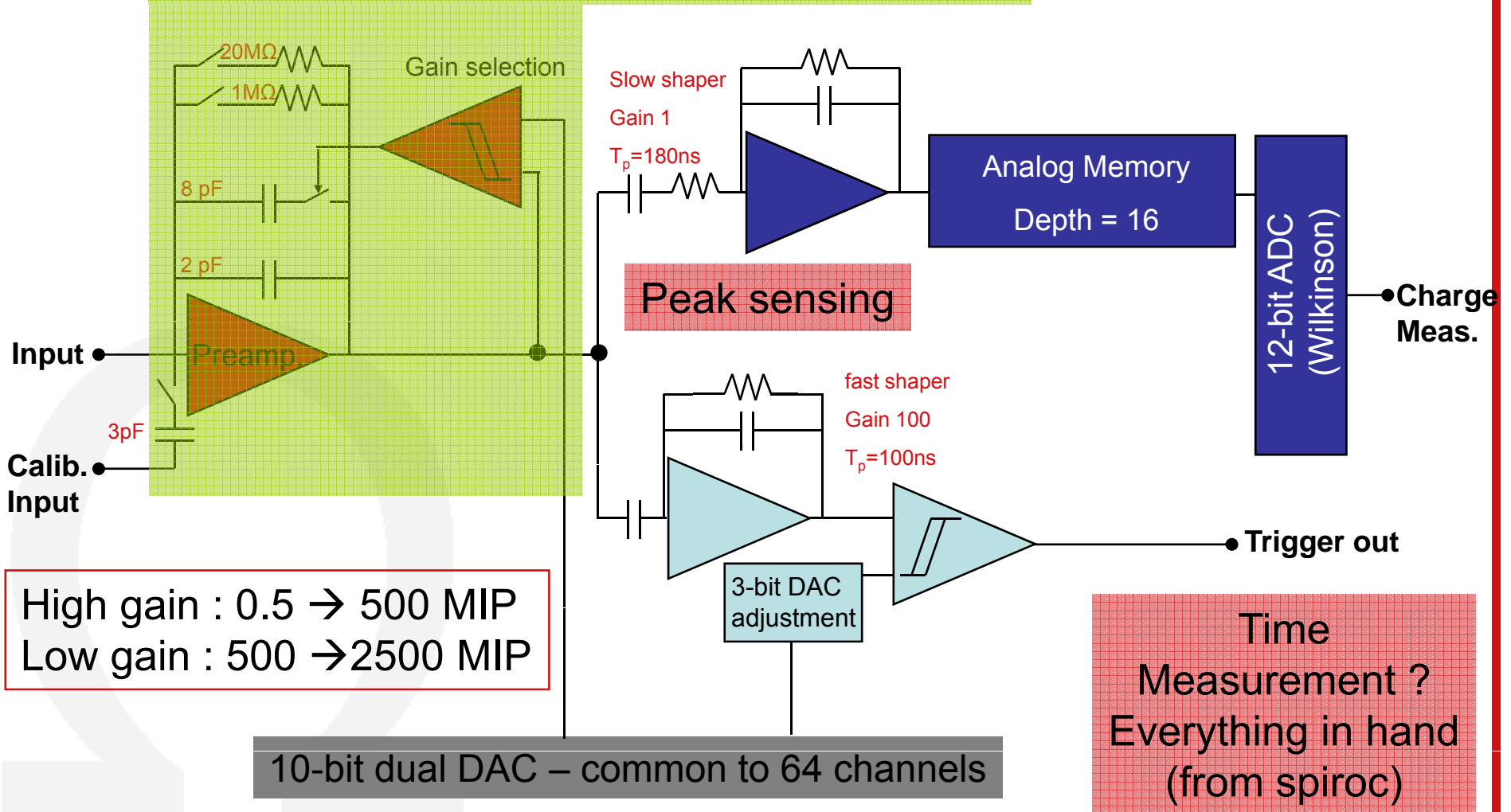


- 64 channels to read out new 256 pads wafers with 4 chips
  - This is a critical PCB requirement
  - This will make SKIROC2 the biggest chip of the ROC family
    - 50-60 mm<sup>2</sup>
- Capability to operate in ILC mode and in test beam
  - This is a physics requirement to take data with EUDET module
  - Calculation of data rates to be validated
- High dynamic range from 0.1 to 2500 MIP
- (Eventually) time measurement to tag events in test beam (not useful in ILC mode)

# SKIROC 2 block scheme proposal



We already have that kind of structure on the shelf



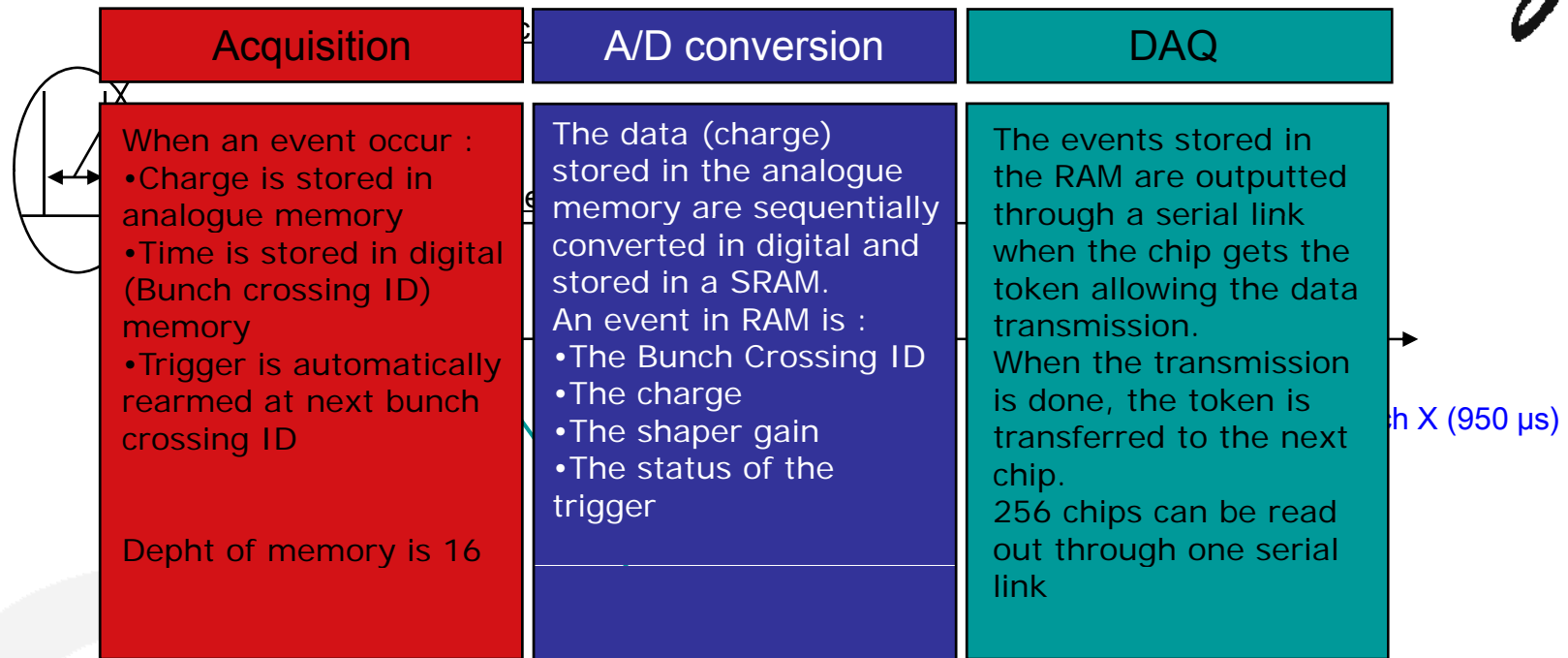


- Skiroc 2 expected to be sent in fab in March'09
  - Sharing of the HARDROC2 and SPIROC2 production
  - If SKIROC 2 is validated → production in hand for EUDET module
  - Cheaper than an engineering run for prototyping due to big silicon area (60mm<sup>2</sup> ie ~60k€)
- Next PCB prototype will use SPIROC2 with Hamamatsu wafers
  - Validation of all electronics and assembling process
  - missing : dynamic range (500MIP/2500MIP), granularity
  - PCB in hand before the end of the year ?

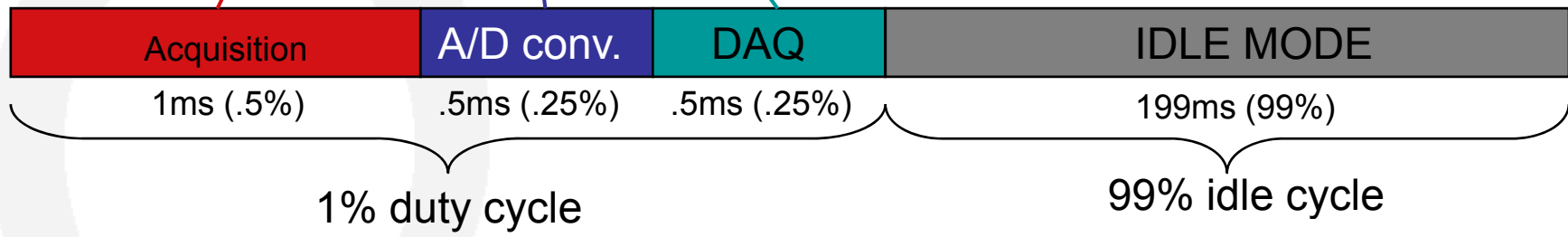
Test beam and ILC timescale trade off



# I LC beam structure



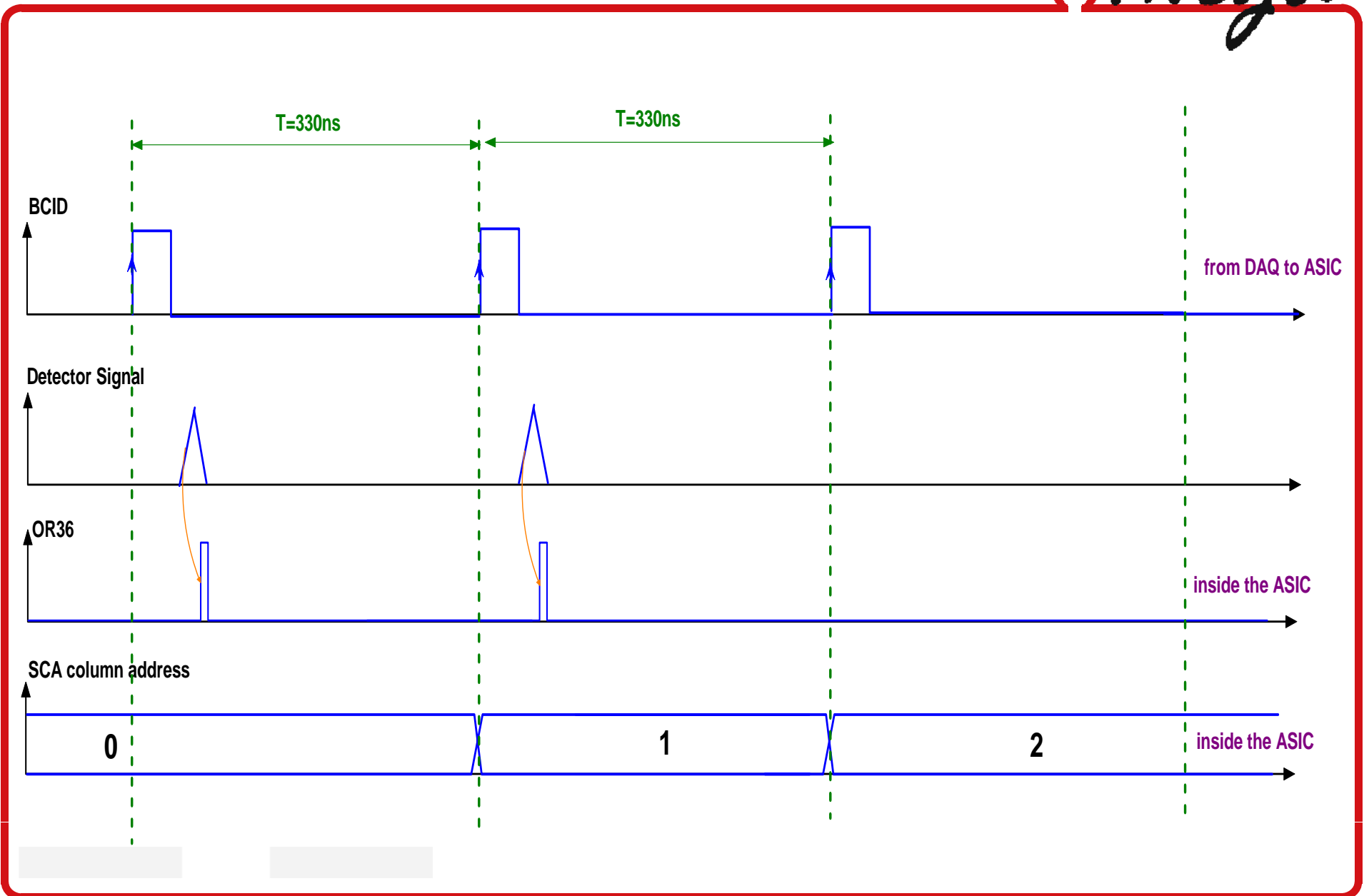
chip X (950  $\mu$ s)



Two orders of magnitude saved on the power consumption

# Acquisition : Trigger in ILC mode

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# Acquisition : Trigger in test beam mode *Omega*

