



Circuit de lecture de photo détecteur permettant de mesurer la charge et le temps.

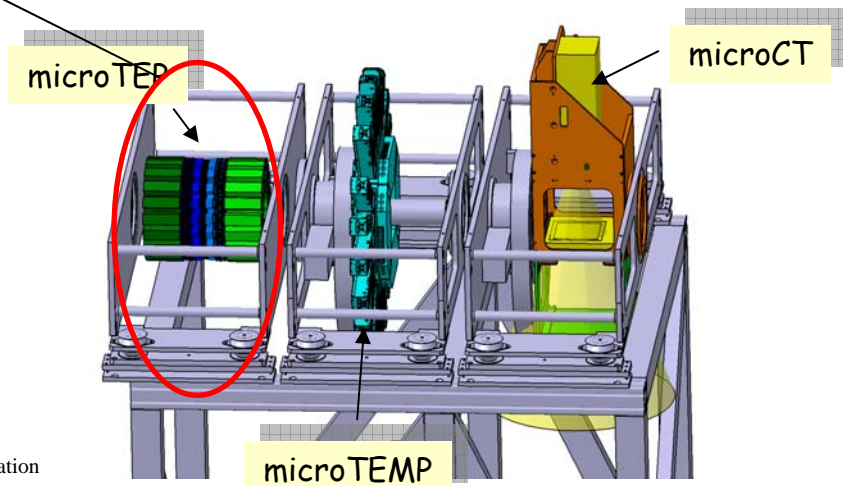
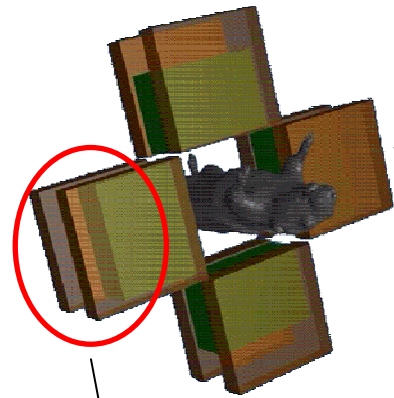


La Londe les Maures le 15/10/2009

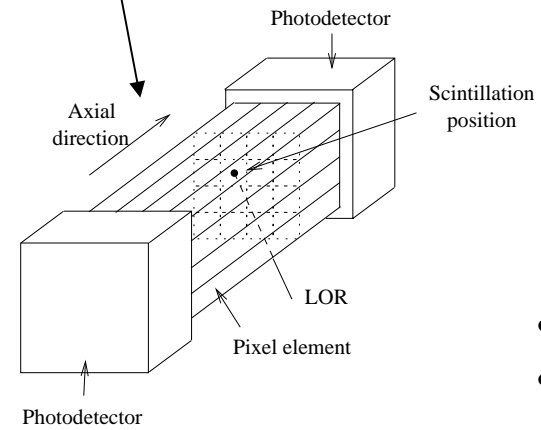


P. 02

- Innovation : axial geometry → decoupling spatial resolution (1 mm³) and detection efficiency (18%)
- 6124 readout channel

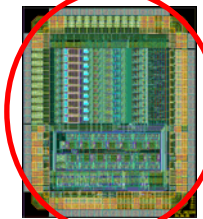


Preclinical imaging.

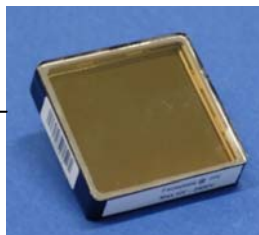


- Charge Measurement.
- Timestamp.

Journée VLSI 2006



IMOTEPA



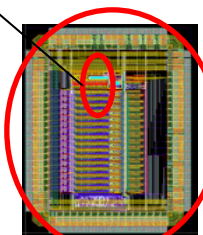
PLANACON

Données constructeur

Fenêtre: Borosilicate
Photocathode: Biakali
Amplification: MCP (25 μm, 2x1 mm)
Anodes: 32 x 32 (1,4 x 1,4)
Pitch: 1,6 mm

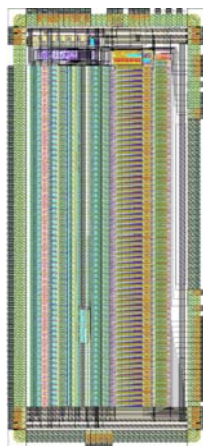
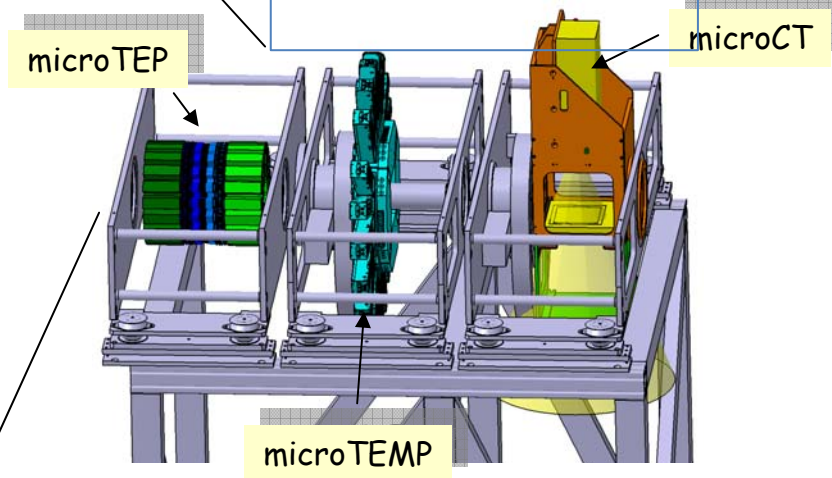
Gain: 6x10⁵ @ 2400 V
Temps de monté: 600 ps
Largeur du signal: 1,8 ns
Uniformité des anodes: 1:1,5

Porquerolles 2005

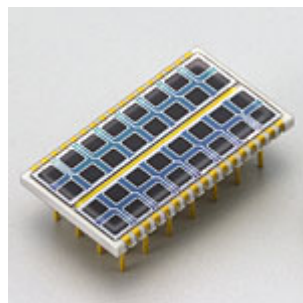


IMOTEPD

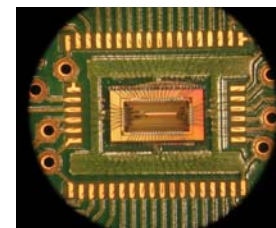
Journée VLSI 2008



IMOTEPAD



Hamamatsu s8550



APD_CHIP



P. 03



Ex abrupto :

- Input range : 160 fC à 104 pC.
- Timestamp bin : 625ps.
- Event rate : 100 kHz.

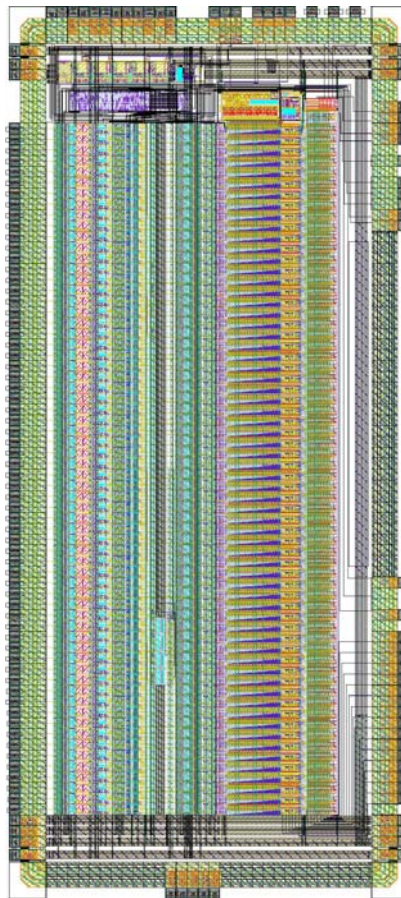
Spécifications :



- Differentiel analog output 1.8 mV à 1.2 V. (+/-)
- Digital output (16 bits) serial LVDS link 125 MHz.
- Threshold 500 fC max (6bits).

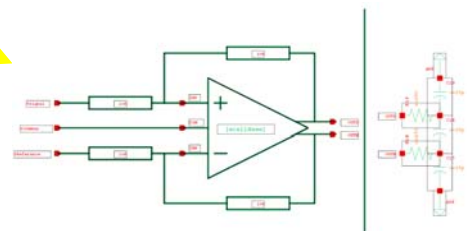
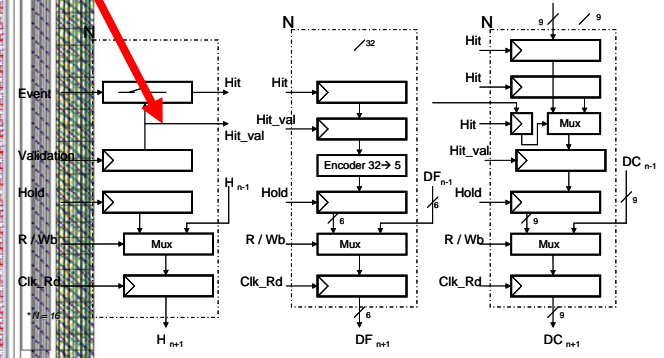
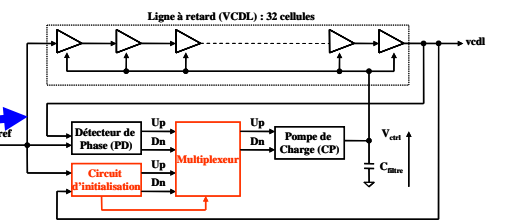
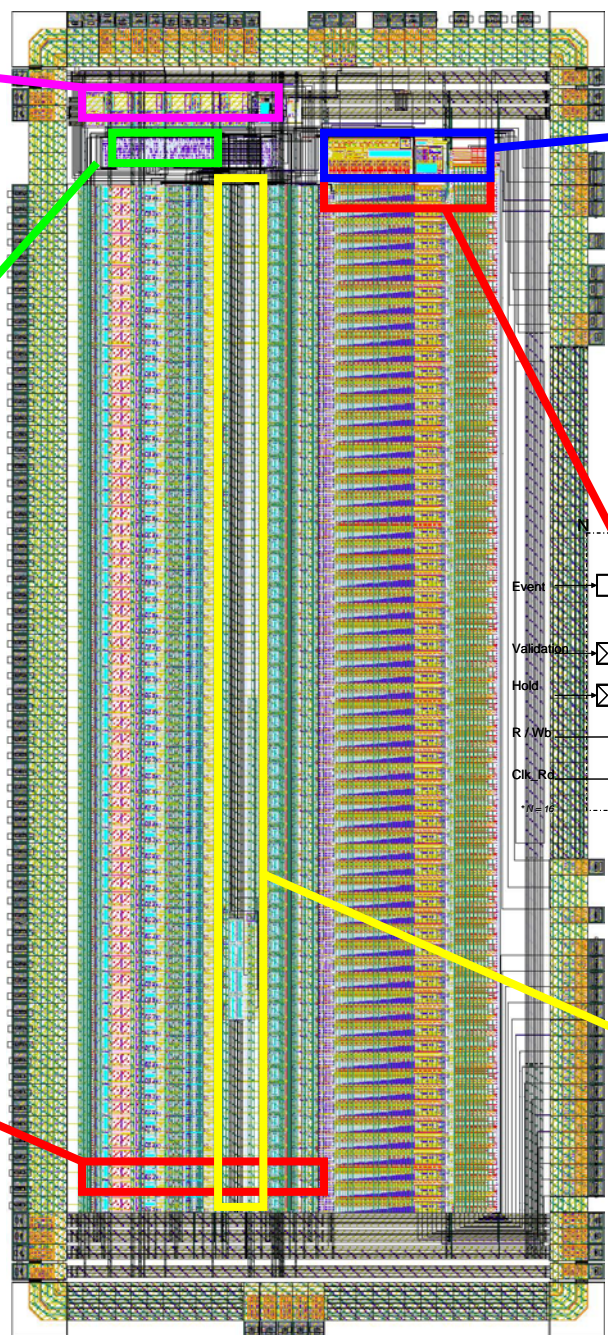
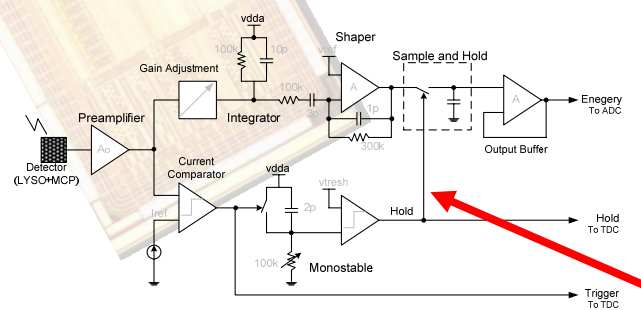
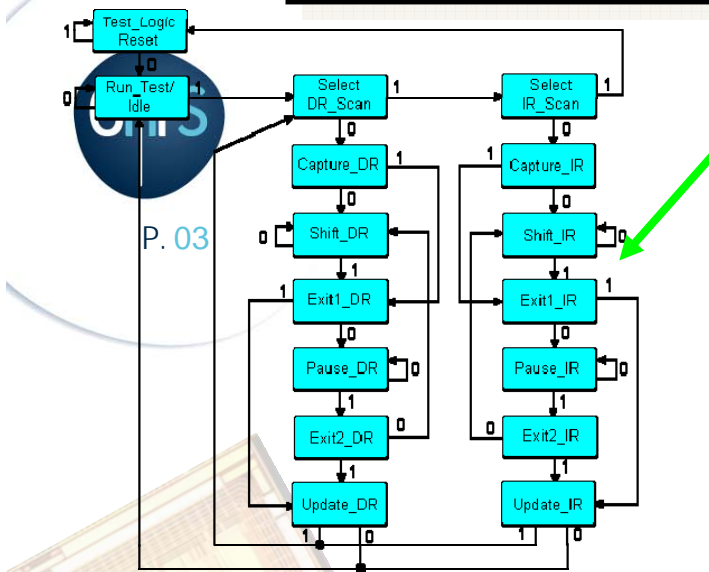
2 | Electronique de lecture

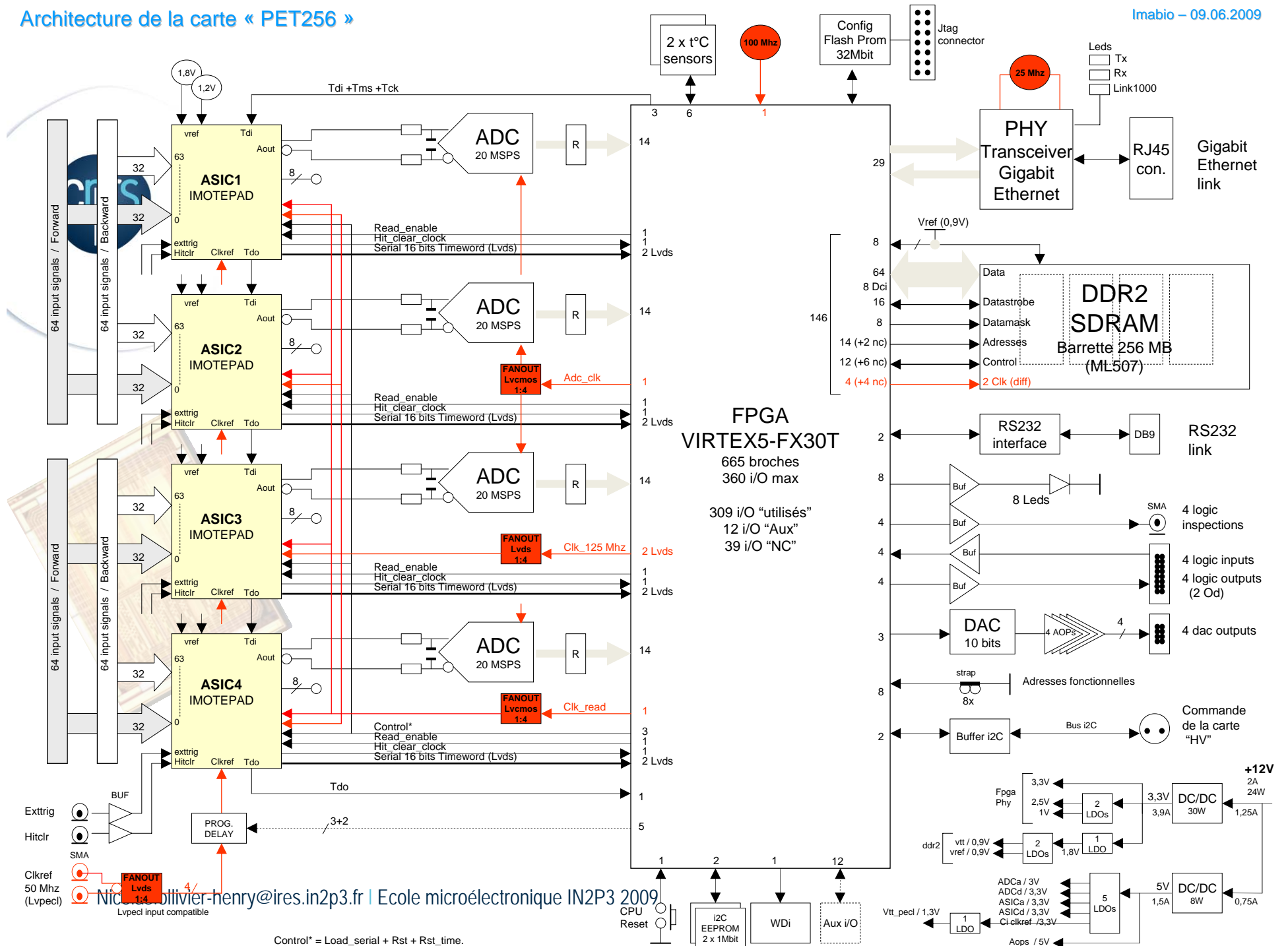
2.3 | Mesure de charge et du temps (IMOTEPAD).



- Technologie : CMOS 0,35 μm
- 64 analog & digital channel
- 130 pads In/Out
- JTAG
- Area : 30,4 mm²
- Pitch : 100 μm /channel
- Serial link : LVDS @ 125 MHz.
- Differential analog serial output @ 10 MHz.
- Clkref : 50 MHz.

DAC courants 8 bits Bandgap



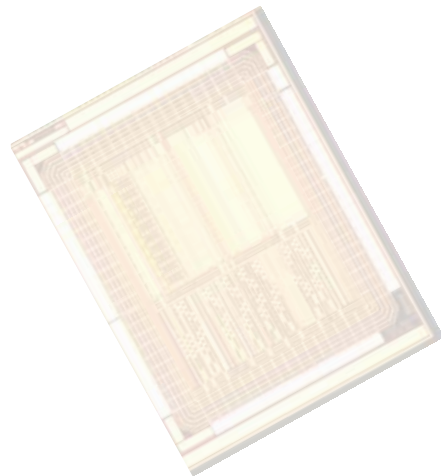
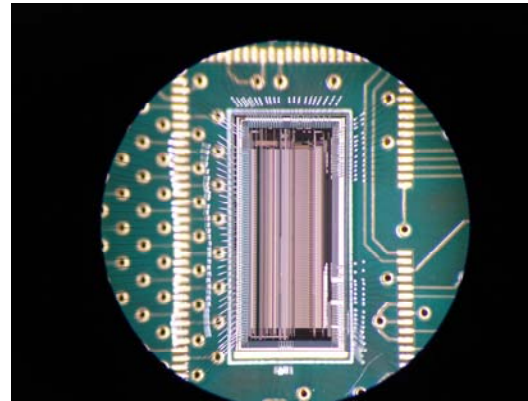


Nicolas Olivier-henry@ires.in2p3.fr | Ecole microélectronique IN2P3 2009

Control* = Load_serial + Rst + Rst_time.



IMOTEPAD

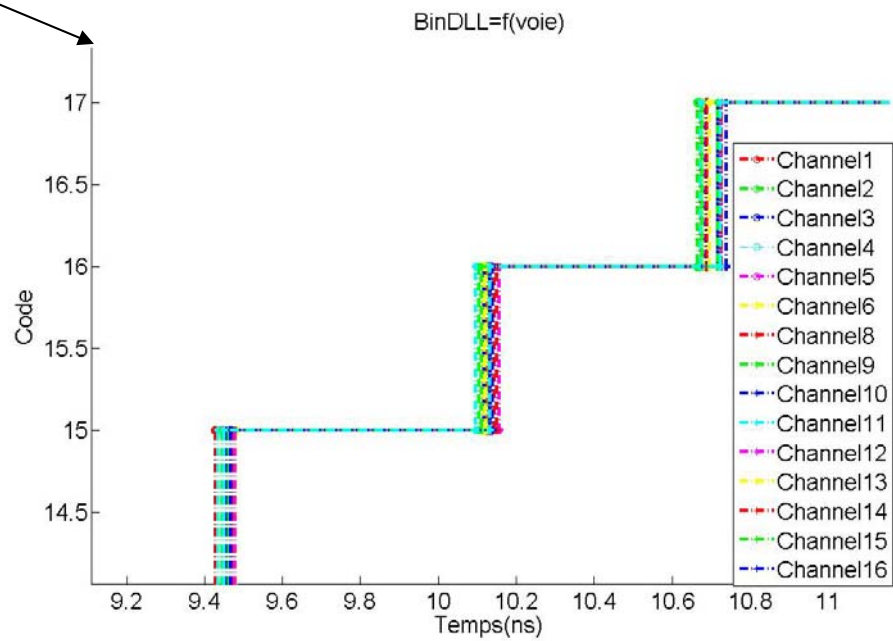
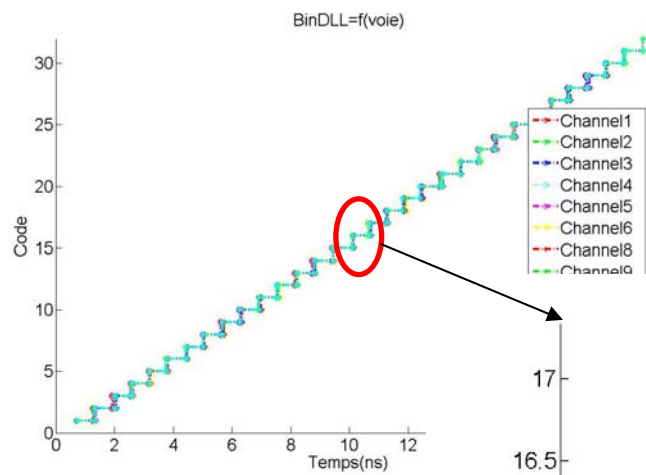
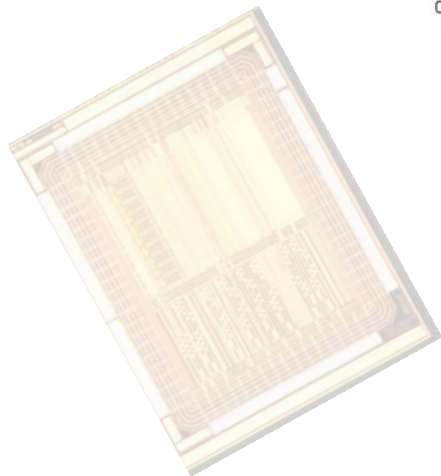


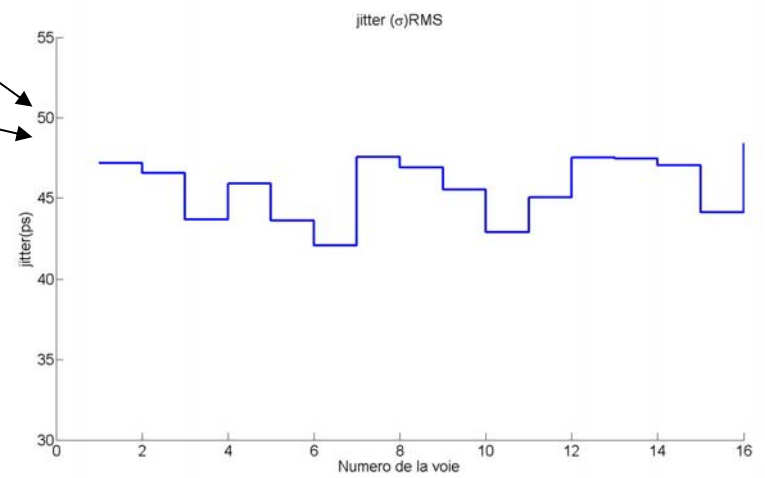
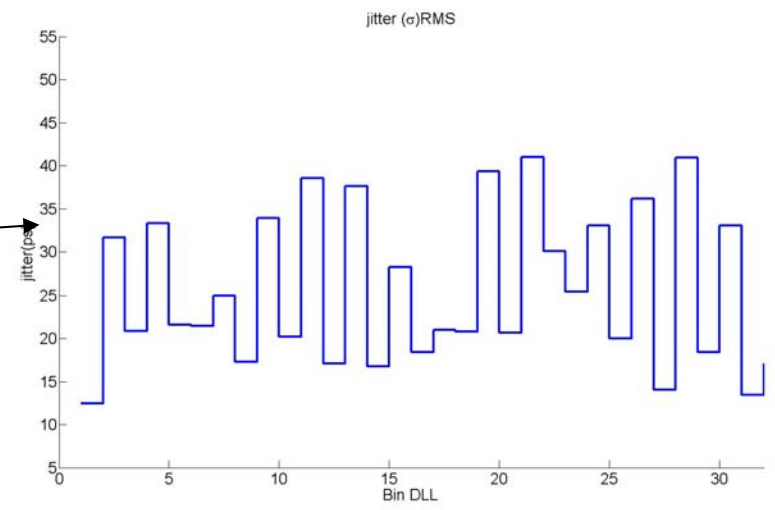
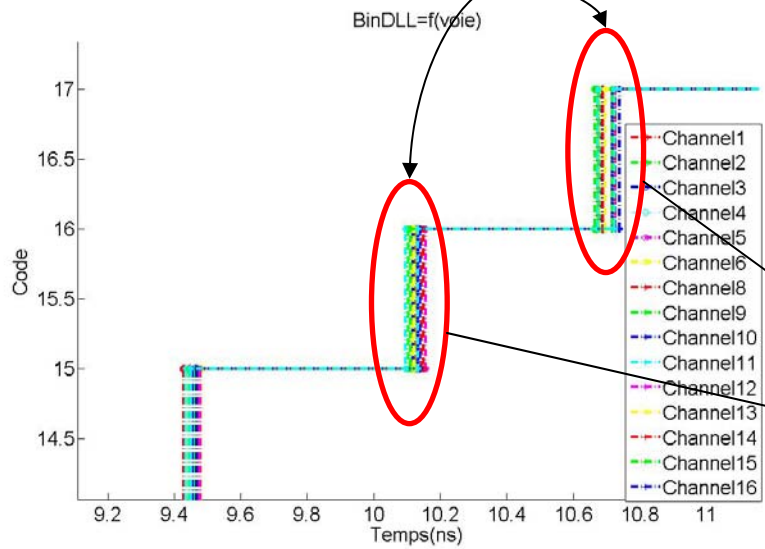
- JTAG ✓
- DLL bin 625ps. ✓
- Serial link LVDS 125 MHz. ✓
- Differential analog serial output @ 10 MHz. ✓
- No oscillations ✓
- Noise
- Jitter
- Efficiency
- Etc...

Fonctionnal ✓

Characterization









Prospectives :

- Digital output for charge measurement .
 - DAC 11 bits 10 MS/s.
- Bin 625ps → 100 ps.
 - New technologie 0.18 μ m XFAB.
 - New architecture.

