Star Ultimate Chip

- **Physic condition : 2,4 x 10^5 hits/s/cm^2**
  - **Readout time 200 µs ➔ ~ 200 hits/frame/sensor**

Pitch (µm)	18	20	25	30
No. of column	1088	1024	768	640
No. of group (64 col.)	17	16	12	10
No. of hits per line (200 hits)	3	3	4	4

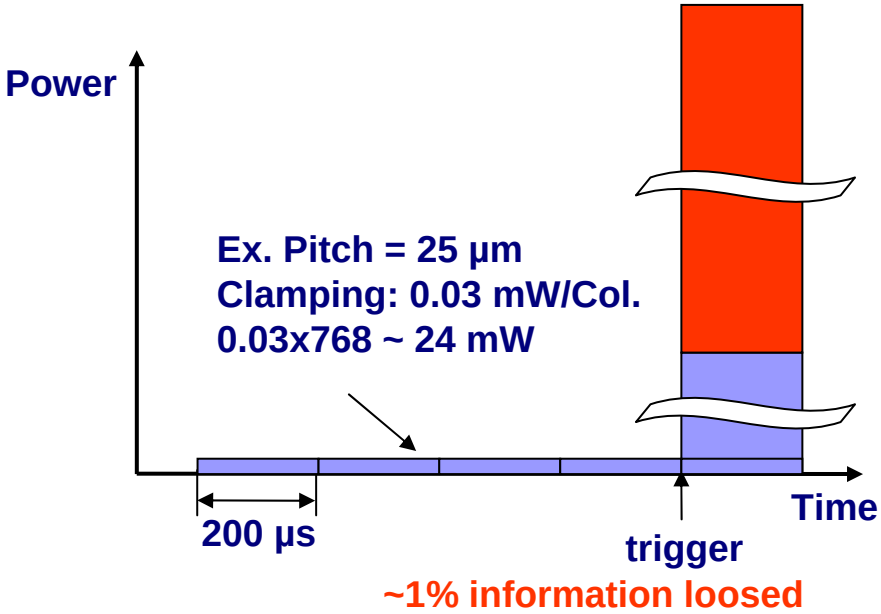
Power Consumption (continue mode)

- **Pixel: CDS (10 µA) Readout (50 µA)**
- **Correction for power consumption estimation:**
  - **No hit in group, no power consumption**

Pixel Pitch	Pixel	Discri.	Group Hits Finder	Line Hits Finder	Sq. controller	Memory	LVDS receiver	LVDS trans.	Total (mW)	Power (mW/cm^2)
30	128 mW 0.2 x 640	192 mW 0.3 x 640	60 15 mW x 4	6	20	34	8	8	454	113
25	154 mW 0.2 x 768	230 mW 0.3 x 768	60 15 mW x 4	6	20	34	8	8	520	130
20	205 mW 0.2 x 1024	308 mW 0.3 x 1024	45 ~~240~~ 15 mW x 3	6	20	34	8	8	634	159 ~~208~~
18	218 mW 0.2 x 1088	327 mW 0.3 x 1088	45 ~~255~~ 15 mW x 3	6	20	34	8	8	666	167 ~~220~~

Power Consumption (pulsed mode)

- **Trigger frequency ~ 1 KHz**



Ex. Pitch = 25 µm

•Pixel readout:	0.17 x 768 = 130 mW
•Digitization :	316 mW
•Memory:	34 mW
•Transmission:	16 mW
	496 mW

!! Separate and decoupled power supplies mandatory ➔ Difficult

!! Check settling time of pixel readout & discriminators

Pixel Pitch	Pixel	Discri.	Group Hits Finder	Line Hits Finder	Sq. controller	Memory	LVDS receiver	LVDS trans.	Mean P (mW)	Power (mW/cm^2)
30	20 mW 108 mW	0 192 mw	0 60 mW	0 6	0 20	0 34	0 8	0 8	82	21
25	24 mW 130 mW	0 230 mW	0 60 mW	0 6	0 20	0 34	0 8	0 8	119	30

Actual situation and planning (Eudet)

- **Mimosa16: Test in progress**
  - Matrix 128 x 32, Pixel with CDS, 25 µm pitch ➔ Star candidate
  - Discriminators at the bottom of the columns ➔ Star candidate
- **Suze: Submission: 25th July, Test: Oct. 2007**
  - Zero suppression ➔ Star candidate
  - Memory & LVDS digital output ➔ Star candidate
- **Mimosa22: Submission: end of Oct., Test: spring 2008**
  - Matrix 544 x 64, Pixel with CDS, 18.4 µm pitch
  - Discriminators at the bottom of the columns
  - Optional power pulsing for discriminators ➔ Star option
  - No zero suppression
- **Mimosa22+ ➔ Mimosa22 + Suze**
  - Matrix 544 x 256
  - Submission scheduled in summer 2008
    - Strongly depends on test results of Suze & Mimosa22

Star Ultimate after Mimosa22+ tests

- **LBL Stage1**
  - Pixel @ 30 µm ➔ 640x640
  - In pixel CDS
  - Column parallel shifting at 1MHz (1 µs/line)
  - Settable threshold
  - Binary readout

- **IPHC Stage1**
  - Pixel @ 25 µm ➔ 768x768
  - OK
  - Column parallel shifting at 6.25 MHz (160 ns/line)
  - OK
  - OK

- 160 MHz RDO clock
- 4 binary outputs
- 640 µs integration time
- Continuous mode

- Zero suppression
- 1 binary output at ~100 MHz
- ~123 µs integration time
- Continuous mode