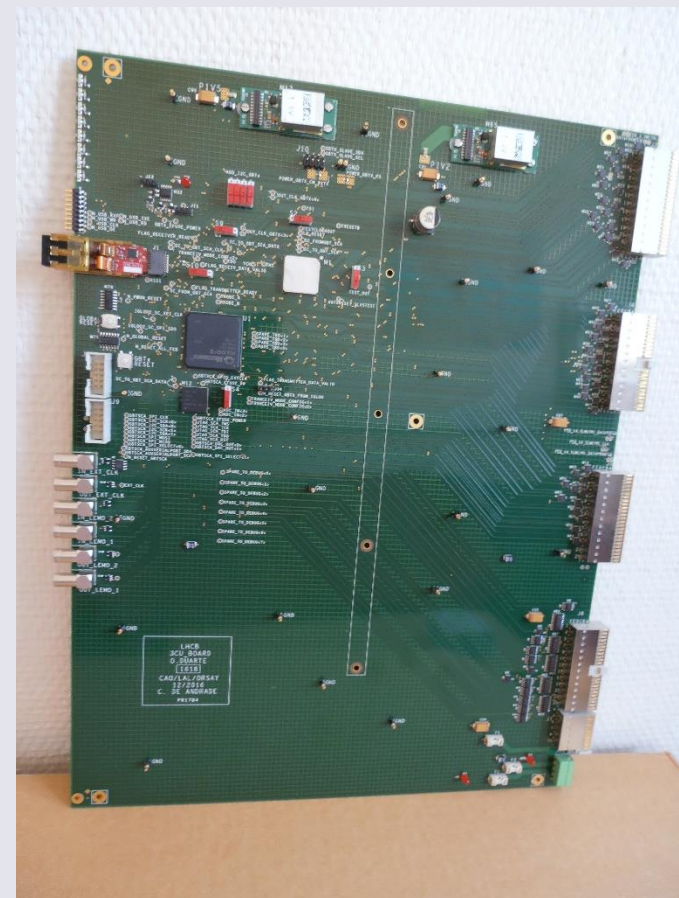


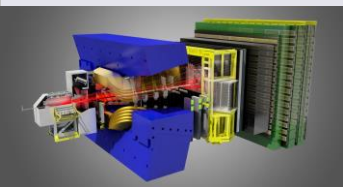
# 3CU (Calorimeter Crate Controller for the Upgrade) Production Readiness Review

## *Test of the production*

- Manufacturer
- Production flow
- Production test  
AOI (Automated Optical Inspection), Rx, Takaya
- Aging



*On behalf of the Orsay group*



## ➤ 30x3CU board will be product

- Price for about 30xPCB ( ~500x30) = 15 000 €
- Price for cabling about 30x3CU board ( ~1000x30) = 30 000€
- According to the CNRS rules, only a PUMA for each will be necessary.

## ➤ Criteria for choice of the manufacturer

- Rx tests for all BGA on all board
- We prefer different manufacturer than FEB (production in the same time)
- Takaya test
- Aging

## ➤ Production of the current CROC board

- It was made by ALTREL
- Renewal ?

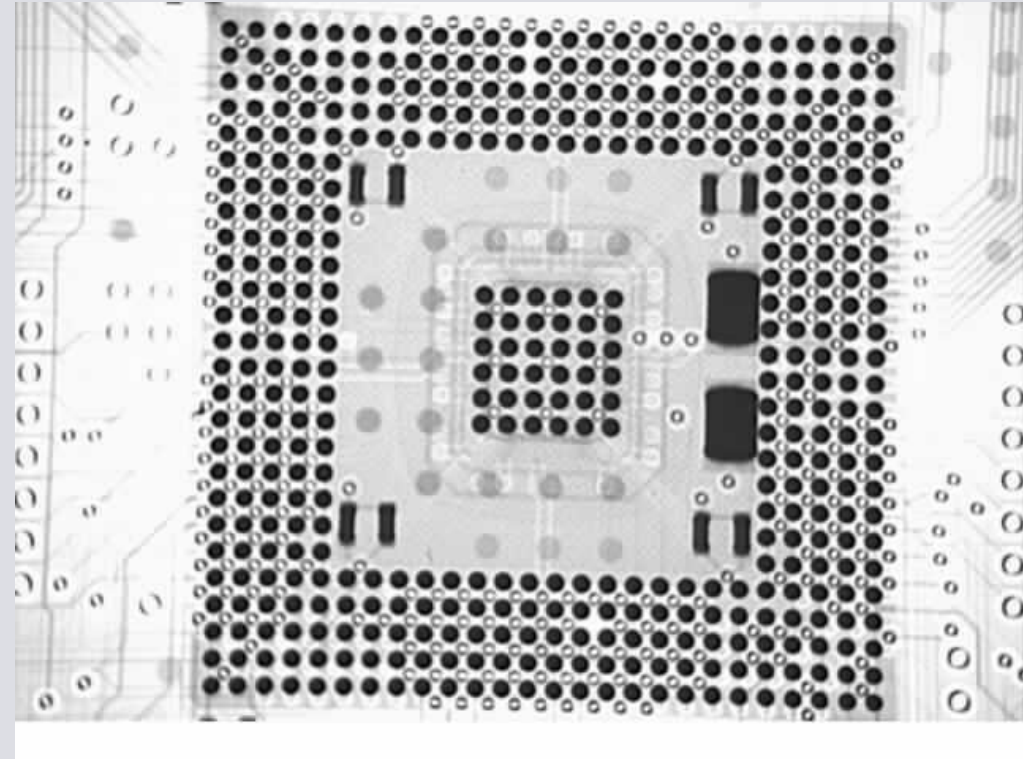
- All the PCBs and components are checked upon reception at the factory.
- SMC components are mounted first.
- Right after the SMC oven, there is a visual control of each side of the board plus a BGA Xray test for all BGA on boards.
- AOI (Automated Optical Inspection). Validation of components polarity, solder quality, no short circuit
- The other components are mounted and soldered
- The press-fit connectors are mounted with a dedicated tool.
- Then the boards undergo the flying probe test (Takaya)
- There is a final visual control before powering the boards and checking the power consumption.
- If this is OK, the boards are sent to the aging oven.
- The power consumptions are tested again at the exit of the oven to look for potential component failure.
- If everything is OK, the boards are sent to LAL.
- All the former step results are noticed in a report file.
- The production boards will be produced by lots of 10-10-8 boards every week.

- **Automated optimal Inspection**
  - Control presence and quality of components weld
  - Control the polarity of components
  - Control the placement (X-Y) of all components by laser
  - Detection of the raised leg



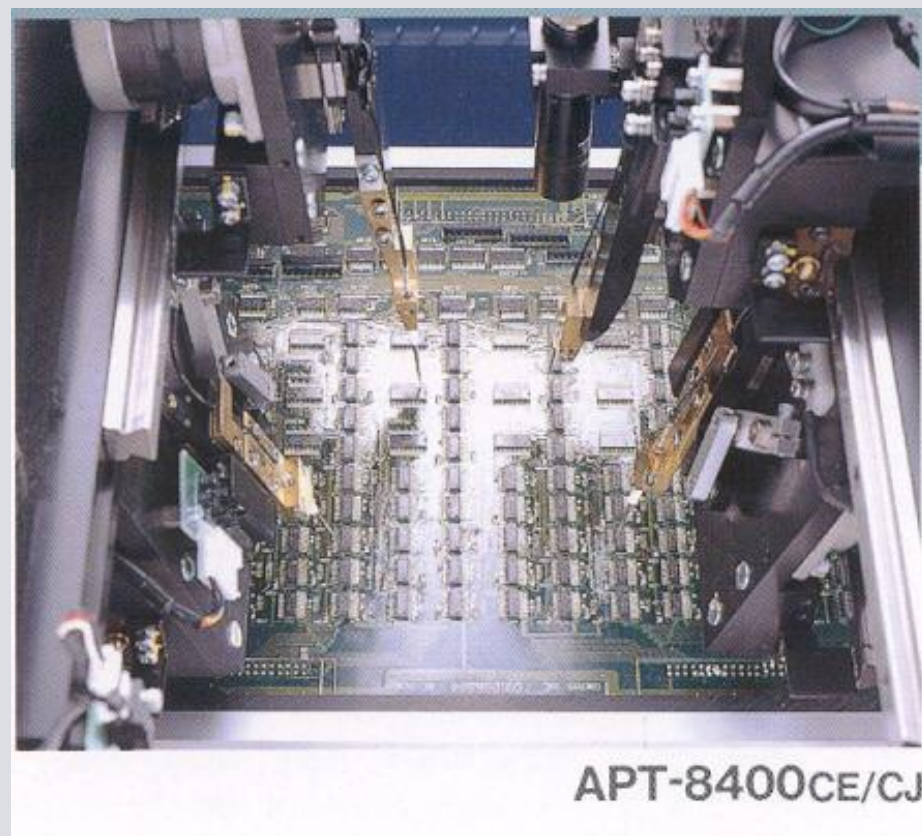
## ➤ RX

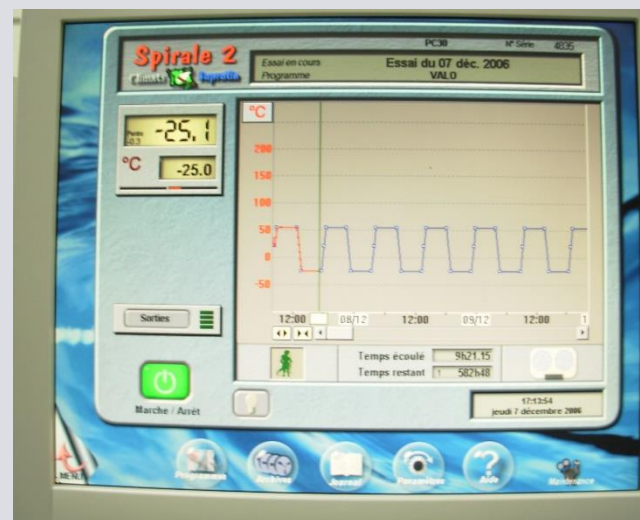
- All BGA on the 3CU
- All board
- Validation solder of all Ball of BGA, no short circuit between ball no void



## ➤ Takaya : flying prob test

- Measures the impedance values of nets and components and check the interconnections
- Valid interconnection and passive components





- For this test we will use the same crate as CROC aging test
- Goals :
  - Detection of bad soldered components
  - Infant mortality
- Power consumption is controlled before and after the aging



Phase 1	Rising 20°C to 30 °C (1°C/mn)	20mn
Phase 2	Level to 30°C	160mn
Phase 3	Rising 30°C to 60°C (1°C/mn)	30mn
Phase 4	Level à 60°C	150mn
Phase 5	Falling 60°C to 0°C (1.5°C/mn)	35mn
Phase 6	Level à 0°C	145mn
Phase 7	Rising to 20°C	20mn

- 8 cycles of 9 hours between 0 and 60 degrees.
- The upper temperature was fixed after measurements made on the hottest component on the board: its package was at 90 degrees when air was at 60.



- The choice of the manufacturer is not fixed, we have several possibility (ALTREL, OUESTRONIC, ...)
- Legal obligation PUMA (rules of the public service !)
- Production will be start for summer
  - 30 PCB
  - 2 x 3CU boards cabling
  - Then 8, 10, 10.

# Thank you



# SPARES