



Module Test status report

CREDITS:

Thanks to all the Module Test speakers from
which I borrowed slides

Special Thanks for their invaluable help in the preparation of these
slides to:

A. Tricomi, C. Marchettini, R. Ranieri (Graphic Designer)

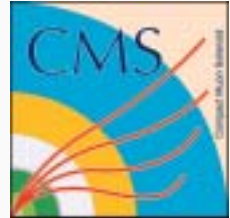
Marco Meschini

INFN Firenze

CMS Tracker Week

Module Production Meeting

12th February 2004



On Procedures... Again!

- For quality assurance we must follow agreed **procedures** during tests
- In case of problems the procedures could allow to trace back the origin of the faults in the production chain
- I presented the **sequence of operations** already in October 2003
- Centres which still have to start final production should begin with Full Set of operations as in hep.fi.infn.it/CMS/moduletest/proc_prod/Procedure3.html
- TOB and TIB centres which have already made more than 30 final production modules can step to the **reduced set of operations**

provided NO problems have shown up

Reduced set of operations used by TIB can be found in hep.fi.infn.it/CMS/moduletest/proc_prod/Procedure.html

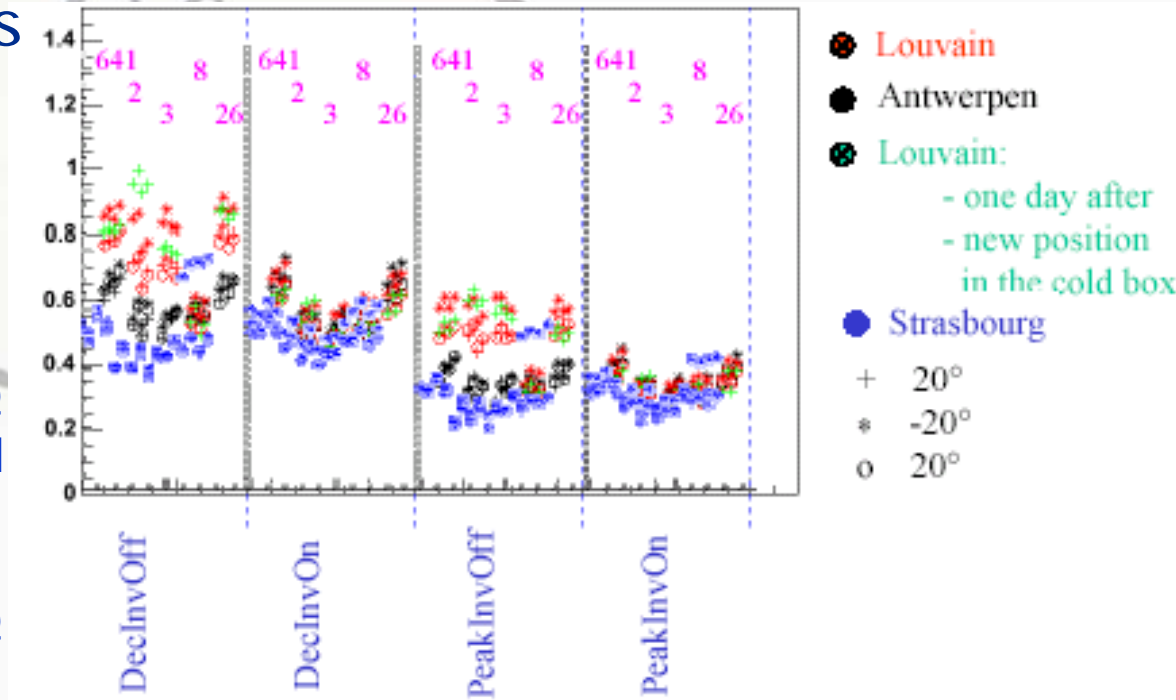
TOB is not strictly following standard procedures ???



TEC X-Calibration



- TEC Longterm centers
 - Aachen
 - based on ARC
 - Antwerpen
 - "standard"
 - Louvain
 - "standard" CMS DAQ
 - Coldbox frame cooled with liquid
 - Strasbourg
 - "standard" CMS DAQ
 - horizontal mounting cooled with liquid
- 5 or 6 modules tested
- 10 hours scenario
 - (not the same for all the centres)



Cuts and grounding need to be adapted between centres to achieve better agreement
Need modules ... maybe with inserted known defects



TIB Results

	Received	Bonded	ARC Tested	Good modules	LT Tested
Total	277	226	223	216	68

TIB centres are in full production, coping with actual hybrid delivery. Almost all centres have bonded all modules shipped by gantry centres. 5 LT setups up and running

Planning to **DOUBLE** weekly production rate (bonding and ARC tests) as soon as they get hybrids

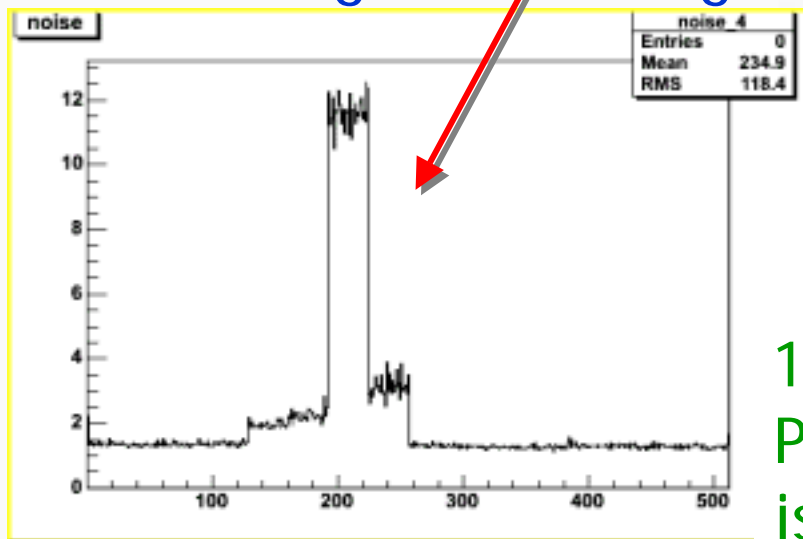


TIB Results

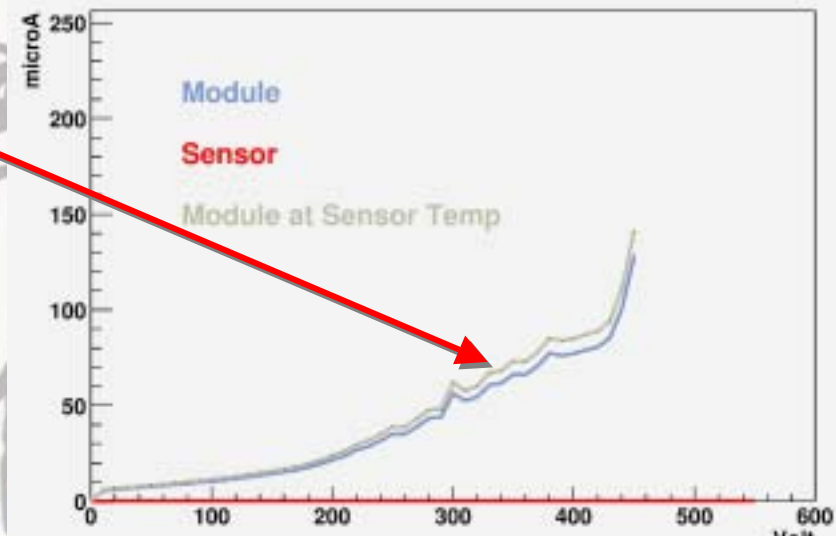
	Received	Bonded	ARC Tested	Good modules	LT Tested
Total	277	226	223	216	68

7 bad modules found over 223

- 4 with IV too high
- 2 bad strips number
- 1 damaged in cooling



30200020033006

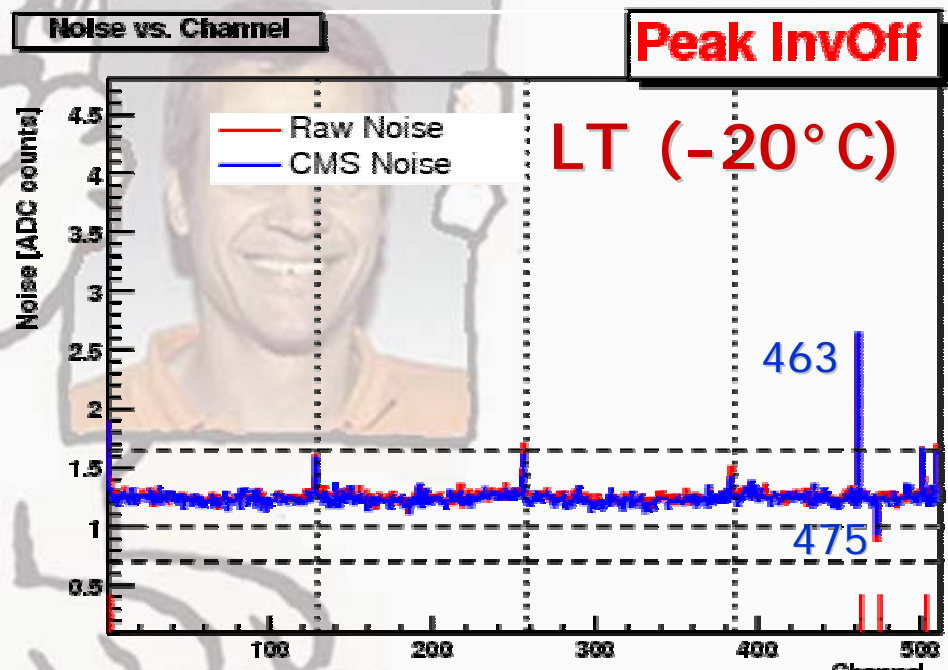
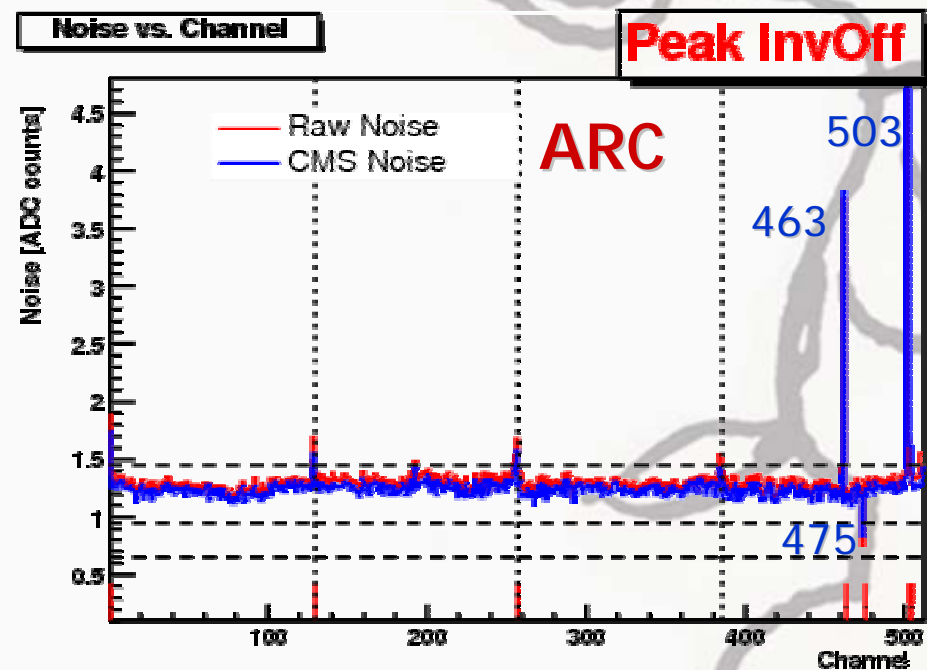


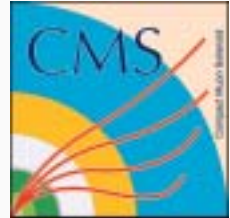
10 Modules "suspicious" during LT:
Problems under investigation, Wim is involved to find solution



TIB Long Term Cuts

- Riccardo found a set of cuts valid for Long Term test and modified the Tony's macros to analyze LT ROOT files
- LT and ARCS analyses are in agreement
- <http://hep.fi.infn.it/CMS/marchett>





The US Multi-Rod burn-in test-stands



- Facility @ FNAL & UCSB will provide:
 - multi-day burn-in
 - thermal-cycle capability between room temperature and -20°C
 - up to 8 rods at a time per site
 - rods safe and happy (dry, cool, dark, powered, biased)
 - ease of operation - by technicians

To be Done

- Need to test with 8 rods
- The software needs some fine tuning
- Full set of cables and power supplies needed
- **Need more experience**





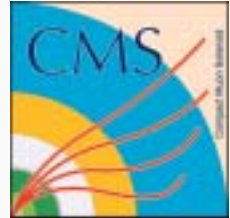
UCSB Status

- 117 modules tested so far
- Failure rates/sources (excluding CMN modules)
 - **0.39%** Bad channels on average
 - **0.26%** known bad sensor channels
 - **0.13%** unmarked bad sensor channels
 - **0.004%** open hybrid-APV bonds
 - **0.001%** module bonding
 - **0.002%** testing errors
 - Less than **0.01%** bad channels introduced during assembly/bonding/testing
- 101 modules thermal cycled
 - One module does not work at -20°C
 - One module developed CMN
 - Prior to thermal cycling, the channel had 10 ADC noise
 - Now consistently has CMN
 - One module has a single APV channel burn-out
 - Multiple noisy channels (2-5 ADC) appeared and disappeared after cycling

Production rate 15/day over 2 weeks

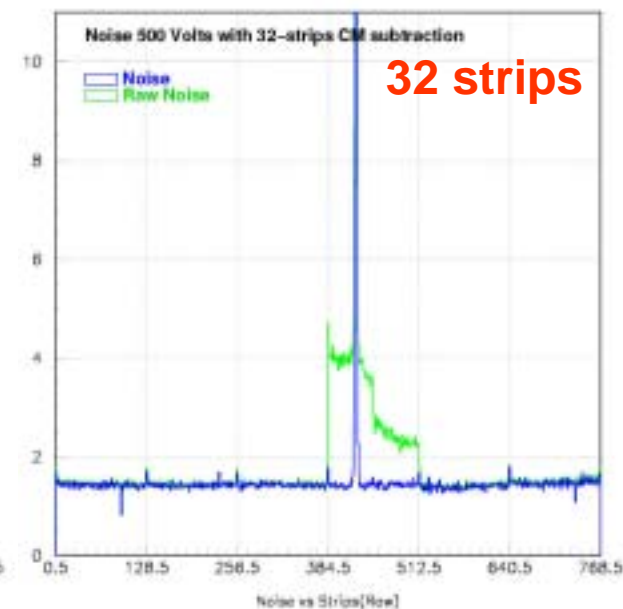
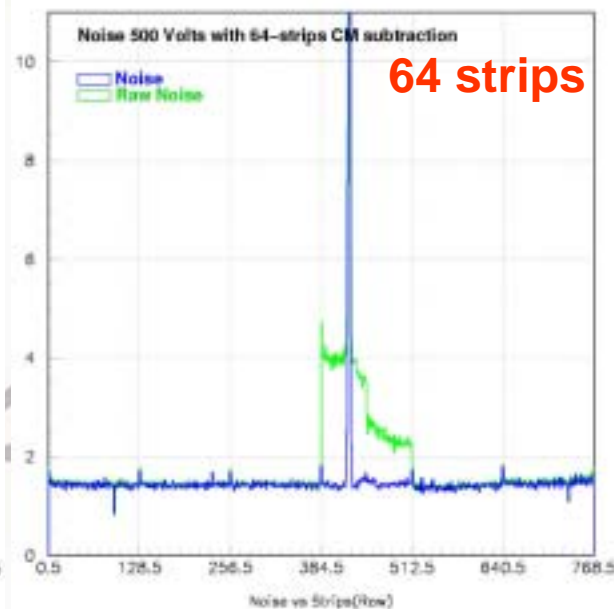
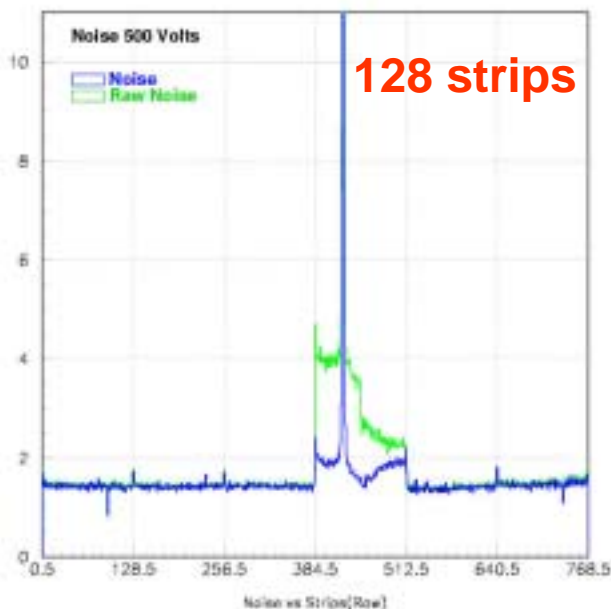
Modules have excellent quality

BUT CMN modules are still being produced at the ~5% rate!!!!



CMN TOB module

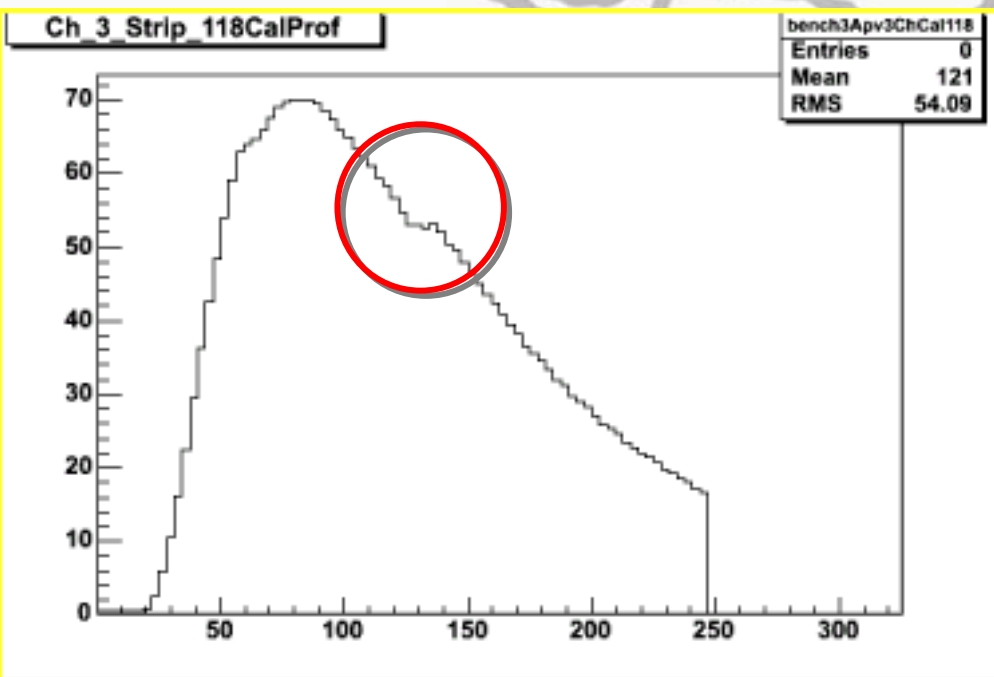
- Study of one CMN TOB module using ORCA test beam sw
 - analysis of ARC raw data done by Simone Paoletti
 - satisfactory CM subtracted noise when the median algorithm is applied to 2 groups of 64 strips per APV
 - Even better with 4 groups of 32 strips
- Can the FED cope with 64 strips CM grouping?





LT Status

- Problems reported in LT
 - PAACBs communication problem
 - Hard Reset problems
 - Pulse height not correctly set and pulse shape strange profile
 - Channel flagging and XML output wrong
- New analysis package in collaboration with ARCS team



New version under development
New requests from users under study
Beta testers needed



ARCS Status



- ARCS 7.0 Bug Fixed Version was released on 22nd of January 2004

- Environment variables are saved also if IV test is done first
- removed the flags on Pedestals



- Modified Pipeline test in ARCS (included in next release)
 - normal Pipeline test: acquire Pedestals and Noise information for each Pipeline location
 - new test: apply calibration pulse to each Pipeline location
 - Backplane test implemented

Conclusions

- TIB and TOB are in full production
- UCSB has shown a peak rate of 15/day
- TIB rate satisfactory for startup. It has to increase, provided enough hybrids are available

- **Module quality is on average very good**

