

Module Test WG

Brief Status Report

*slides not presented due to
mod. constr. meeting timeout*

VUTRI

- Order for 60 (30 TIB + 21 TEC) VUTRI cards has now been placed in Italy
 - components procurement underway, Lemo connectors available after mid Jan/03, then 8 weeks for production
- To reduce cost:
 - A fraction of components has been ordered at cern
 - Simple electrical tests in Pisa with INFN resources
- Delivery to end users in march/April 2003?
 - We ordered additional bare pcbs for future needs
- Price: 295 euro per Vutri (including Tax)
- PAACB adapter (Wim B.)
 - TIB will probably order more than 30, final number to be determined, delivery still unknown
- ERNI to VME adapter
 - A new batch will be produced with a redesigned layout for TIB:
P. Tempesta (Bari) has to give details → New ARC FE adapter compatibility (LAST CHANCE !)

Vienna Cold Boxes

- New production batch
 - 1 TEC delivered to Antwerpen, in commissioning
 - 1 TIB to be delivered to Torino before end of year
 - 1 more to TOB or TIB, decision to be taken after discussion with USA people (see Ariella)
 - Other requests to be satisfied early next year:
 - 5 for TIB (FI, PI, CT, PD, BA)
- M. Pernicka estimates delivery by end of Feb 03**

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Summary

All tests done with the Aachen repeater card, APV25, FED and our prototype module. There was no fine tuning for the latency or any other parameter, the settings stayed the same for all measurements.

- Noise baseline at $\langle 2.5 \rangle \dots \langle 2.6 \rangle$ for both configurations, noise for multiplexer slightly increased, but no additional noisy channels have been seen.
- Calibration pulses identical
- Pulseshapes are identical
- 7 Mux devices tested the last one will follow soon

T. Weiler
Karlsruhe
MUX



ToDo List

- Calibration with a source to determine the signal to noise ratio
- testing crosstalk of multiplexer channels
- Mux devices still have to be tested with V-Utri card and to be integrated in long term software
- Prototype PCB for multiplexing the output for the optical receiver arrived last week, tests have to be done
- 40 channels (4 multiplexer cards) can be equipped for the needs of the optical receiver



MUX and Cables

- The measurements have to be repeated with VUTRI and a **NEW TYPE OF CABLE** (used at cern): Pisa (R. Dell'Orso) volunteered
- We must start soon cable production at CERN after definition of optimal length: Weiler results showed no problems up to 2.5 m (+1.2 m from vutri to MUX: these cables are soldered to mux pcb) with old type (large diameter) cables
- If Pisa results are good and no objections arise, I will propose 2m cables for analog signals and 0.5m for ck and trigger
- **If there is any objection please react NOW !**

Tests and SW

- LED test to identify pinholes:
 - Work is in progress, some evidence of cases in which the pinholes are identified only with LED test AND only in a particular range of induced current in the silicon crystal
- Automatic test procedure is a very difficult task especially from the analysis point of view
- We have no statistic accumulated up to now to say if the number of pinholes which escape sensor qualification AND basic module test (without LED test) is a SIGNIFICANT NUMBER
- An important issue: do we create damages in the module with LED test (large currents artificially injected in crystal surface layers)? Do we start an early ageing process ?
- More work and study is absolutely needed

Long Term SW

- Progress in the debugging of code (Wim, Laurent, Valery, Cristiano etc.)
- This week and next one Laurent and Wim will be working together at cern for new improvements (speeding up calibration, mux integration etc.)
- LT sw must migrate to RH 7.2, 2.4.9 kernel (Linux cern supported) or Debian 3.0, 2.2.20 kernel;
- RH 7.2 ISO images downloadable from cern
- See the guide in http://cmsdoc.cern.ch/cms/cmt/System_aspects/Daq/Install/daqinstall.html
- Pilot centres for installation tests (already contributing !): Firenze and Torino
- Writing to DB is mostly working: now users have to USE this sw and see if it fits our needs
- Minor modifications are still possible

The Problem of Cuts in Module Testing

- C. Civinini (Firenze) presentation: we are entering the phase of “cuts understanding and tuning”

Bad strip number list (an example → Tib180)

CMS ARC comparison

From C. Civinini

	Deconvolution		Peak		
	CMS Inv. Off	ARC Inv. Off	CMS Inv. Off	ARC Inv. Off	
30216680500180	1	1	1	1	
	2	2	2	2	Detector edge
	3	3	3	3	
			4		
			5		Only detected by CMS; sigma (1.27) close to limit
			6		Only detected by CMS; sigma (1.20) close to limit
			33		Only detected by CMS; sigma (1.21) close to limit
			129		Only detected by CMS; chip edge
			256		Only detected by CMS; chip edge
		257		257	Chip edge
			509		Only detected by CMS; sigma (1.28) close to limit
		510	510	510	
		511	511	511	Detector edge
	512	512	512		

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Analisis made with Torino macros

CMS ARC comparison (2)

From C. Civinini

- Summary table of bad strips (4 modules):

Module	ARC only	CMS only	Both	Total
180	0	7	7	14 2.7%
177	0	13	12	25 4.8%
005	1	1	21	23 4.5%
168	2	3	7	12 2.3%

NB: Edge strips are included !

Cut on r.m.s. of noise distribution

From C. Civinini

- Drop 'r.m.s. cut' and use 'percentage cut'

$$\langle \sigma_{\text{noise}} \rangle * (1 - p) < \sigma_{\text{noise}}^i < \langle \sigma_{\text{noise}} \rangle * (1 + p)$$

- Typically $p=0.2$...as we used in our analysis

Look for a compromise between money (spent in rejected modules) and acceptable number of noise clusters in final FED

Percentage Cut

From C. Civinini

The main problem is to answer this question:
“which is the correct (or most effective or best) procedure to fix the ‘p-value’?”

My proposal is to look at the recently made modules and build up a statistics of defective strips in terms of their normalized noise.

- To fix p we should measure the **noise cluster rate** as function of p itself in a statistically significant sample of modules and define which is the maximum cluster rate that is tolerable by the DAQ.
- extract a raw data dump that can be analyzed using the most **FED-like cluster algorithms** available.

Conclusions

- L3 module test managers must ensure LT sw is installed and tested in their labs: a new release is foreseen next week (for RH 7.2)
- READ documentation carefully: in present release it is still possible to modify cuts for bad strips, apply them and verify results
- Upload results to the test DB
- LT sw web page <http://hep.uia.ac.be/cms/testing/>
- SW installation guide
http://cmsdoc.cern.ch/cms/cmt/System_aspects/Daq/Install/daqinstall.html