

# Software for Module Test

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Lino Demaria- Torino INFN

Test Procedures

DB tables

Software for setups

Simple Analysis Macro

# Test Procedures

Draft 1 of the document of Module Test Procedures has been circulated last week and comments are needed.

	Hybrid	APV25 bonding		Gantry		Bonding			Module qualification	
		recept.		recept.		recept.	after bond	after T cyc	Deep test	Long term
Optical inspection		X		X		X				
Setup-self test	X	X	X	X	X	X	X	X	X	X
I-V test					opt	opt	X	X	X	X
Basic Test: H0-test (APV25, MUX, PLL, DCU) F-test, G-test	X	X	X	X	X	X	X	X	X	X
PSH-test									X	X
PLL-test									X	
B-test			X				X	X	X	X
L-test							X	X	X	
Pipe-test									X	

# DB tables (1)

MD-ID	integer
MD-type	integer
MD-grade	string
MD-stat	16 bits
bad ch & stat.	integer array
TS-ID	integer
Op-ID	integer
DB-vs	integer
Soft-ID	integer
Alg-ID	integer
Set-ID	integer
k	real

Header

Basic-test flag	integer
T <sub>room</sub>	real
TS-T	real
t <sub>start</sub>	integer
t <sub>end</sub>	integer
H-T	real
I <sub>25</sub>	real
I <sub>125</sub>	real
I <sub>25i</sub>	real
I <sub>125i</sub>	real
VDC <sub>125</sub>	real
VDC <sub>25</sub>	real
Alg-ID*10000 + Set-ID	integer

P <sub>i</sub> (peak)	real array
R <sub>ni</sub> (peak)	real array
N <sub>i</sub> (peak)	real array
CMN <sub>l</sub> (peak)	real array
C <sub>2i</sub> (peak)	real array
C <sub>3i</sub> (peak)	real array
P <sub>i</sub> (dec)	real array
R <sub>ni</sub> (dec)	real array
N <sub>i</sub> (dec)	real array
CMN <sub>l</sub> (dec)	real array
C <sub>2i</sub> (dec)	real array
C <sub>3i</sub> (dec)	real array

Basic Test data (Hybr/Gantry)

pa-test flag	integer
T <sub>room</sub>	real
TS-T	real
t <sub>start</sub>	integer
t <sub>end</sub>	integer
H-T	real
I <sub>25</sub>	real
I <sub>125</sub>	real
I <sub>25i</sub>	real
I <sub>125i</sub>	real
VDC <sub>125</sub>	real
VDC <sub>25</sub>	real
Alg-ID*104 + Set-ID	integer

P <sub>i</sub> (peak)	real array
R <sub>ni</sub> (peak)	real array
N <sub>i</sub> (peak)	real array
CMN <sub>l</sub> (peak)	real array
C <sub>2i</sub> (peak)	real array
B <sub>i</sub> (peak)	real array
P <sub>i</sub> (dec)	real array
R <sub>ni</sub> (dec)	real array
N <sub>i</sub> (dec)	real array
CMN <sub>l</sub> (dec)	real array
C <sub>2i</sub> (dec)	real array
B <sub>i</sub> (dec)	real array

bonding flag	integer
T <sub>room</sub>	real
t <sub>start</sub>	integer
t <sub>end</sub>	integer
Alg-ID*104 + Set-ID	integer
IV data	real array
Basic-test data @	Vstd
l-t data	real array
B-test data	
L-test data	

APV25 Bonding Test data

MD Bonding: Test data

# DB tables (2)

deep-t flag	integer
T <sub>room</sub>	real
t <sub>start</sub>	integer
t <sub>end</sub>	integer
Alg-ID*104 + Set-ID	integer
TS-H	real
MD-T	real array
IV data	real array
Basic-test data @	Vstd2
CPPT <sub>i</sub>	real
CPPA <sub>1</sub>	real
l-t max value	real
Basic-test data @	Vmax
Pipe-test short results	
B-test data	
L-test data	

Deep test data

long-t flag	integer
T <sub>room</sub>	real
t <sub>start</sub>	integer
t <sub>end</sub>	integer
Alg-ID*104 + Set-ID	integer
Long term data @	Tplate= 25C t=0
Long term data @	Tplate=-20C t=Δt
Long term data @	Tplate=-20C t=(N-1) Δt
Long term data @	Tplate= 25C t=N Δt

Long term data

TS-H <sub>i</sub>	real array
TS-T <sub>i</sub>	real array
MD-T <sub>i</sub>	real array
IV data	real array
Basic-test data @	Vstd1
Psh <sub>i</sub>	real array
CPRT <sub>1</sub>	real
CPFT <sub>i</sub>	real
CPPT <sub>i</sub>	real
CPPA <sub>1</sub>	real
B-test data	

These tables are under implementation by V.Zhukov. Need finalization this week.

<http://hep.uia.ac.be/cms/testing/software/database.html>

# Software for Module setups

## CMS-like software:

- Software based on Lione software  
(at least beta\_1\_0\_revision...)
- HybridDialog test program is most widely used
- Migration to Antwerpen software on going

## ARC software:

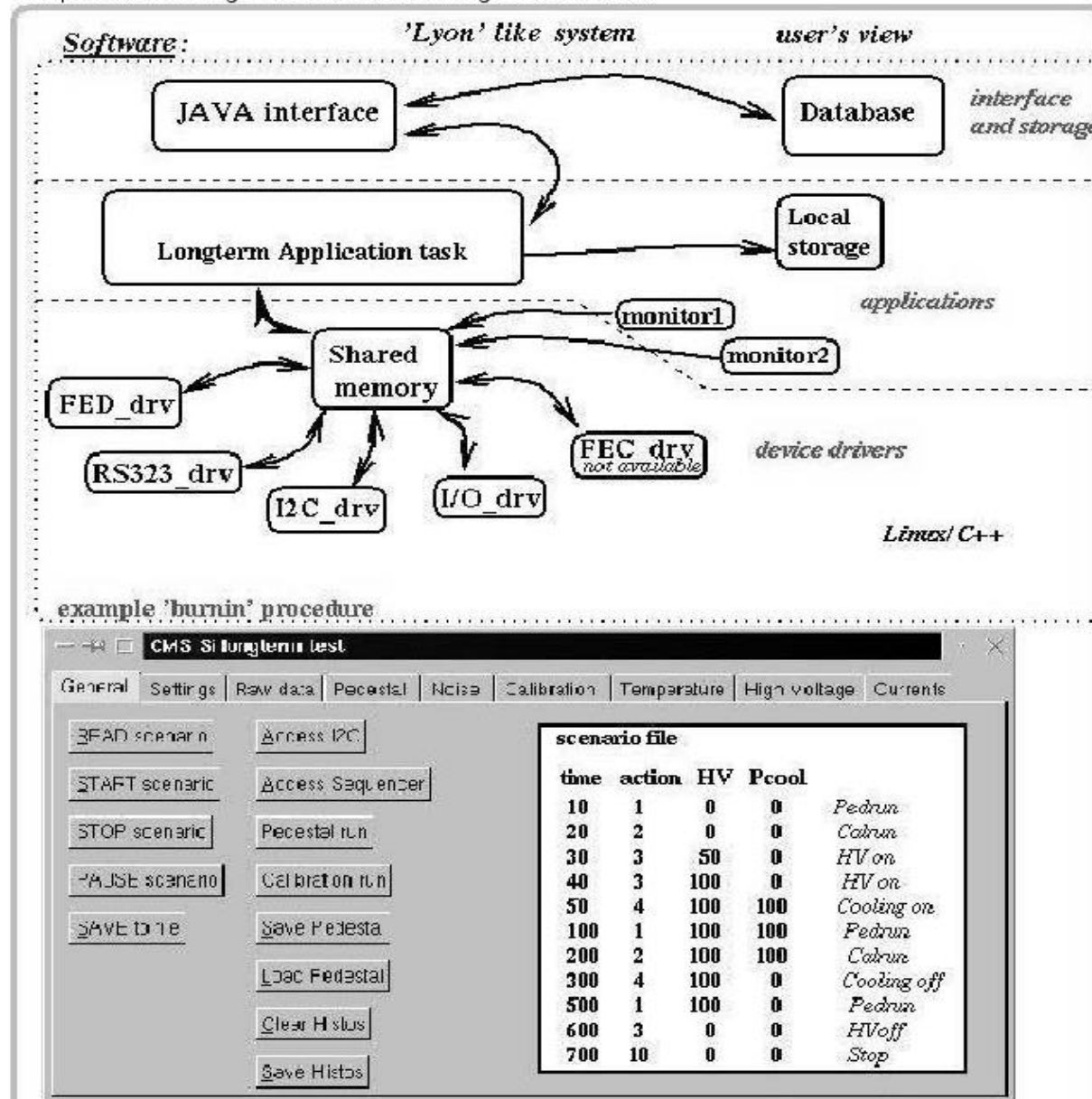
- New release waiting to be distributed

## Output files:

Local file as RootDB format both for ARC and CMS-like  
(Antwerpen)  
Root histos for HybridDialog

## 1. Longterm task

The place of the longterm task in overall software structure:



# Express line module tests

Before going to write to DB we can have some intermediate step to allow fast feedback and “standard” data comparison

- It is important to distribute the test results on the present module (web page ?) at least for the basic tests
- Proposal of a simple Root macro to analyze at least Basic Test data and give Bad channels list.

# Analysis Macro

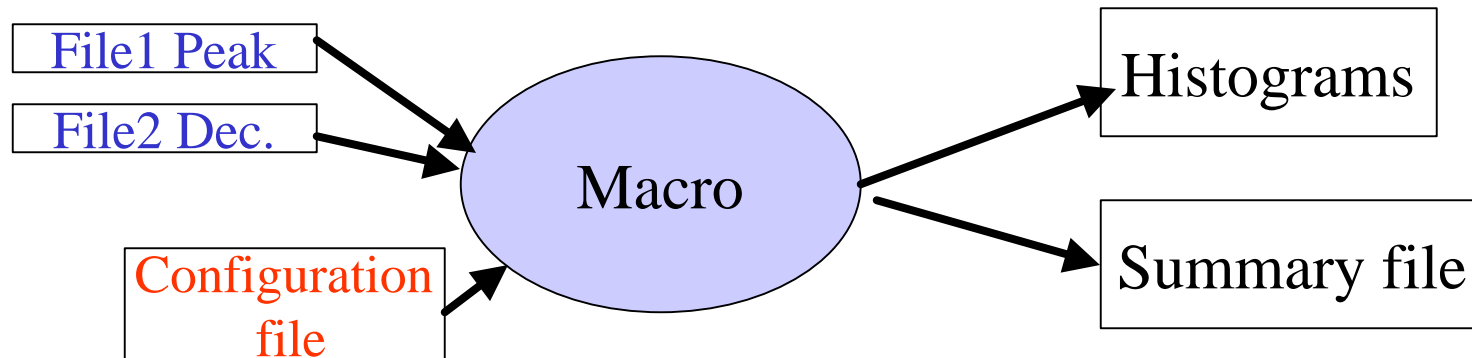
It allows a standard analysis of present results, at least for the Basic Test data :

Ped., Rnoise, Noise, Cal.

Right now is implemented for HybridDialog output but it can easily accept ARC data too (next thing to do...).

Running without reset, 2 sets of data are taken at  $V_{std}=300V$

It is a standard Root executable file (macro)



# Configuration file

Directory:TobPro05-02-2002/

File name 1:pedCal-80v-peak-invOn

File name 2:pedCal-80v-deconv-invOn

Number of chips:4

Cut method: Pedestal: 1 low .1 high .1

RoNoise: 2 low 5 high 5

Noise: 2 low 5 high 5

Calibration: 1 low .2 high .1

Cuts can be defined:

- 1) in relative mode (i.e. +10%, -10%)
- 2) in number of sigma
- 3) in absolute value (ADC)

1 & 2 are defined w.r.t. chip per chip average values.

# Output summary file

=====  
Input files :

Directory: TobPro05-02-2002/  
File name 1: pedCal-80v-peak-invOn  
File name 2: pedCal-80v-deconv-invOn

Number of chips:4

=====

Pedestal:

	mean	t.mean	rms	t.rms		mean	t.mean	rms	t.rms
chip 1:	344.887	344.577	3.136	2.612	-	300.990	300.824	2.980	2.670
chip 2:	341.481	341.481	4.120	4.136	-	298.687	298.687	4.429	4.447
chip 3:	347.111	346.832	2.636	2.125	-	302.092	301.843	2.830	2.321
chip 4:	344.139	344.050	3.325	3.183	-	299.043	298.942	3.501	3.322

=====

noise before CMN sub.:

	mean	t.mean	rms	t.rms		mean	t.mean	rms	t.rms
chip 1:	1.594	1.609	0.143	0.054	-	1.992	2.008	0.164	0.070
chip 2:	1.570	1.569	0.044	0.042	-	1.879	1.879	0.055	0.056
chip 3:	1.602	1.600	0.058	0.054	-	1.905	1.905	0.053	0.053
chip 4:	1.643	1.659	0.144	0.050	-	2.011	2.029	0.154	0.061

=====

noise after CMN sub.:

	mean	t.mean	rms	t.rms		mean	t.mean	rms	t.rms
chip 1:	1.545	1.564	0.158	0.060	-	1.876	1.894	0.188	0.074
chip 2:	1.526	1.526	0.053	0.054	-	1.755	1.755	0.063	0.063
chip 3:	1.549	1.547	0.065	0.061	-	1.775	1.776	0.060	0.055
chip 4:	1.594	1.611	0.164	0.065	-	1.872	1.893	0.184	0.074

=====

Calibration:

	mean	t.mean	rms	t.rms		mean	t.mean	rms	t.rms
chip 1:	73.331	74.855	9.379	0.926	-	55.559	56.774	7.313	0.940
chip 2:	69.627	69.945	1.413	0.685	-	50.789	51.066	1.322	0.770
chip 3:	72.790	73.078	1.348	0.748	-	52.797	53.065	1.209	0.709
chip 4:	67.585	68.779	8.076	0.812	-	49.960	50.893	6.719	0.784

# Output file : cont.

Bad channel list:

```
===== Cut methods
Pedestal   : 1 low 0.10 high 0.10 ** 310.12 307.33 312.15 309.65
                                                379.03 375.63 381.52 378.46
                                                270.74 268.82 271.66 269.05
                                                330.91 328.56 332.03 328.84
Noise      : 2 low 5.00 high 5.00 ** 1.34 1.36 1.33 1.41
                                                1.88 1.78 1.87 1.91
                                                1.66 1.60 1.64 1.73
                                                2.36 2.16 2.17 2.33
RNoise     : 2 low 5.00 high 5.00 ** 1.26 1.26 1.24 1.29
                                                1.86 1.80 1.85 1.94
                                                1.52 1.44 1.50 1.52
                                                2.27 2.07 2.05 2.27
Calibration: 1 low 0.20 high 0.10 ** 59.88 55.96 58.46 55.02
                                                82.34 76.94 80.39 75.66
                                                45.42 40.85 42.45 40.71
                                                62.45 56.17 58.37 55.98
```

Number of bad strips 5:

```
Strip: 1 chip 1 status p 0 status d 2
Strip: 8 chip 1 status p 14 status d 14
Strip: 78 chip 1 status p 14 status d 14
Strip: 479 chip 4 status p 14 status d 14
Strip: 507 chip 4 status p 14 status d 14
```

Status number is :  $1*(\text{Ped bit}) + 2*(\text{Rnoise bit}) + 4*(\text{Noise bit}) + 8*(\text{Cal.bit})$

# Histograms

F-test (part of Basic Test) :

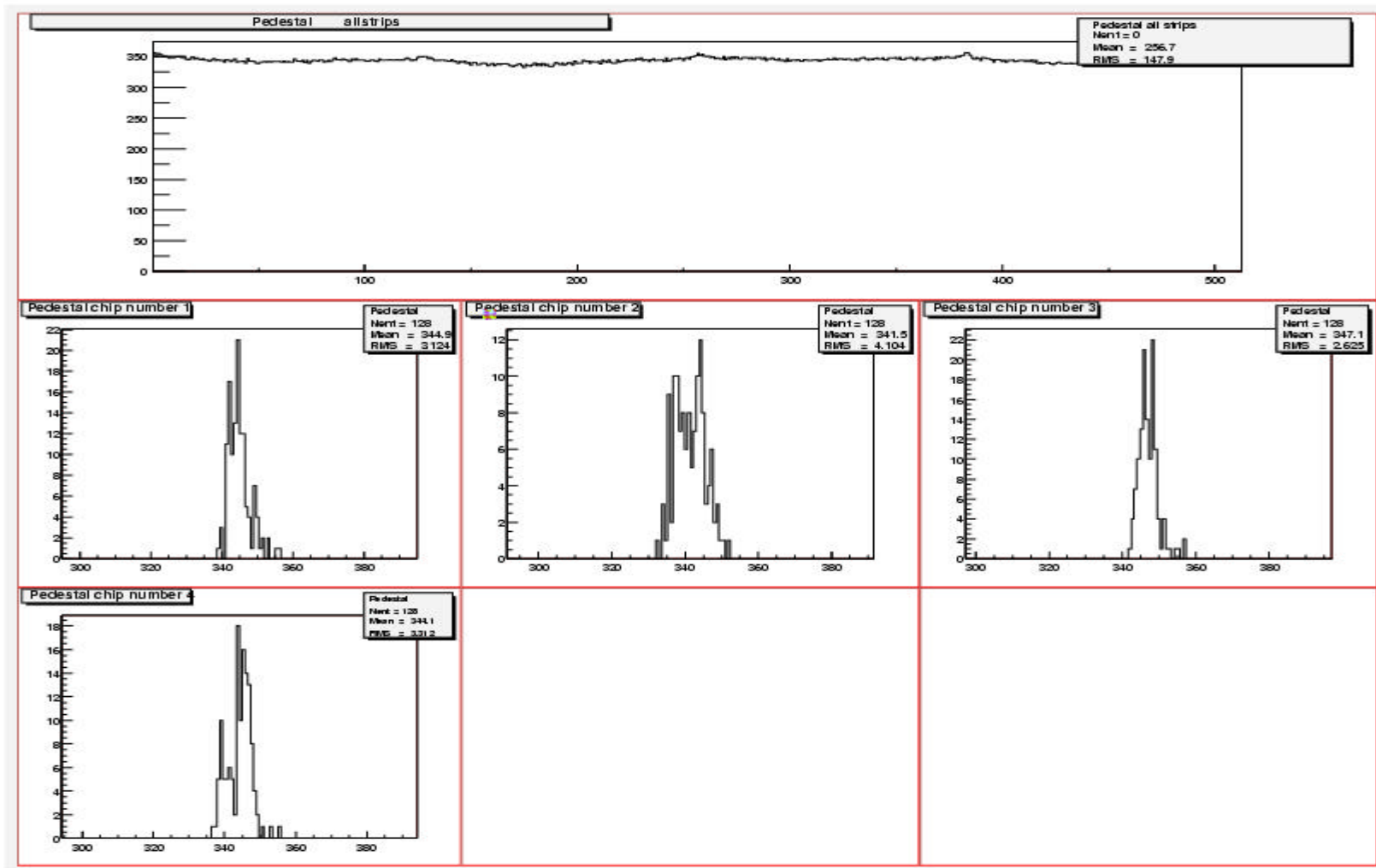
Pedestal (Peak / Dec )

Raw Noise (Peak/Dec)

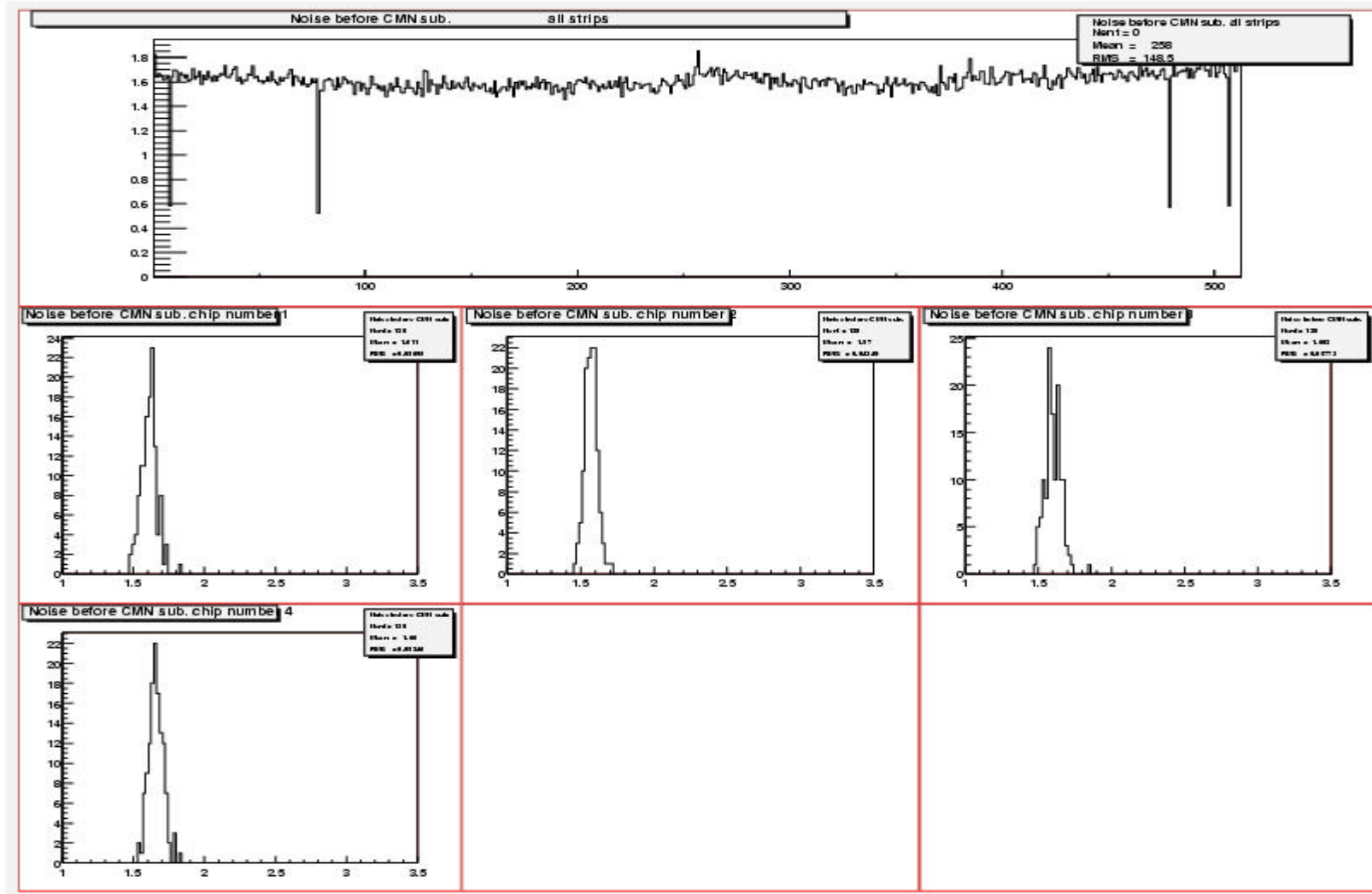
Noise (Peak/Dec)

Calibration (Peak/Dec)

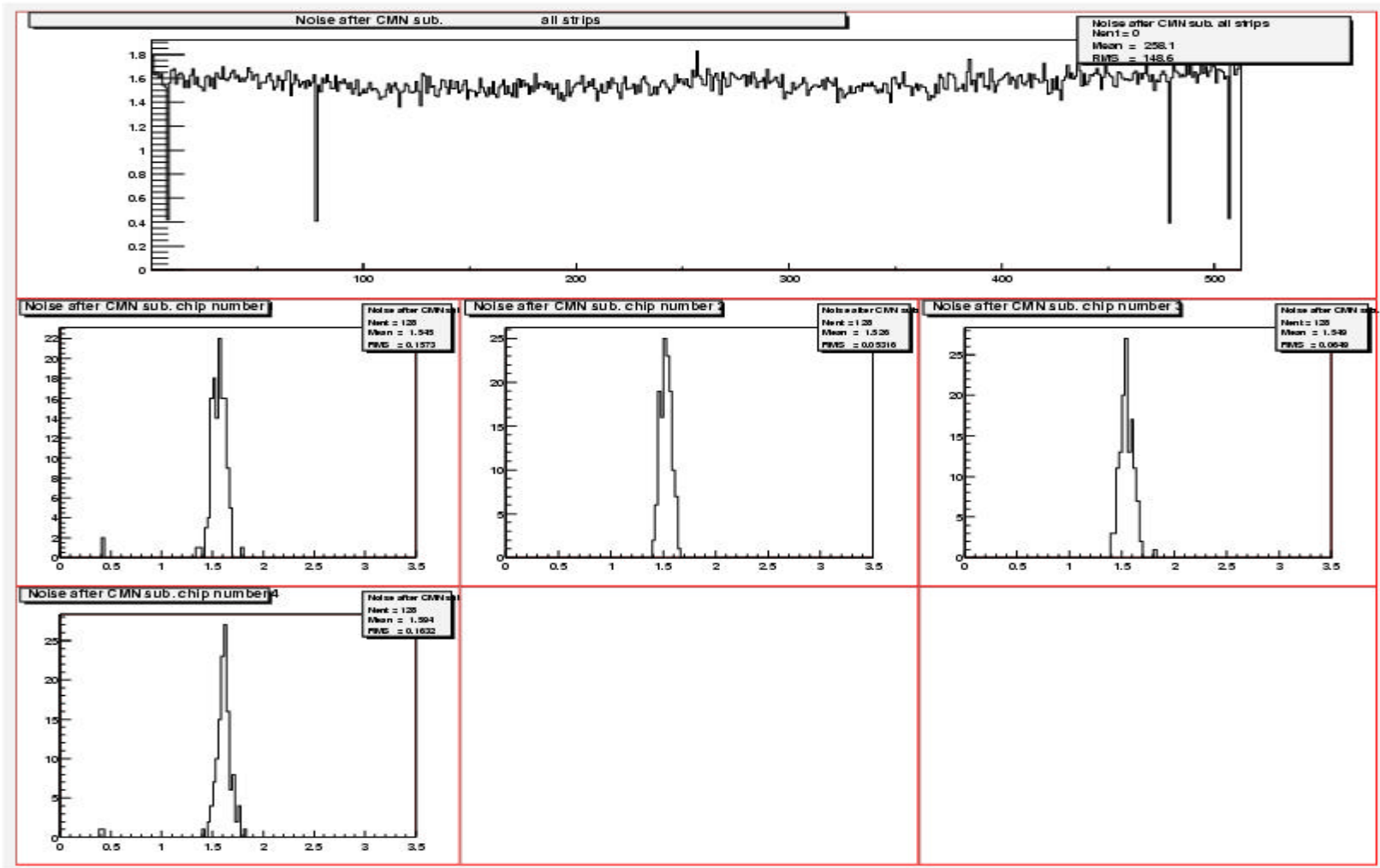
# F-test: pedestal Peak



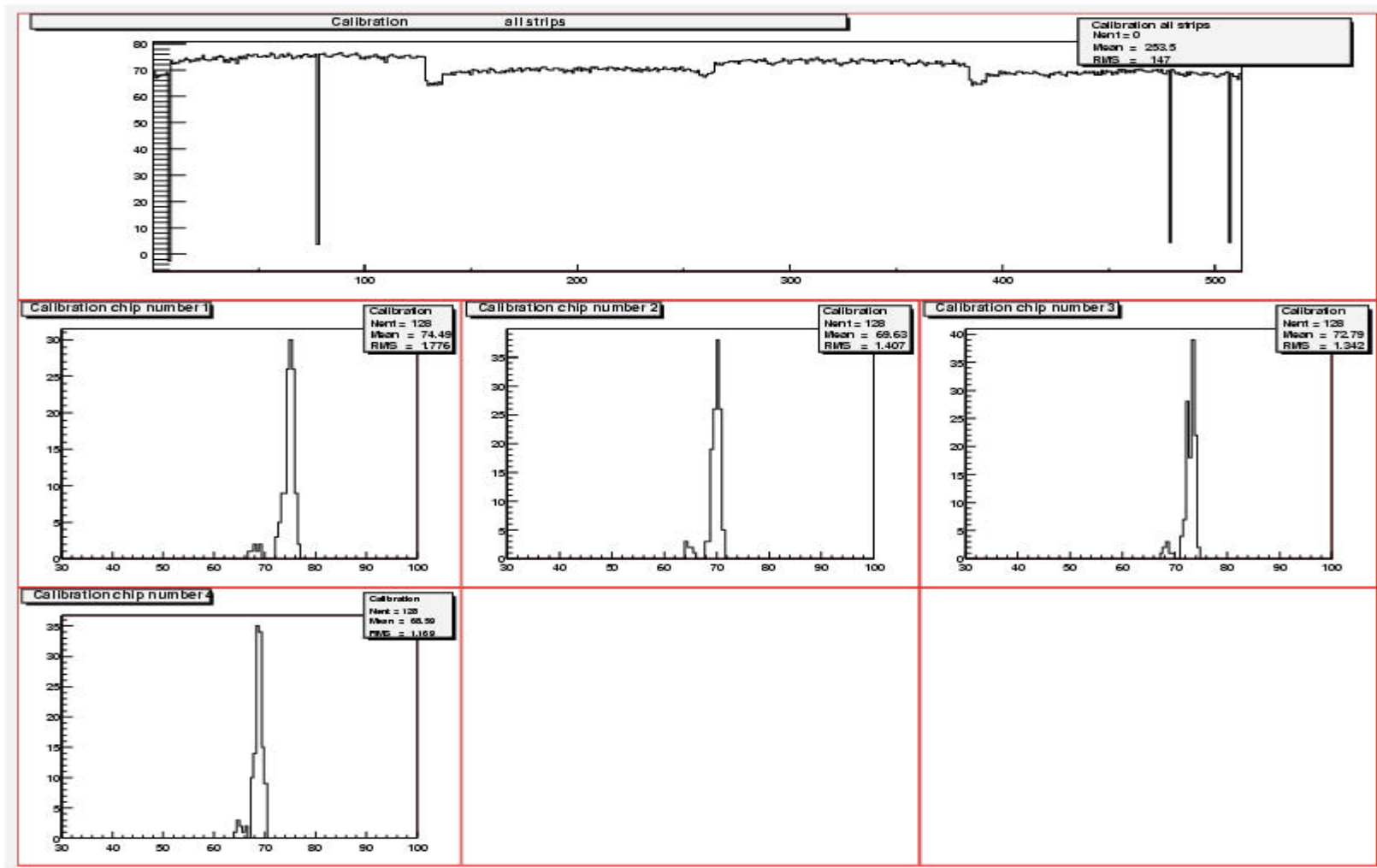
# F-test: Raw Noise (peak)



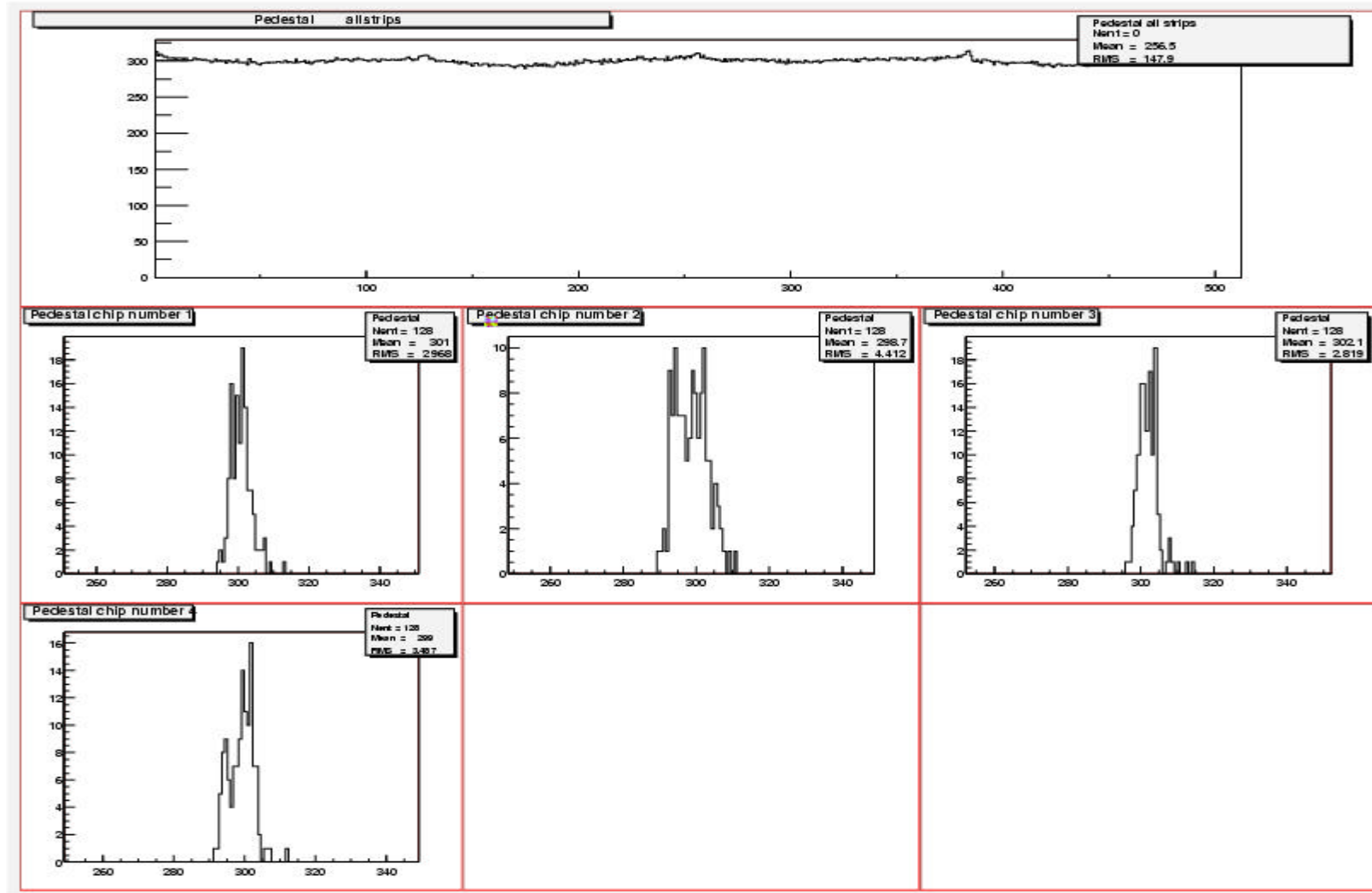
# F-test: Noise Peak



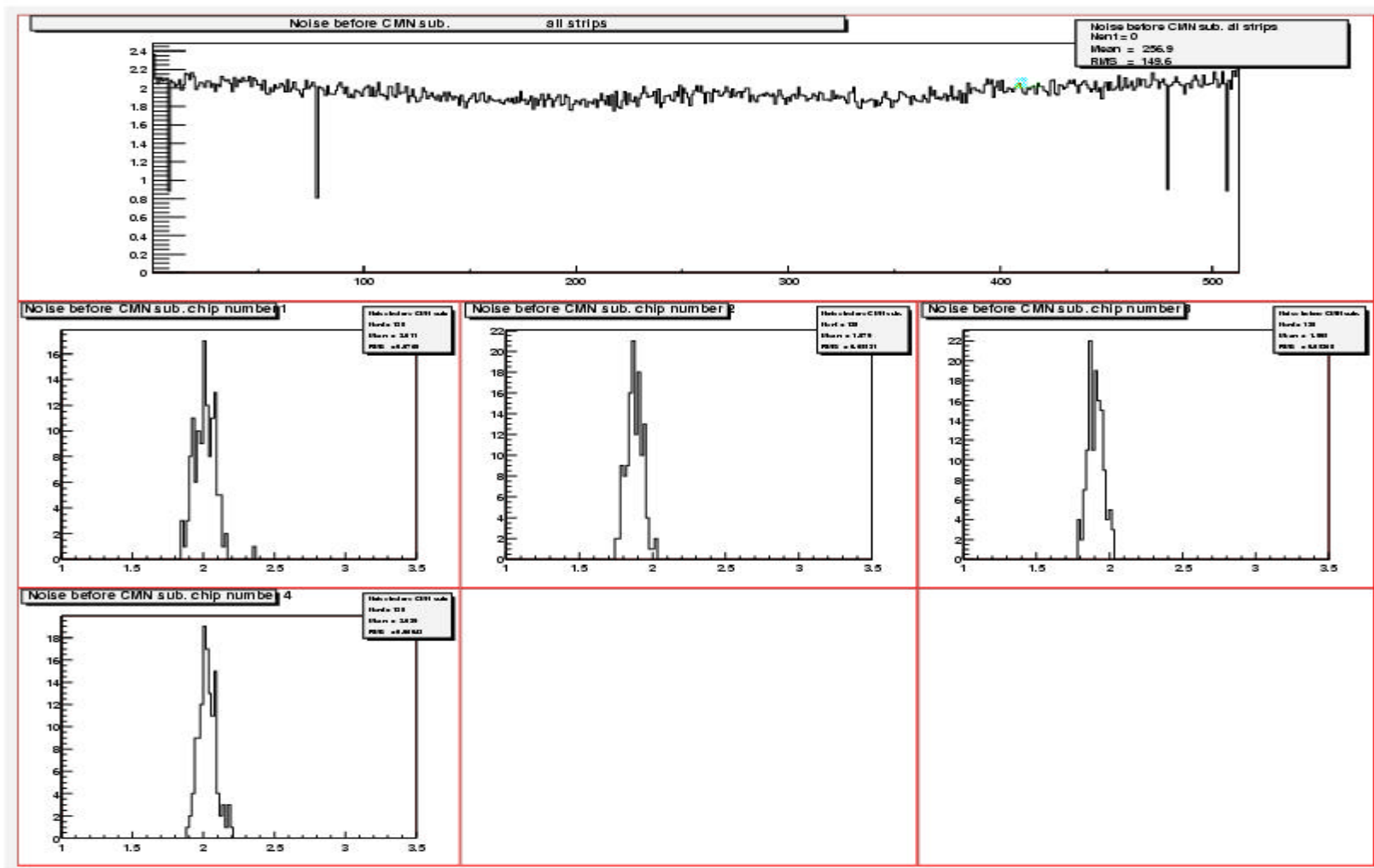
# Calibration (Peak)



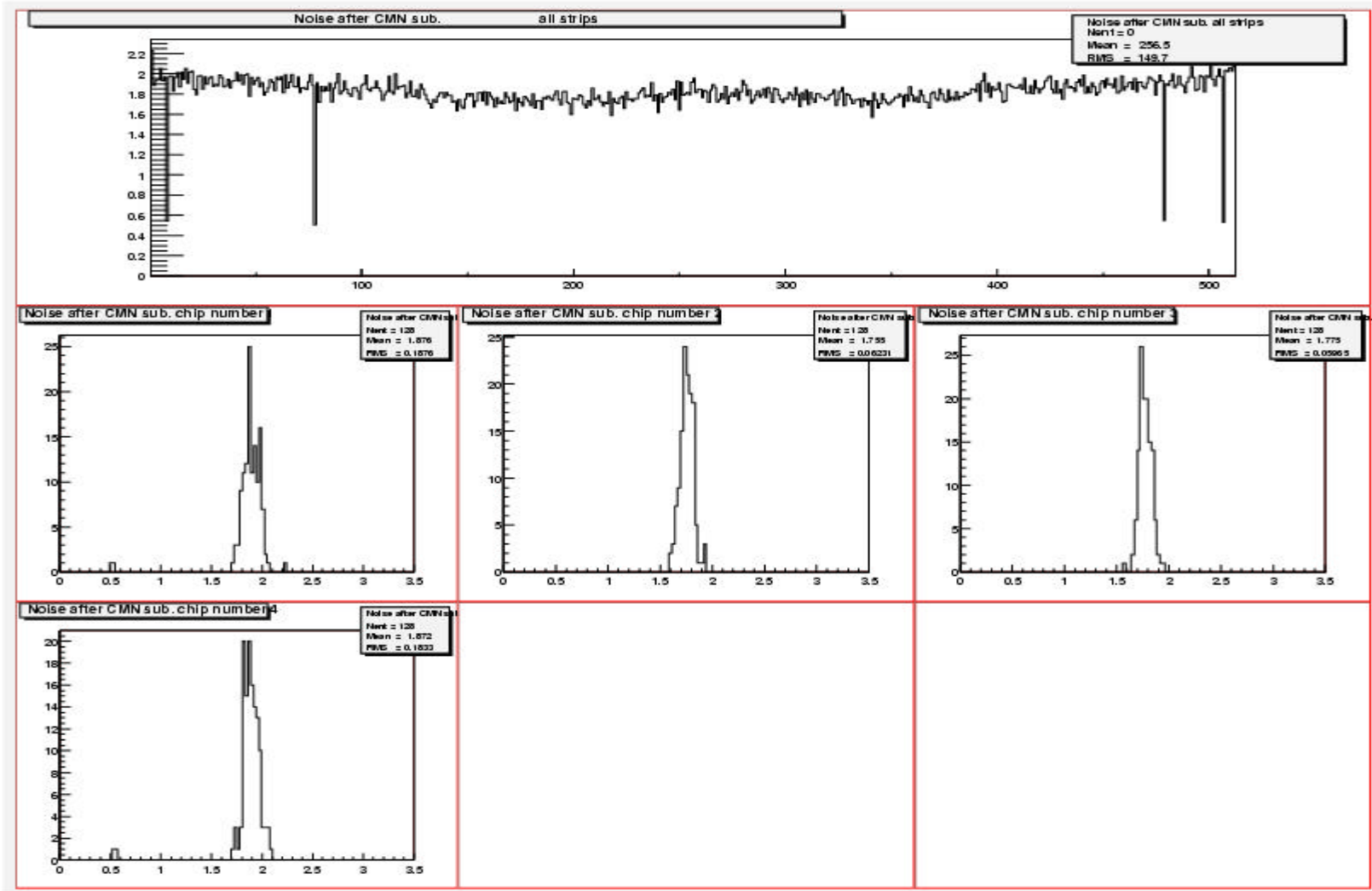
# F-test: Pedestal Dec



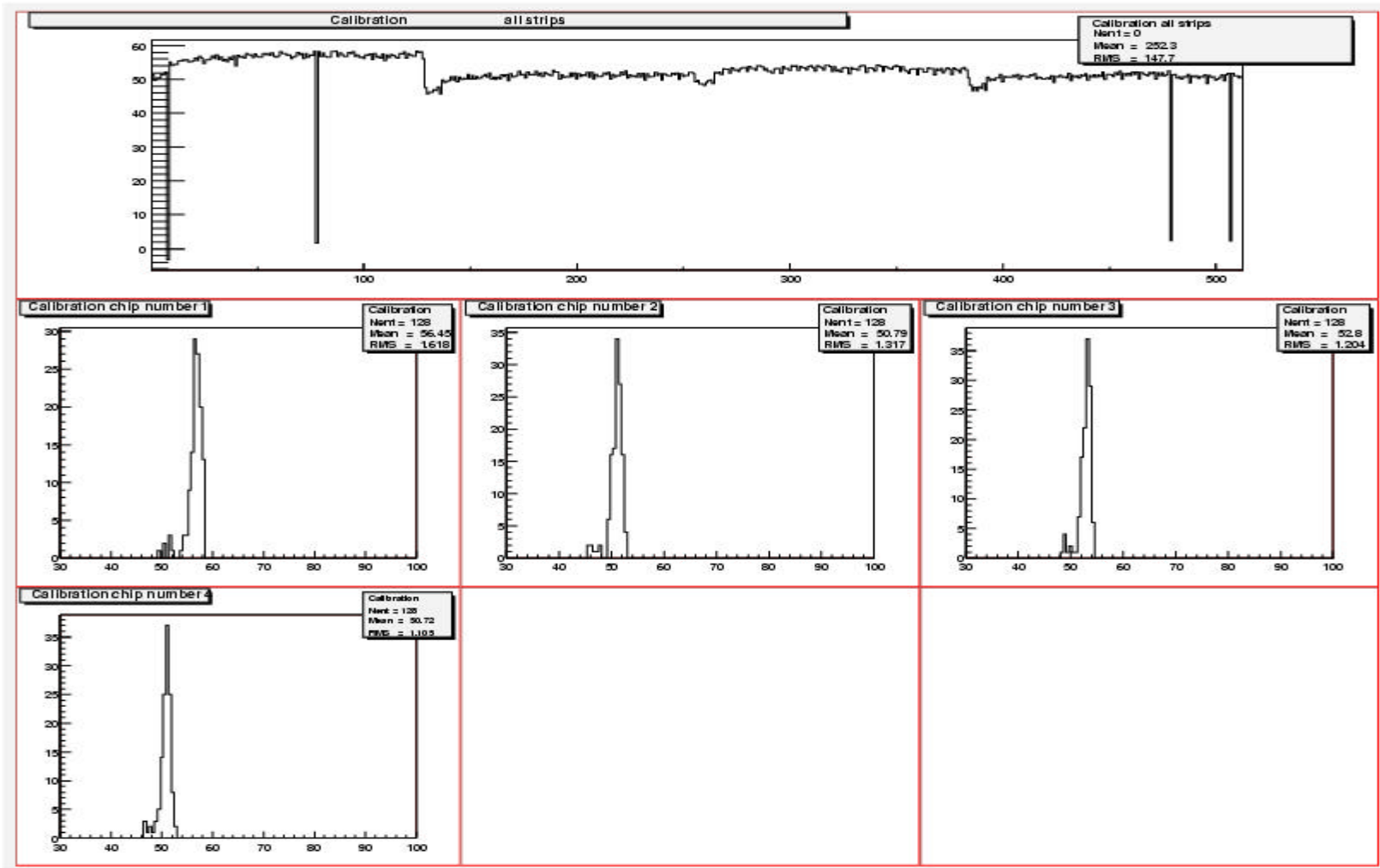
# F-test: Raw Noise Dec



# F-test: Noise Dec



# calibration Dec



# Proposal

- 1) Test results, either with CMS-like or ARC set-ups in institutes Web pages, together with Summary file and Histograms (in xml format?)
- 2) Macro can be made public this/next week
- 3) DB implementation continues in the meantime
- 4) Software implementation/installation continues in the meantime