



Front end Hybrid Industrial Tester



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In collaboration with

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<http://www.fynu.ucl.ac.be/themes/he/cms/activities/tracker/hybrids.html>



FHIT status



Now : 8 FHIT pcb = 3 dual-FHIT + 2 mono-FHIT

- new :
- **ARC system** (*hardware & software*)
 - **FHIT firmware**
 - **LabVIEW interface** (*FHITS*)
- } since Sept 2002

FHIT setup : being tested in Strasbourg...

- CT, ET, FT
- FHITS
- comparisons with other test stations
- reliability



Strasbourg feedback



Good feedback from Strasbourg

=> **bug corrections**

=> **measurements in industrial-like conditions**

→ **reliability really improved**

NEW Statistics !

~100 FEH including :

1663 (~60)	TEC	Top	4 apv's
1664 (~10)	TEC	Bottom	4 apv's
1665 (~5)	TEC	Top	6 apv's
1667 (~5)	TIB	Top	4 apv's
1668 (~15)	TIB	Bottom	4 apv's
1670 (~2)	TIB	Bottom	6 apv's

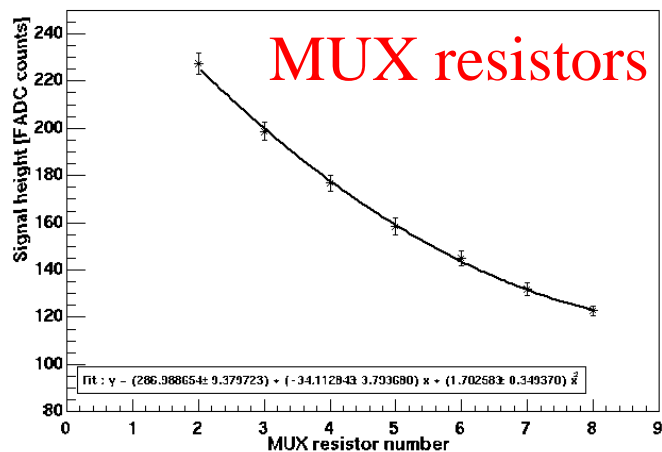
... *I125, I250, DCU calibration, DCU channels, MUX resistors, pedestal, noise, rawnoise, ...*



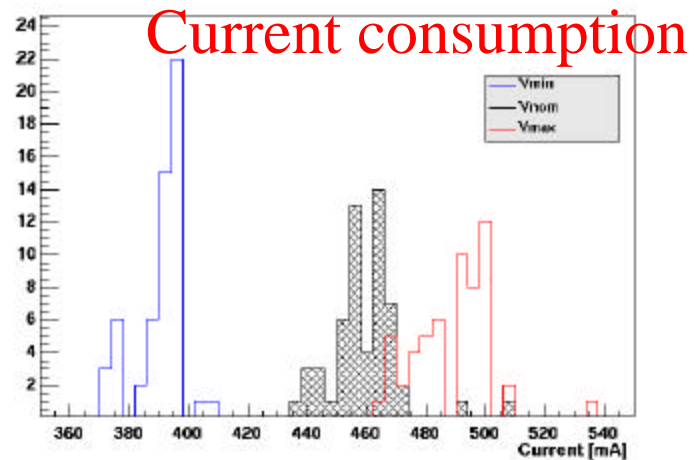
Some statistics...



Signal after mux resistor patterns (APV = 0x24, Part = 1664, N = 7)

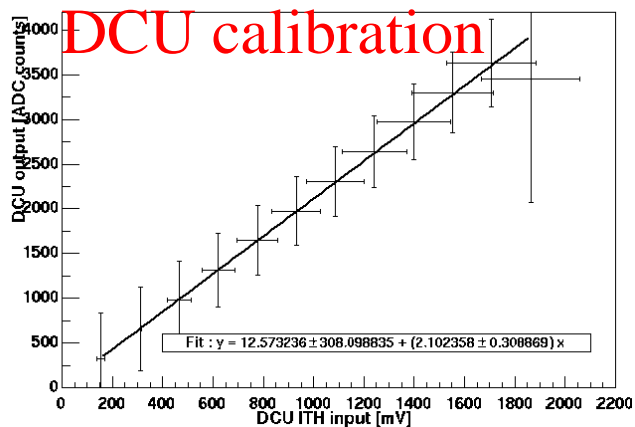


All APVs current consumption @_v250-databas/ge: FEH supply lines (part = 1663)

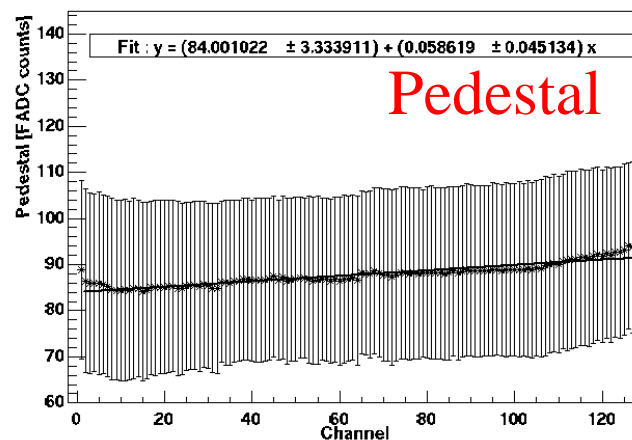


Analysis not finished...

DCU calibration for FEH 1663 (Vnom, N=57)



Pedestal distribution per channel (APV = 0x20, Part = 1663, N = 56)





FHIT *almost* ready for industries...

- CT : binary subtests (*good* or *bad*)
- ET :
 - binary subtests
 - **current measurements** (one or all APVs biased)
 - **DCU calibration data** (linear / non-linear regions)

... *but not yet !*

Characterization from data analysis



ET : current measurements...



Proposal for **acceptation intervals** on currents...
(from statistical distributions)

I_{125} one APV biased	V_{\min}	[42 ; 78] mA
	V_{nom}	[48 ; 84] mA
	V_{\max}	[52 ; 88] mA
I_{250} one APV biased	V_{\min}	[220 ; 320] mA
	V_{nom}	[300 ; 400] mA
	V_{\max}	[320 ; 420] mA

... comments are welcomed !

$\approx [0.7\mu ; 1.3\mu]$

and the same for I_{\dots} all biased
BUT ...



... acceptance intervals

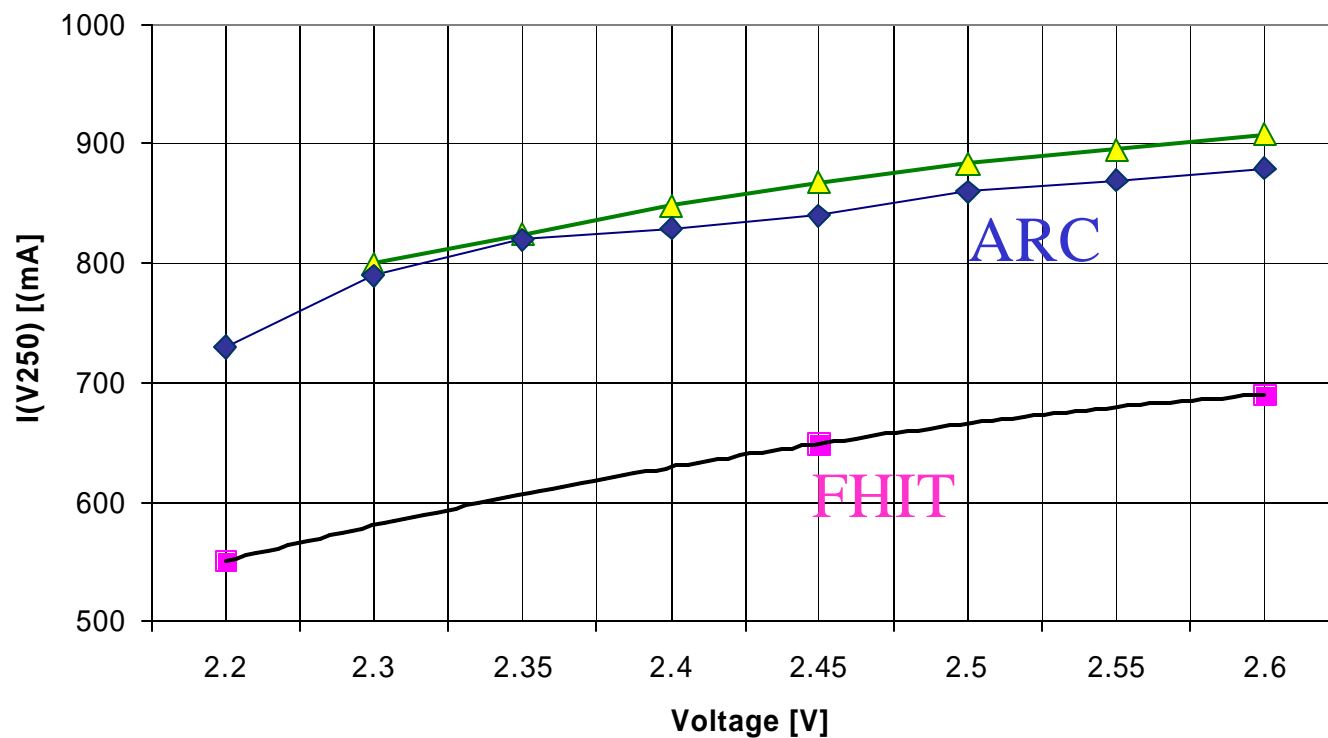


I_{125} all APV biased	V_{\min}	[?] mA
	V_{nom}	[?] mA
	V_{\max}	[?] mA
I_{250} all APV biased		
$\approx [0.7\mu ; 1.3\mu]$		

Problem with these measurements !

$I(V250) = f(V250)$
comparisons between test setups

→ *Not the same as the ones from other test stations (P Graehling)*





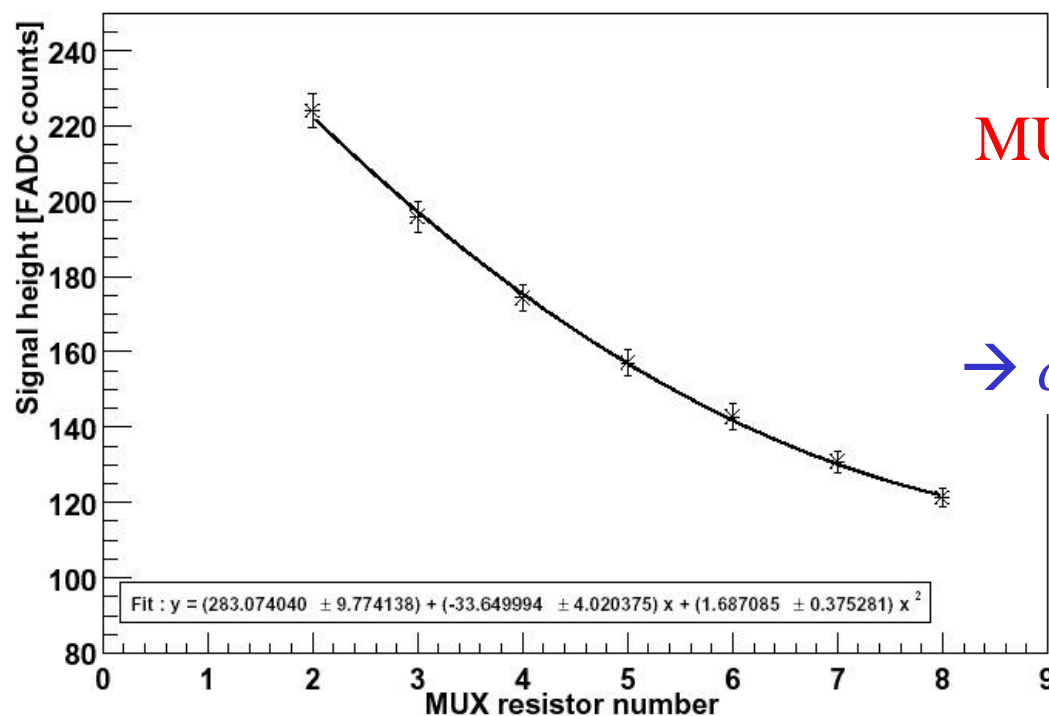
FT : MUX test



What does the Industrial Test consist in ?

<http://www.fynu.ucl.ac.be/themes/he/cms/activities/tracker/ITcontent.html>

Signal after mux resistor patterns (APV = 0x20, Part = 1663, N = 36)



MUX resistors : signal height

Good quadratic fit

→ *conditions on fit parameters ?*

Gain test : still to be analyzed...



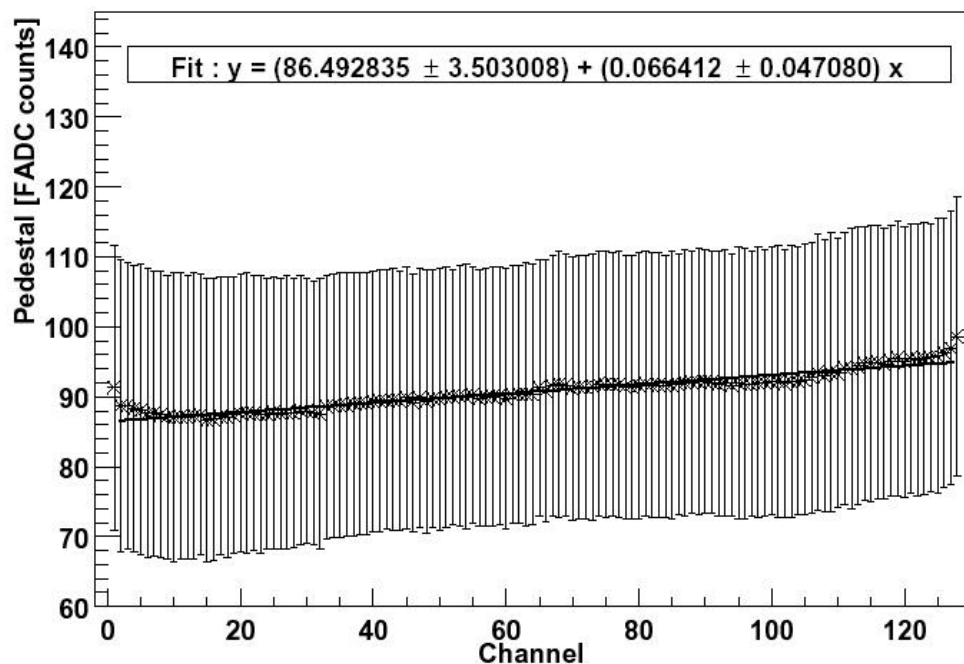
FT : pedestal test



Pedestal : good linear fit

→ *conditions on fit parameters ?*

Pedestal distribution per channel (APV = 0x20, Part = 1663, N = 38)



good / bad channels
[0.8 μ ; 1.2 μ]

According to
“*Procedures on module test*”

L. Demaria, M. Meschini,
F. Hartman, G. Dirkes



FT : noise test



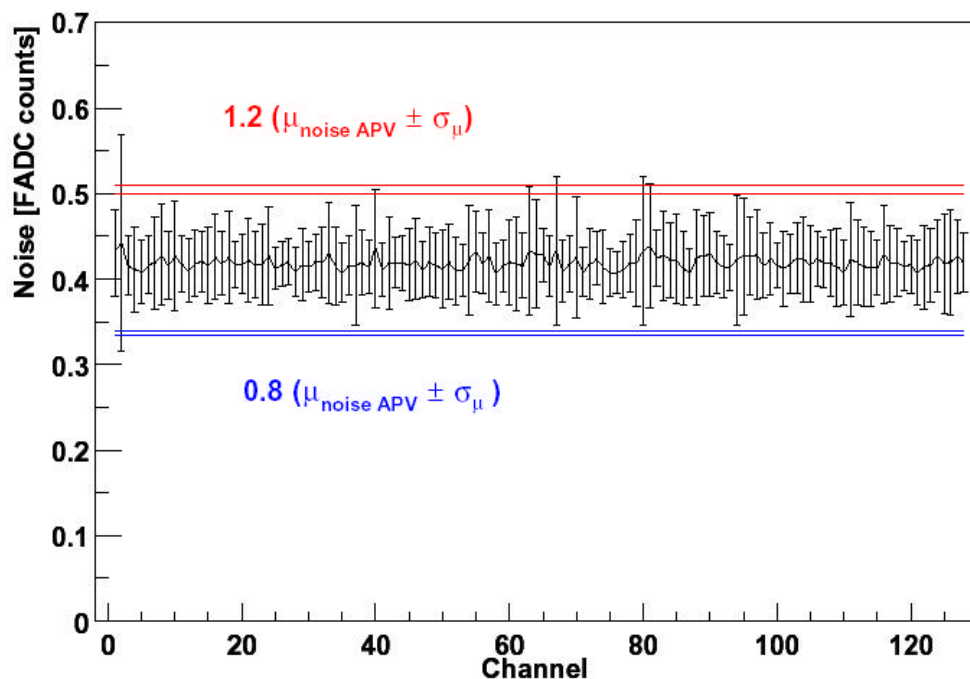
Noise : bad channel definition **should be refined**

→ **too sensitive** (20% : too small) ==> not always reproducible

→ noise should have **upper** (and lower) **limit(s)**

in case of an high noise mean, for instance

Noise distribution per channel (APV = 0x20, Part = 1663, N = 38)



good / bad channels
[0.8 μ : 1.2 μ]

Proposal : noise should be in [0.1 ; 1.2] ADC counts and the interval around the mean should be increased...

(as well as trials with more data)



IT conclusions



Waiting for enough data to deal with FT acceptance intervals
→ *FHIT should **not** be sent in industry before having this data*

BUT

FHIT is almost ready for CT & ET

- + :
 - good stability
 - well tested
- :
 - current measurements ~ relative to other test stations
 - minor instabilities in LabVIEW code (FHITS)
 - ERNI connector not really supported



Foreseen updates



Things to be realised:

- integration of **new part numbers** (as now TOB \neq TEC)
new firmware revision needed
- corrections of **minor bugs**
in **debug mode** (NOT for industries)
in **FT** (NOT for mono-FHIT)
instabilities
- compatibility with new **ERNI adapters** (NOT available)
waiting for information => new firmware
- **FHIT test procedures**
- link to database : from ASCII to **XML** files...
(next slide...)



XML and database



Translation **from FHIT log file** to **database XML file** :

- by a dedicated **C/C++ program** (not by FHITS)
 - more efficient (faster)
 - easily updated (factorised from FHITS)
- **not during IT** (performed on several log file, afterwards)

Strong collaboration with **P. Juillot** (Strasbourg)

Available next weeks...



Next weeks...



Software debug (*Louvain, Aachen, Strasbourg*)

Data analysis and characterization

... and FHIT can be sent to industries...

XML translation

FHIT tester