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In collaboration with

RWTH Aachen (M. Axer, F. Beissel, T. Franke, J. Mnich)
IRES Strasbourg (JD. Berst, P. Graehling, P. Juillot, C. Maazouzi)

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

Xavier Rouby  
tracker week 23.10.02
FHIT status

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

new :
  • ARC system \((hardware \& software)\)
  • FHIT firmware
  • LabVIEW interface \((FHITS)\)
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, ...

Xavier Rouby
tracker week 23.10.02
Some statistics...

MUX resistors

Current consumption

Analysis not finished...

DCU calibration

Pedestal

Xavier Rouby  
tracker week 23.10.02
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*
Proposal for acceptation intervals on currents…
(from statistical distributions )

<table>
<thead>
<tr>
<th>$I_{125}$ one APV biased</th>
<th>$V_{\text{min}}$</th>
<th>[42 ; 78] mA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$V_{\text{nom}}$</td>
<td>[48 ; 84] mA</td>
</tr>
<tr>
<td></td>
<td>$V_{\text{max}}$</td>
<td>[52 ; 88] mA</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>$I_{250}$ one APV biased</th>
<th>$V_{\text{min}}$</th>
<th>[220 ; 320] mA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$V_{\text{nom}}$</td>
<td>[300 ; 400] mA</td>
</tr>
<tr>
<td></td>
<td>$V_{\text{max}}$</td>
<td>[320 ; 420] mA</td>
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</table>

$\approx [0.7\mu ; 1.3\mu ]$
and the same for $I_{...}$ all biased
BUT ...

... comments are welcomed!
... acceptation intervals

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

Problem with these measurements!

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

Xavier Rouby
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…

Xavier Rouby

tracker week 23.10.02
Pedestal : good linear fit  

→ conditions on fit parameters?

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

Fit: \[ y = (86.492835 \pm 3.503008) + (0.066412 \pm 0.047080) \times \]

According to

“Procedures on module test”

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

good / bad channels

[ 0.8 \mu ; 1.2 \mu ]
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

![Graph showing noise distribution per channel](image)

1.2 ($\mu_{\text{noise APV}} \pm \sigma_{\mu}$)

0.8 ($\mu_{\text{noise APV}} \pm \sigma_{\mu}$)

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)
Waiting for enough data to deal with FT acceptation intervals

→ **F_HIT should not be sent in industry before having this data**

**BUT**

**F_HIT** is almost ready for CT & ET

+ : - good stability
   - well tested

- : - current measurements ~ relative to other test stations
   - minor instabilities in LabVIEW code (F_HITS)
   - ERNI connector not really supported
Foreseen updates

Things to be realised:

- integration of **new part numbers** (as now TOB ≠ TEC)
  
  \(\text{new firmware revision needed}\)

- corrections of **minor bugs**
  
  in **debug mode** (NOT for industries)
  
  in **FT** (NOT for mono-FHIT)
  
  instabilities

- compatibility with new **ERNI adapters** (NOT available)
  
  \(\text{waiting for information => new firmware}\)

- **FHIT test procedures**

- **link to database** : from ASCII to **XML files**...
  
  \(\text{(next slide...)}\)
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