CMS
Compact Muon Solenoid

Testing Hybrids at CERN

CERN Hybrid &
Module Test Station

Hybrid & Electronics Meeting

17.07.2002

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Hybrids arrived at CERN

ceramic

- about 60 tob/tec 302166302xxxxx

fr4

- 4 tib 302167004xxxxx

flex

- 1 tob/tec 302166505xxxxx
- 7 tib 302166805xxxxx
- 2 tib 302167005xxxxx

Testing Procedure

- Pedestals & Noise (Aachen code)
  - at least 10 kevents
- Change Low Voltage - Check DCU Response
  - delay of 5s between consecutive lv changes
- Pulse Shape Peak Mode
  - 10 events per measurement
  - inverter on
- Pulse Shape Deconvolution Mode
  - 10 events per measurement
  - inverter on

Hybrid 30216700400004

- Very high common mode noise on apv 0x46
  - fr4 tib hybrid with 6APV
  - cross check with cmslike system
  - ask Strasbourg
  - consult Mark Raymond

  => hybrid & APV should be ok

=> Check ARC test setup

=> setup is ok

? ? ?

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Further Testing

- Baseline stable not sending random trigger
  - problem is pipeline dependent
  - APV problem
- Calibration pulses
  - signal height unstable

=> Not just a problem of common mode correction!

Screenshot Pipeline Scan

Hybrid 30216700400004

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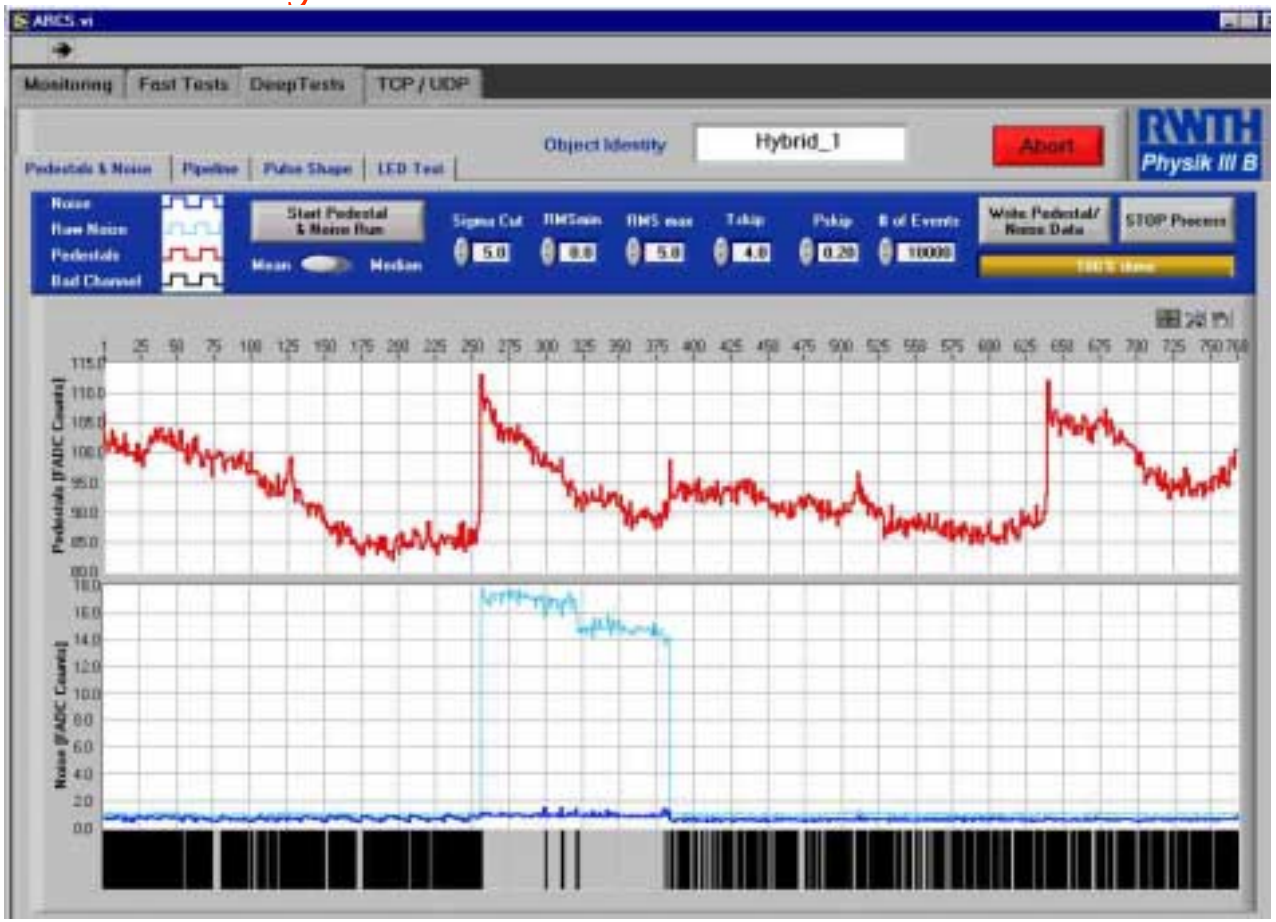
Screenshot Pedestals & Noise

Hybrid 30216700400004



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Screenshot Pipeline Scan
Hybrid 30216700500169

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Error Detection

Error was not found:

- at wafer level
  - masked by calculation routines
- in Strasbourg
  - read out one pipeline cell
- with cmslike system at CERN
  - read out one pipeline cell
  - masked by calculation routines

Changed Qualification Procedure

Additional tests:

- Pipeline Scan
  - 100 events per pipeline
- Pedestal & Noise calculation (V. Z. code)
  - 10 kevents
  - keep an eye on raw noise!

Summary

- APV pipelines are not unique
- Unstable APV baseline is masked by code
- Faults may not have been found in past
- Tests are not done in the same way
- New qualification procedure is needed

Conclusion

⇒Tests must be done in agreed way to be able to make cross checks

⇒Raw noise must be qualification criteria for APV

⇒There might be faulty APVs around

Data available on webpage (under construction):

cern.ch/poettgens

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