Addendum to Expressline II
Database status
The new Frontend Adaptor

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Overview

- Some additions to the Expressline II measurements

  (Comments to the last talk)

- Some comments to the database

- Measurements with the new Frontend
  - Comparison noise
  - Calibration pulse height
  - Backplane pulse

Some Additions to the Exressline II Measurements

Expressline II

9 Modules

- TEC Ring 6
- Equipped with ceramic hybrids
- Assembled on the gantry in Bruxelles
- Bonded in Aachen (AC I)

- Tests done by Aachen I *(Jan Olzem, Katja Klein)*
  - Using ARC & ARC LED System

- *All nine in IV tests under controlled conditions*
- *5 of 9 modules in cooling cycles*

Result Table

Frame 30200020000-xxx	Hybrid 30216630200-xxx	Channel (draft numbering)	Channel (sensor numbering)	Noise (Inverter on)				Pulse Shape (Inverter on)												LED Test		Pinhole-test	Visual Inspection or (assumed) Error	Pinholes known on Sensor Level
								Peak						Dec										
				Peak		Dec		rise time		peak time		signal height		rise time		peak time		signal height		signal				
				higher	lower	higher	lower	shorter	longer	shorter	longer	higher	lower	shorter	longer	shorter	longer	higher	lower	higher	lower	suspi-cious		
..501	..106	-	-	-		-		-		-		-		-		-		-		-		-		
..502	..105	495	18	-		-		-		x		x		(x)		(x)		x			x	-	missing bond (SEN-SEN)	
..503	..102	-	-	-		-		-		-		-		-		-		-		-		-		
..640	..098	435	78		x		x		(x)		(x)		0		(x)		(x)		0		x	x	pinhole	yes
		423	90	-		x		x		x		x		x		x		x			x	-	missing bond (APV-PA)	
..641	..099	270	243	x		x		x		x		x		x		x		x			x	-	broken line on pitch adapter ?	
..642	..097	183	330	-		-		-		-		-		-		-		-		-		x	high leakage current pinhole	no
		512	1	(x)		(x)		-		-		-		-		-		-		-		x	high leakage current pinhole	no
..643	..101	292	221						x		x		0		x		x		0			x	pinhole	no
		65	448		x		x		x		x		0		x		x		0		x	x	pinhole	yes
		3	510		x		x		x		x		0		x		x		0		x	x	pinhole	yes
		2	511		x		x	-		-			0	-		-			0		x		pinhole ?	no
..644	..104	155	358		x		x		(x)		(x)		0		(x)		(x)		0		x	(x)	high leakage current pinhole	no
..645	..100	-	-	-		-		-		-		-		-		-		-		-		-		

Now “normal“ pinhole

New “normal“ pinhole

New: no signal at all

Some Comments on the Database

Writing XML Files

No problem in principle…

- Pedestal, noise, raw noise, calibration amplitude etc.
- Definition of some tags had/have to be clarified:
  - val
  - tool_id
- Reordering of XML file structure requires minor changes

…but still some work needed,

→ **New ARCS Release next week**

Writing XML files

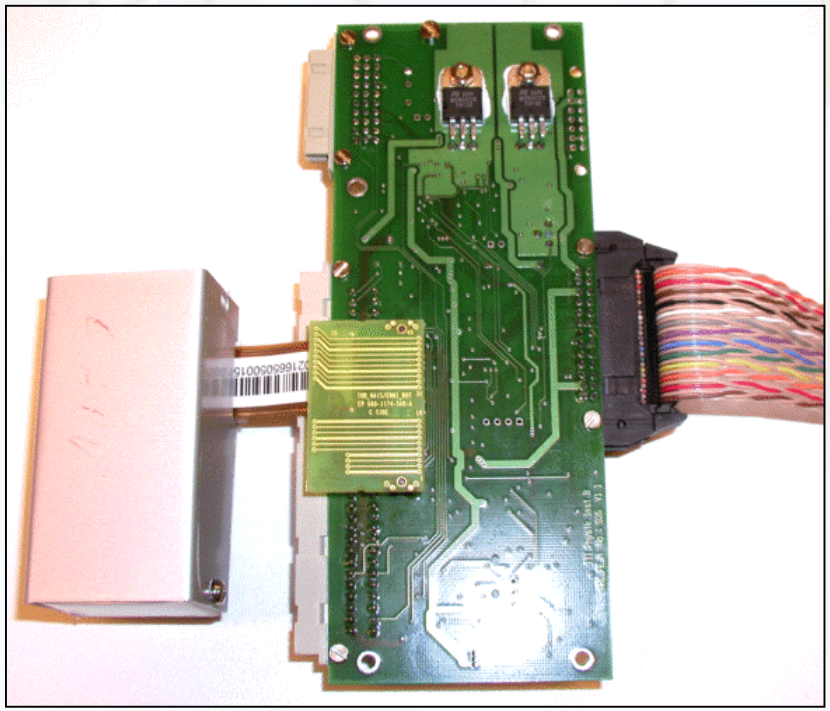
- Up to now we assumed a fixed database definition where only some small things had to be clarified.
  - ➡ *based our implementation on that fact*
    XML files were created during the testrun (not afterwards)

- Latest discussions about database defintion (29/01/03) showed that many things are not clear and will become fixed by experience only
- Changes in DB and XML file structure are very probable
- Need possibility to extract data from older local data files to convert in the latest DB compatible XML file version
  - ➡ *Requires a much more flexible concept*
  - ➡ *We will try to profit from Valery Zhukovs XML parser which has that flexibility*
  - ➡ **Will cost more time to finalize the new ARCS version need two weeks in optimistic scenario**

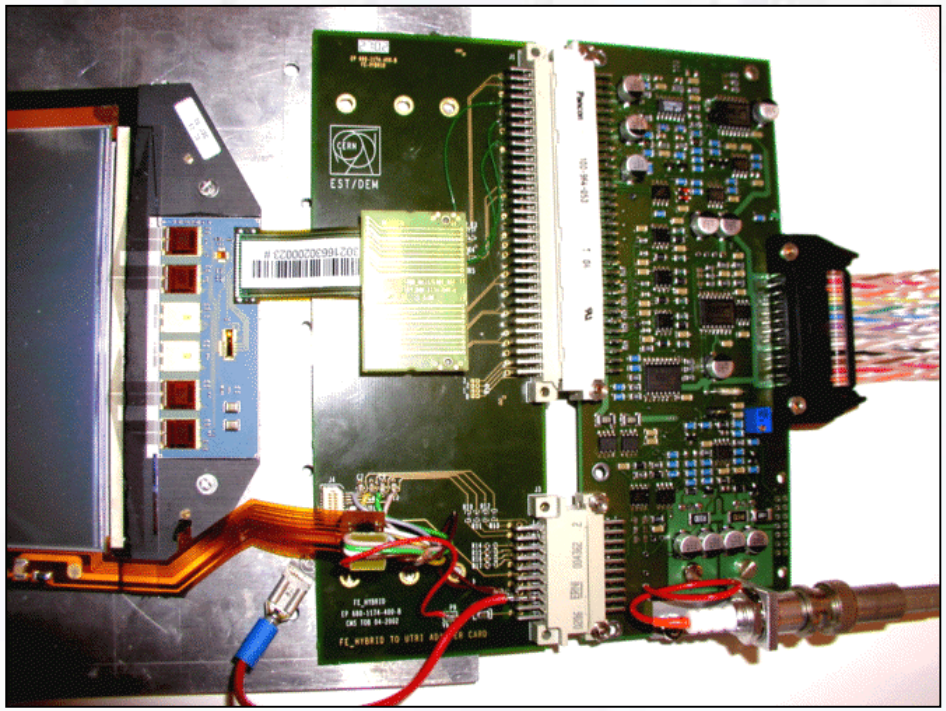
Measurements with the new ARC Frontend

The New ARC Frontend

- Status:
  - 25 PCBs asssemled
  - All will be tested until end of this week



Setup for hybrid tests using the ERNI connector at the backside of the frontend

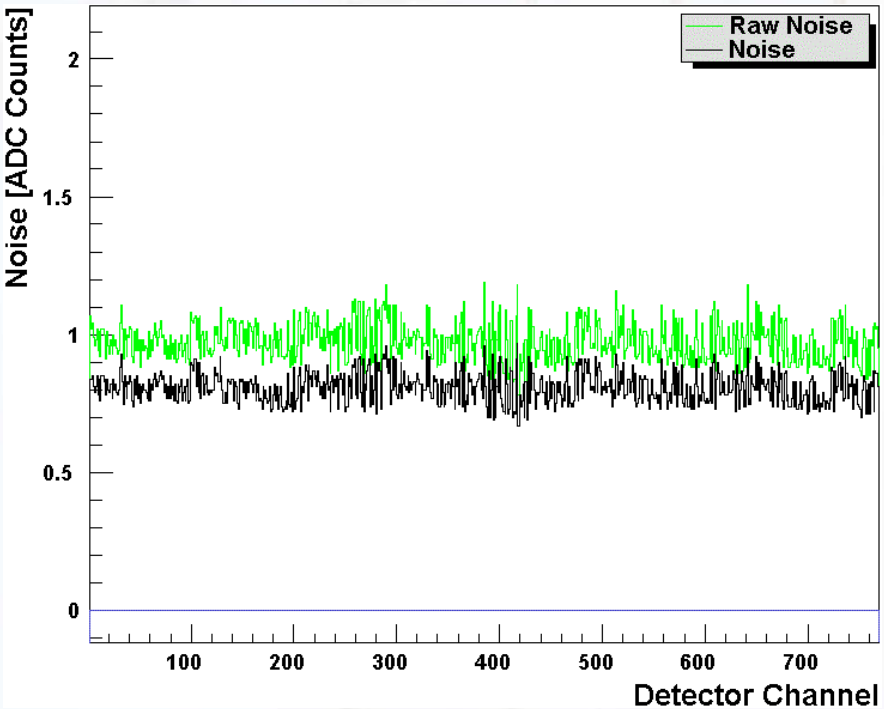


Setup for Module Tests

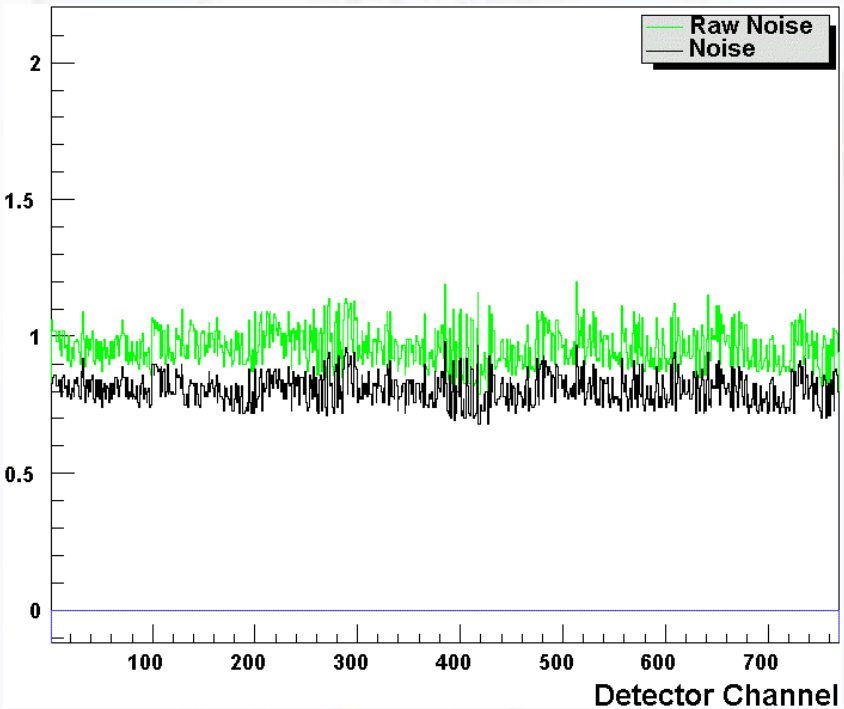
Comparison in Hybrid Tests

Noise

- Noise nearly identical



Old Frontend

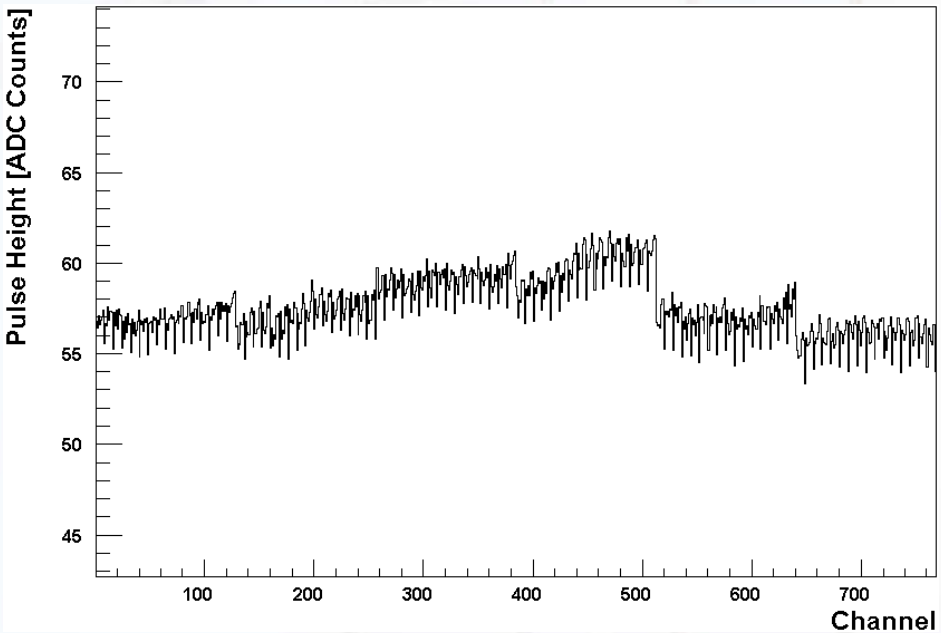


New Frontend

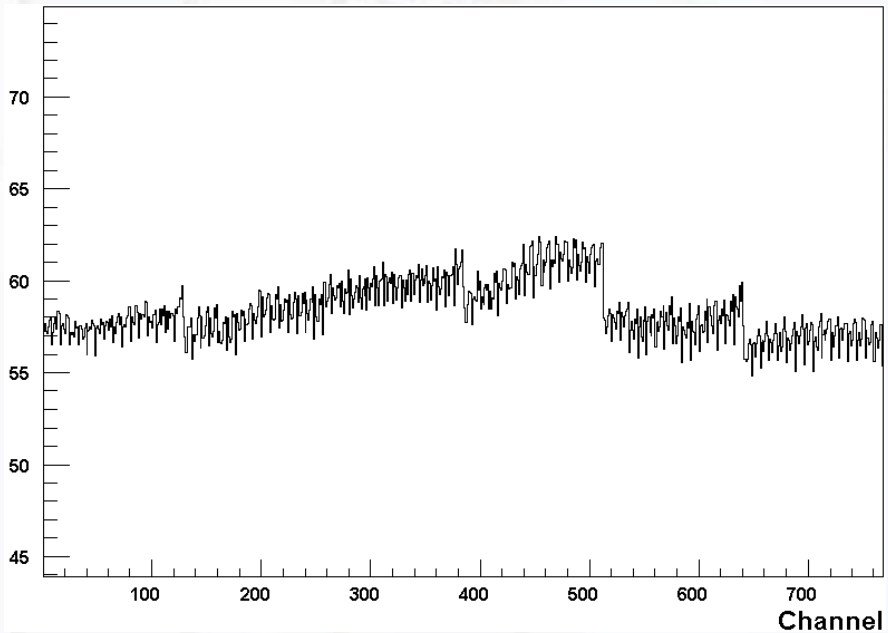
Noise and Raw Noise in Deconvolution Mode, Inverter off

Height of Calibration Pulses

- Calibration pulse height nearly identical



Old Frontend



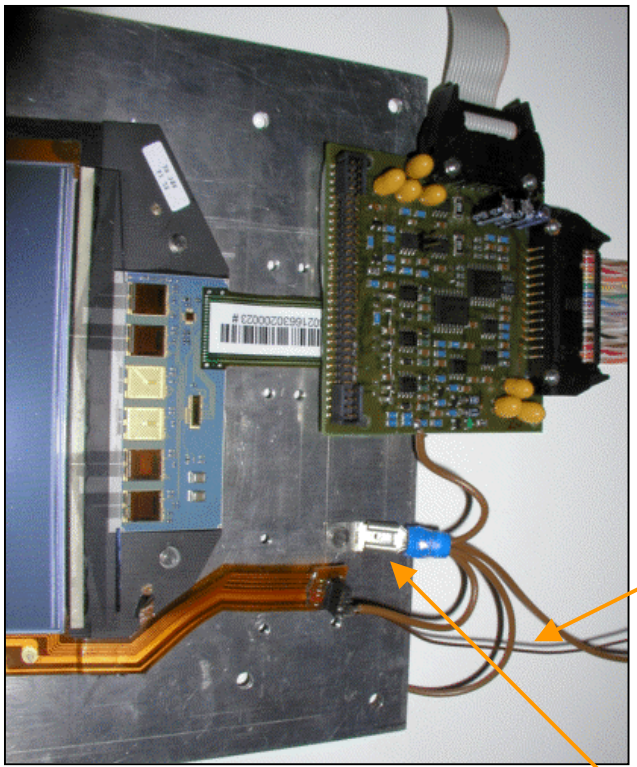
New Frontend

Fitted height of calibration pulses

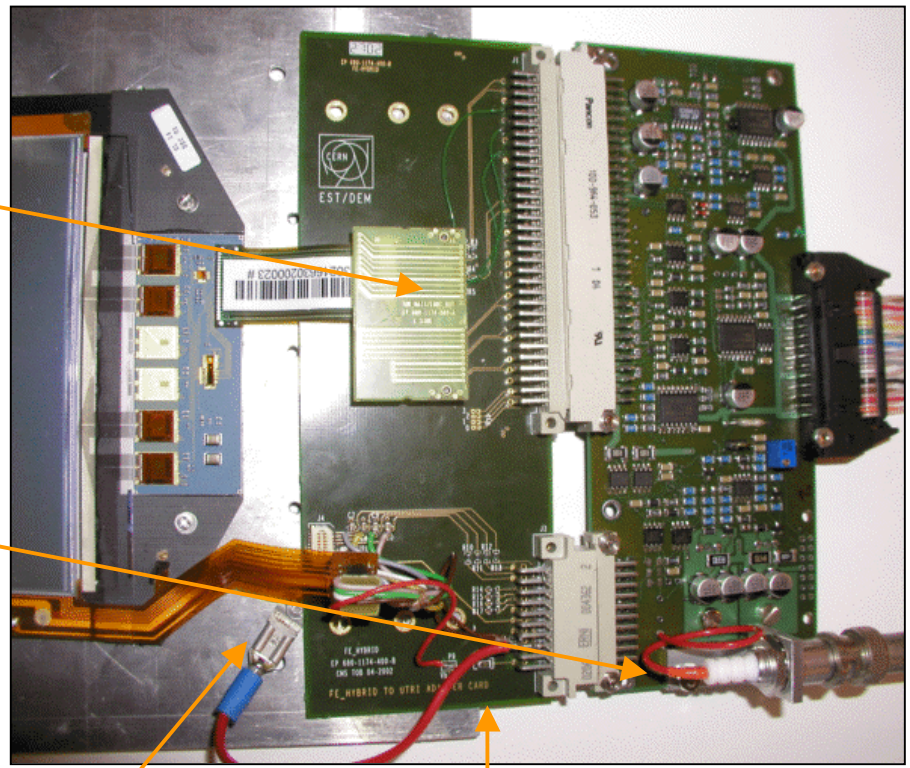
Comparison in Module Tests

Setups

Old Frontend



New Frontend



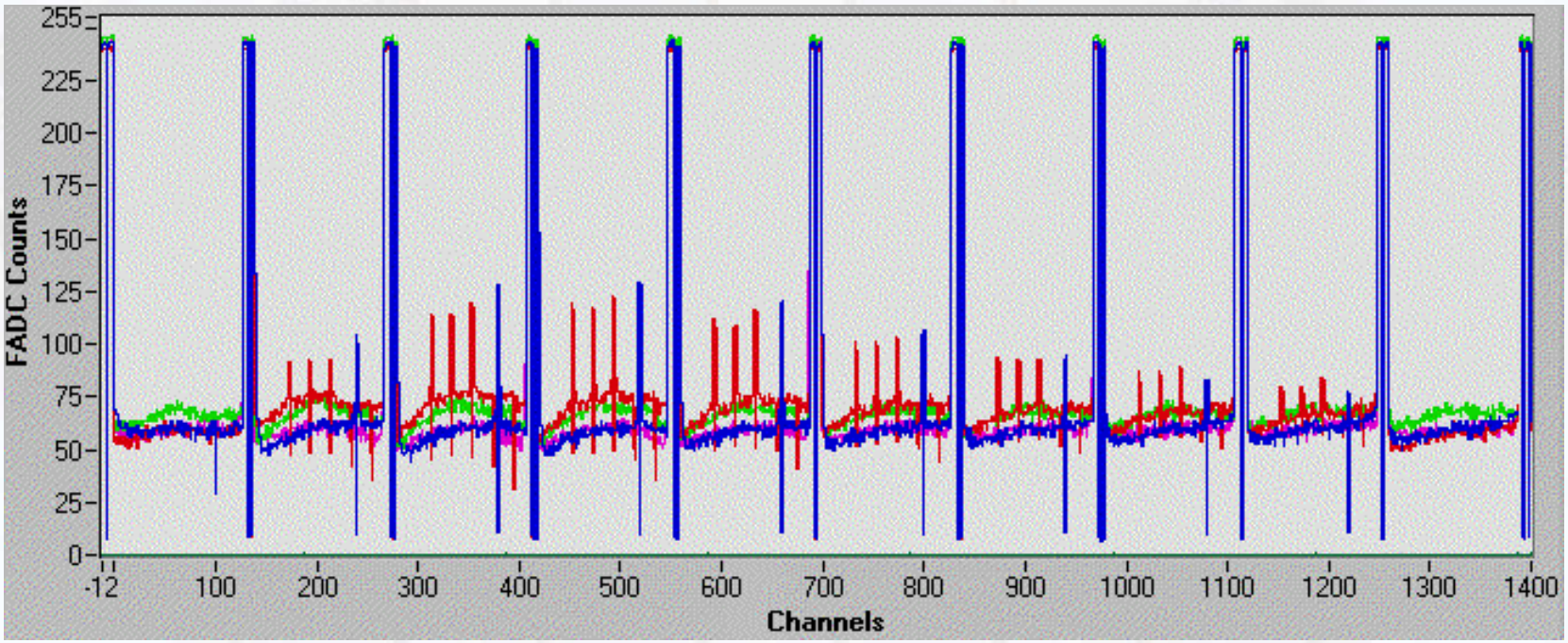
All measurements with TEC module 23 (1 open bond, 2 shorts, 3 pinholes)

Noise

- Old and new Frontend adaptor give the same results
  - Mean noise of a certain APV is idendical
  - Noise of healthy channels within statistical variations
  - With new FE adaptor smaller at module edges if carrier plate is grouded
- Small differences for faulty channels due to slightly different common mode

Backplane Pulse

- *Requires update of the ARC firmware*
- Signal of 2V volts is “put on the HV line“ (Rise time of some ns



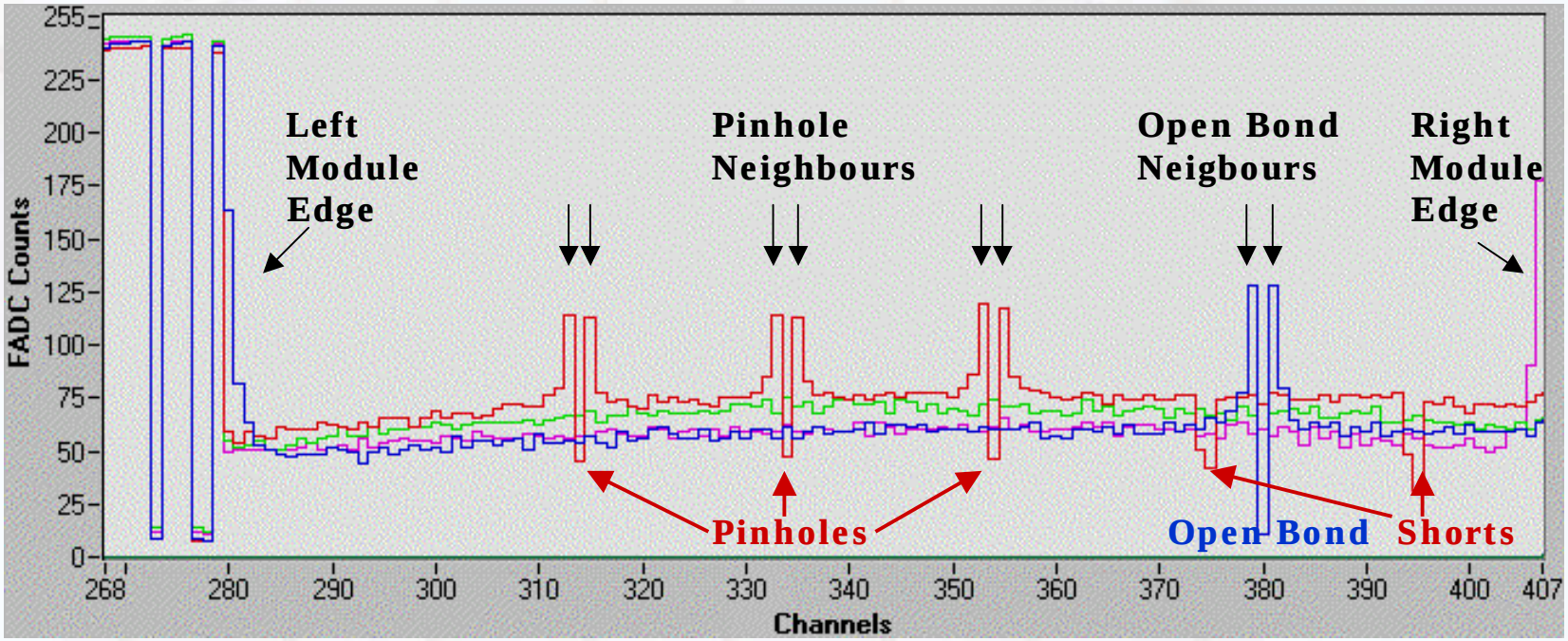
The picture shows the data of 10 consecutive pipeline entries representing the time evolution of the backplane pulse signal. The four different colours represent the four APVs.
(APVs in three sample mode, Trigger 00000010 01001001)

Backplane Pulse

Closer look on one frame:

⇨ All faults are obvious

fakes (obvious but OK)



real faults

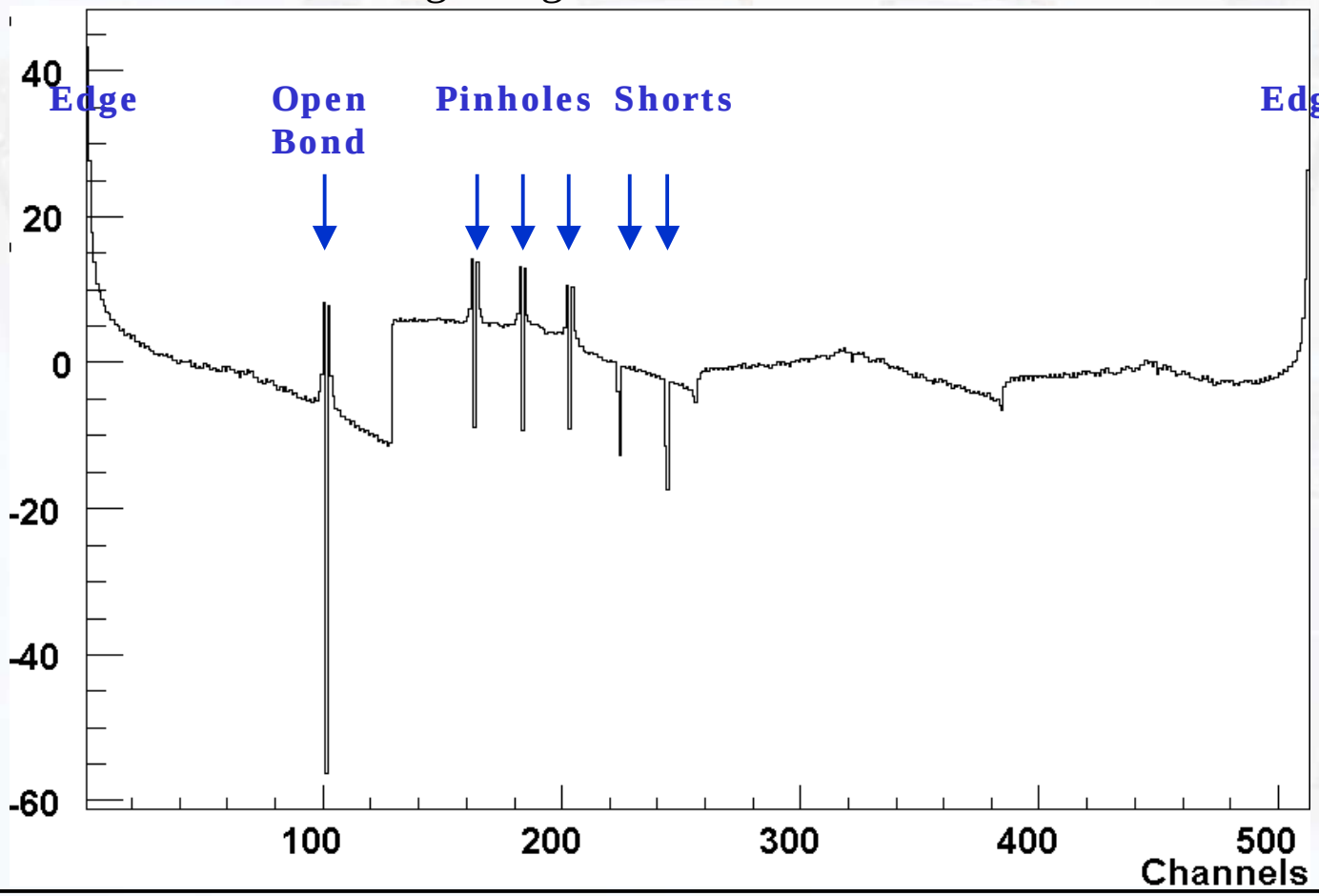
Faults have lower pedestal, fakes have higher pedestal

But will it always be that simple?

(APVMode : ???????)

Signature in Pedestal

- Measure difference of pedestals with and without backplane pulse
  - All faults can be found !
  - But huge edge effects



Plot shows
$Ped_{normal} - Ped_{backplane}$

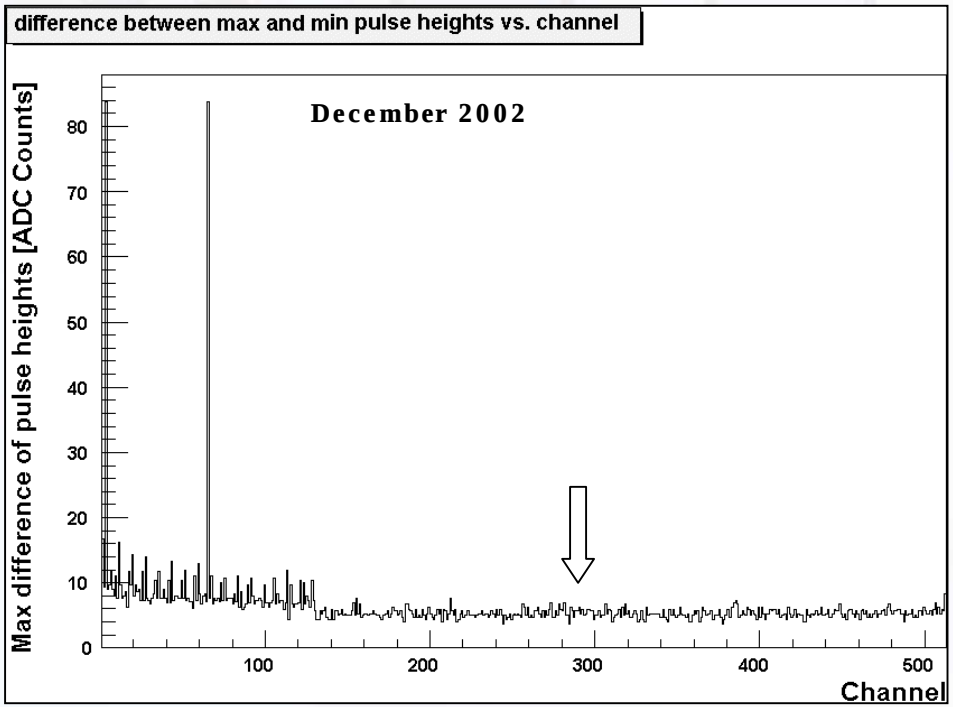
Measurement with
Deconvolution
Inverter on

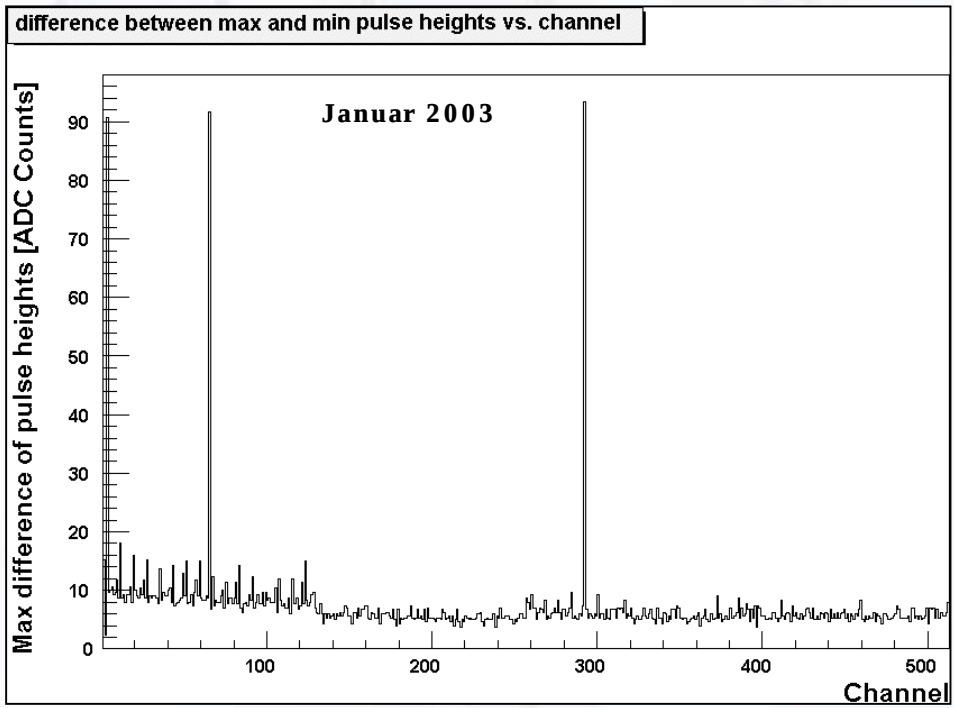
Summary

- Pinhole test finds pinholes
  - But does it harm the detector ?
- New ARCS release next week
  - Can generate DB compatible XML files
- New frontends are working and available

Oops ... a new pinhole

- Detected two new pinholes
  - Not a high leakage current pinhole
  - Channel has never been conspicious in the first test run

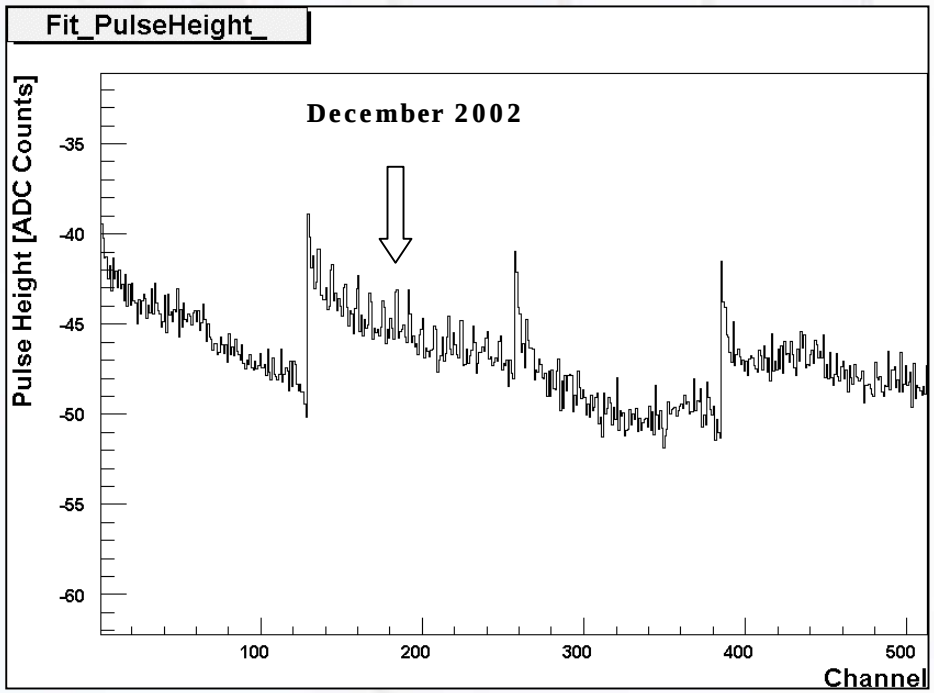


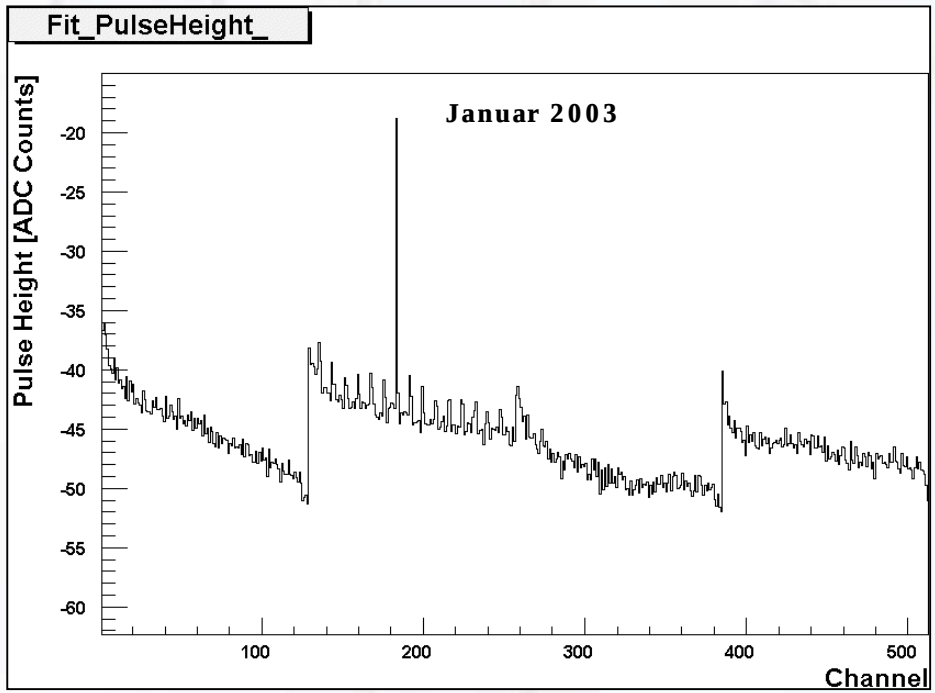


result of the pinhole test (Frame …643, Hybrid …101, channel 292 resp. 221)

Change of pinhole Behaviour

- was detected as a high leakage current pinhole
- Now behaves like a “normal” pinhole (conspicuous at low currents already)





fitted height of pulse shape in Dec. Mode / Inverter OFF (Frame … 642, Hybrid … 097, channel 183 resp. 330)