

ARC Software Status & Perspective

Module Test Meeting
CMS Week
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New Releases since Version 7.1



Last Report on ARCS Status was given on Version 7.1 which was released on 8th of April 2004.

Since then we had 3 new Releases:

1. ARCS 7.2alpha 8th June
2. ARCS 7.2 16th August
3. ARCS 7.2bugfix 20th August



Improvements since Version 7.1

Improvements since Version 7.1:

1. Fast Test

- Is configured by testsettings_*.xml
- Is stored in Root file
- Was completely new designed (sequence of tests and appearance)

2. XML Parser

- Was cleaned from Bugs
- Is now an Analysis Tool

3. X-Talk Test

- X-Talk in Calibration Run
- Very effective Tool to spot Shorts

4. Other Changes

- VPSP is set to 35
- And



The Fast Test

Configuration via XML: ArcsFastTestRunDescriptor

I2Cset	CDATA	"default"	I2C Settings to be used
apvdatatestnevents	CDATA	"50"	Number of Events where Header must be found
muxttestnevents	CDATA	"50"	Number of Events used for MUX Test
methodmedian	CDATA	"false"	Method used for Common Mode Correction
TBad	CDATA	"5.0"	Cut used in Noise and CM Calculation to skip Channel with RMS noise higher than TBAD*RMSavr
RMSmin	CDATA	"0.4"	Min and Max Noise Cuts to spot bad
RMSmax	CDATA	"2.3"	Channel and exclude them from Common Mode Correction
TSkip	CDATA	"4.0"	Check Channel with Signal larger than 4 times RMS Noise and exclude them from CM correction
PSkip	CDATA	"0.2"	Do not use Events where Fraction of Channel with Signal higher than TSkip is larger than PSkip
pednoinevents	CDATA	"500"	Number of Events for Pedestal & Noise Run
pednoimode	CDATA	"peakinvon"	Mode used during Pedestal and Noise Run

Configuration via XML: ArcsFastTestRunDescriptor

calnevents	CDATA "50"	Number of Events for Calibration Test
calcsel	CDATA "0"	Setting for APV CSEL Register
callat	CDATA "15"	Setting for APV Latency Register
calmips	CDATA "2"	APV ICAL Register is set to calmips*29
calmode	CDATA "peakinvon"	Mode used in Calibration Test
DCUnevents	CDATA "10"	Number of Measurements in DCU Test

Configuration via XML: ArcsFastTestCutDescriptor

```
LV_V125min          CDATA    "1.225"  Cuts for LV Test
...
LV_I250max          CDATA    "0.52"
PLLnurseuallowed   CDATA    "1"      Accepted Number of SEU Errors in PLL Test
(DigitalHeaderDiff and MUXdiff are adjusted if Number of MUXResistors changes!)
DigitalHeaderDiff  CDATA    "210"   Minimum Height of Digital Header
MUXdiff            CDATA    "4"     Tolerated Change of Digital Header Height
                in MUX Test (Number of Resistors fixed but
                different Resistors are switched on)

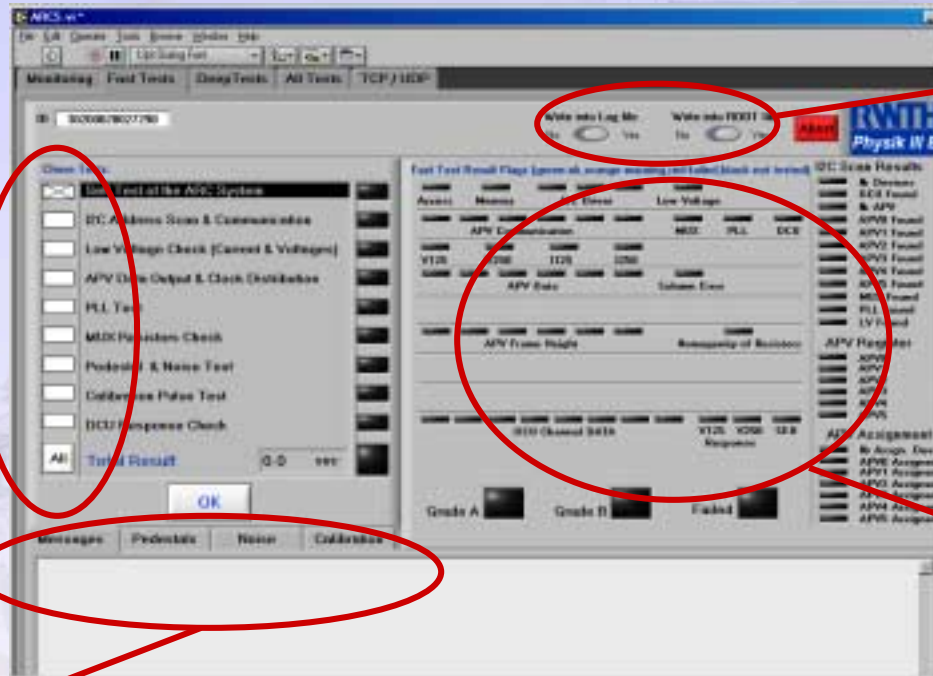
noisemin           CDATA    "0.5"   Absolute Cuts for bad Channel Detection in
noisemax           CDATA    "1.5"   Pedestal and Noise Run

calheightperccut   CDATA    "0.2"   Percentage Cut for Calibration Amplitude
Calheightabscut    CDATA    "20"    Absolute Cut for Calibration Amplitude

DCU_sitempmin      CDATA    "0"     DCU related Cuts
...
DCU_dcutempmax     CDATA    "2900"
DCUnurseuallowed   CDATA    "4"     Accepted Number of SEU Errors in PLL Test
```

New Design and Sequence of Tests

1. ARC Self Test is mandatory to ensure reliability of Fast Test
2. Sequence allows to better understanding of Errors



Data storage in root File, ASCII or both

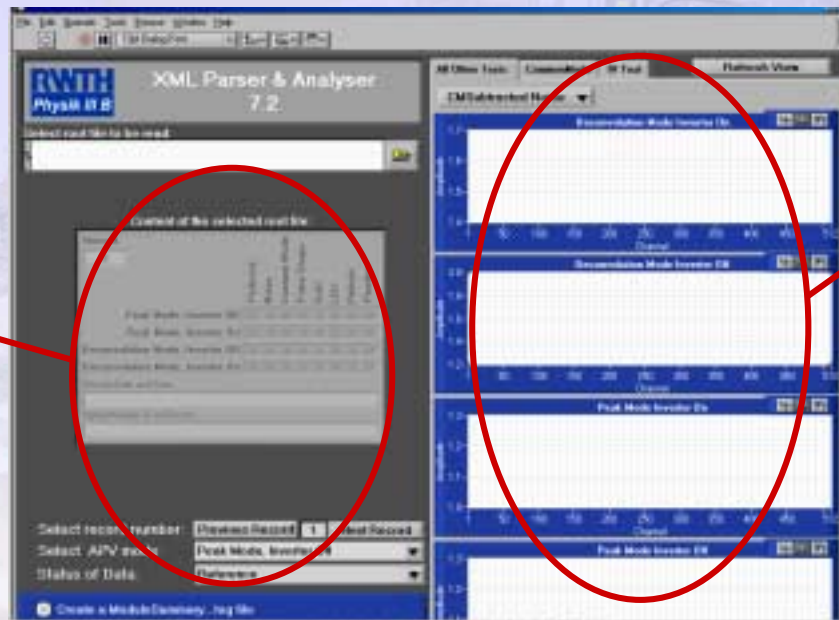
Indicators for all Tests (hope it's not too confusing)

Display of Messages, Pedestals, Raw Noise, CMS Noise, Calibration Amplitude

Other Changes:

- ASCII output documents every single Step during Tests
 - **Very useful to spot were exactly an Error occurred**
- Automatic change of Baseline during Calibration Test
 - **Identical with Test in Deep Analysis Part**
- Low Voltage check is done with DAQ switched off and also with DAQ switched on
 - **Only DAQ on Case is used to check Power Dissipation**
- X-Talk is also stored in Fast Test

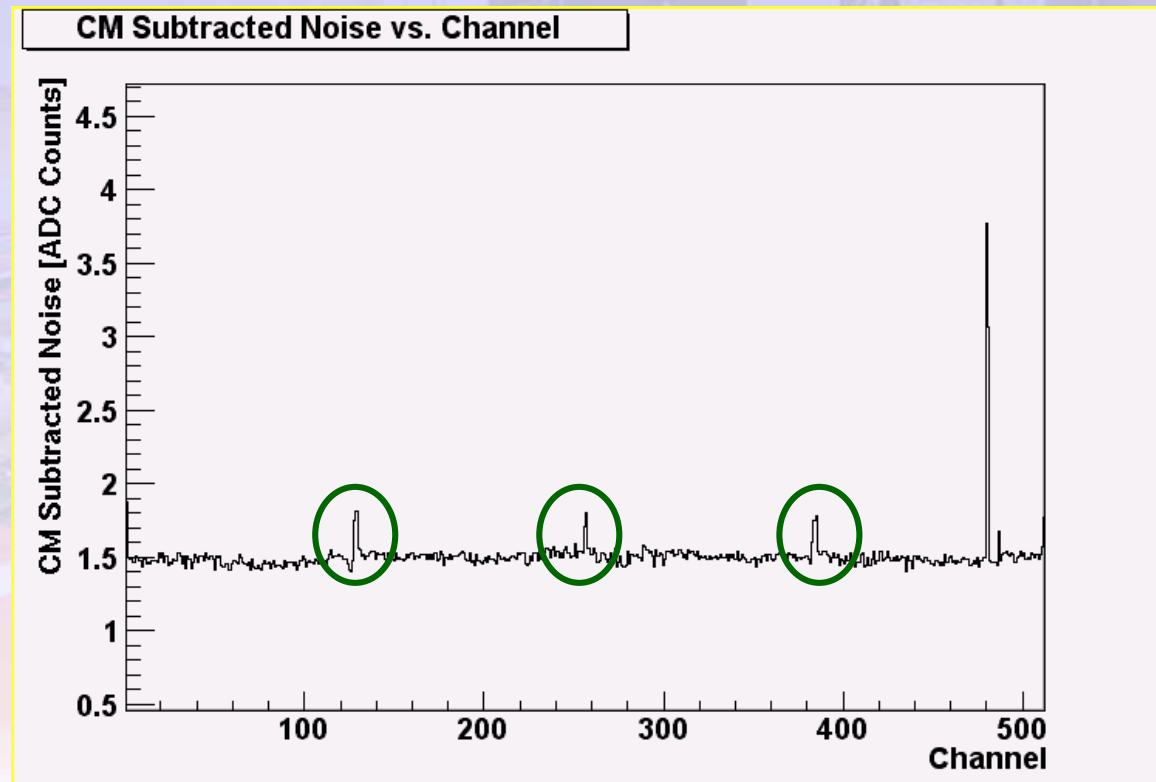
- XML Parser is not only just used for xml File Creation
- It runs an Analysis on Root File using the cuts of a given testsettings_*.xml File
 - Excellent Tool for Reanalysis of Data
 - Outputs also a Summary File (ASCII)
 - Fault finding Algorithm is identical to the one deccribed in CMS Internal Note hep.fi.infn.it/CMS/moduletest/note/in0418.pdf



Choose Root File
and Record

1. Chose Test Type
2. Display Content of
Root File

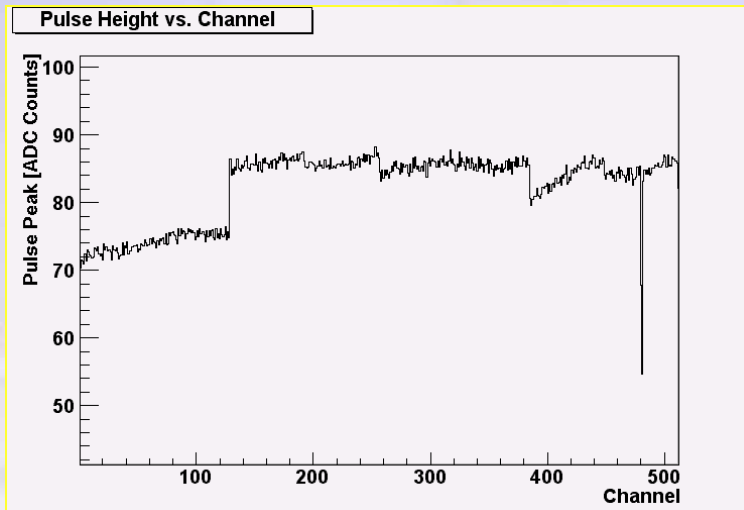
- Is available as a standalone Tool
- New Flag „absAPVEdgeNoisy“ used to prevent strips of APV edges to be flagged as noisy



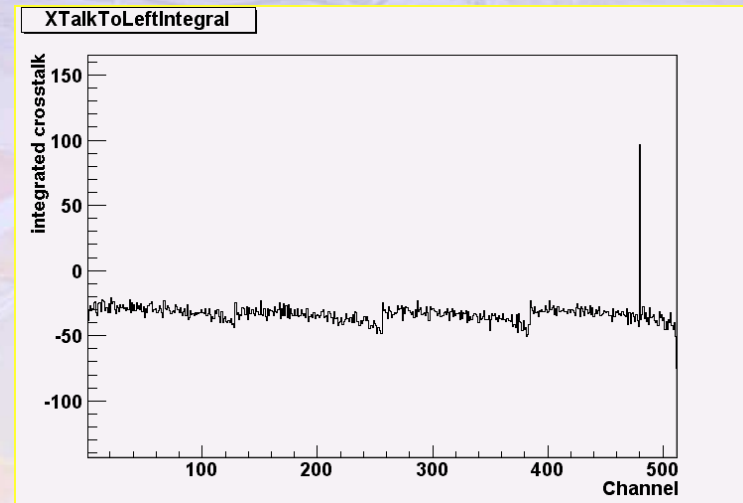
Check Response of neighbouring and overnext Channel using the APV internal Calibration Unit during Calibration Test.

Very nice Tool to find Shorts:

Pulse Height

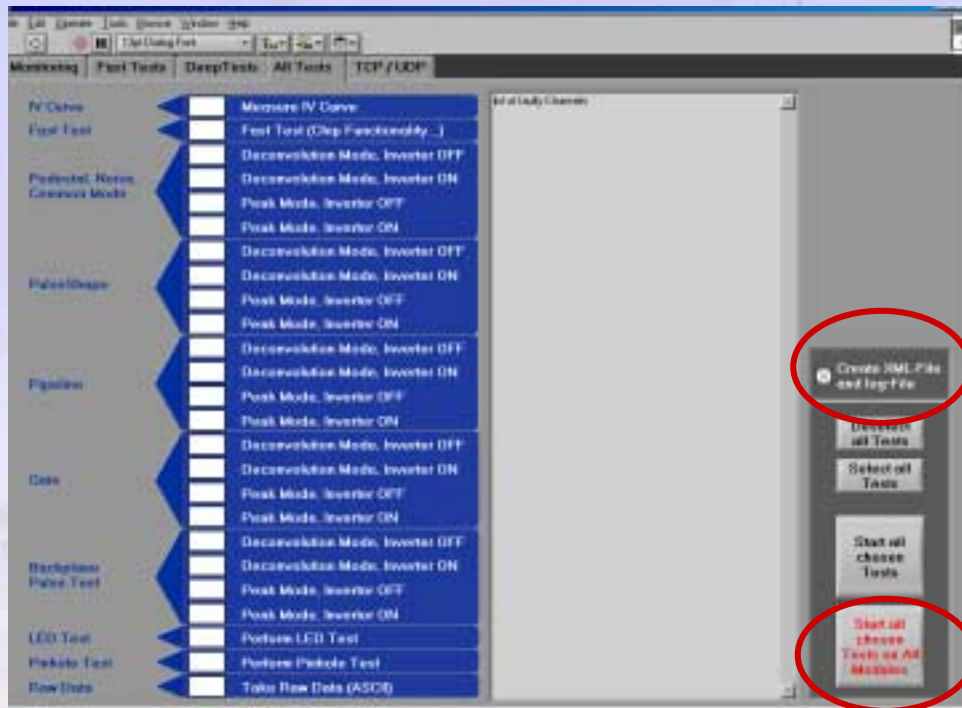


X Talk to left Neighbour



- Since ARCS 7.2 the Initialisation routine copes with ARC Boards with old and new Firmware
 - Firmware update of all ARC Boards is not mandatory
- I2C Self Healing
 - In case of I2C problems at the beginning of a test the settings are loaded again after a Power off/on, Reset and Reassign Procedure
 - If this does not help the Test is suspended after 20 Tries
- HV Ramp Speed
 - Additional Setting in `arcs_main_config.cfg` called `_HV_ramp` is used to influence the Ramp Speed of HV
 - Very useful for old PCs where a small Value can decrease Test Time a lot
 - After a Discussion with Manfred Kramer we decided that this is useful to reduce Time for Tests without doing a Harm to the Sensors (Ramp Down is twice as fast as Ramp Up)

Changes on the All Tests Panel



Automated Creation of XML and Log File

Start Test on all initialised Modules:

1. Nice Feature for People who like to test 2 or more Modules in one go
2. Is used in Aachen LT Teststation



Known Bugs & Missing Features



1. Adaption of Cut for Digital Header Height is not implemented correctly in Fast Test
 - Test will fail if an additional MUX Resistor is switched on
2. Root File Creation does not work correctly
 - Root File is corrupt if a certain Sequence of Tests is done
 - Has to be solved before the Usage of ARCS 7.2 is recommended for Production
3. Fast Test Data is not taken over into XML File yet
4. PLL Test has to be implemented in Fast Test

- Would like to freeze the next version of ARCS as final Verison
- Later just Bugfixes if necessary
- Date of Release of „Final Version“ is presently unknown because Bug in root File Creation could not be found yet