



TEC Module Quality and ARC Testing

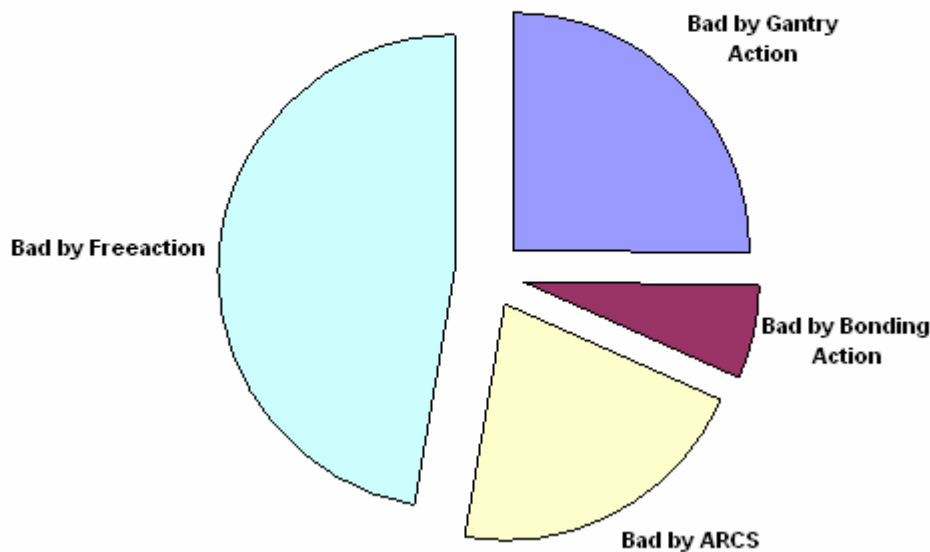
CMS Week October 05
Module Test Meeting

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*Marko Dragicevic

Modules are set faulty in the TrackerDB because...



Distribution of Faulty Modules (from TrackerDB)
Total Number of faulty Moduls: 207



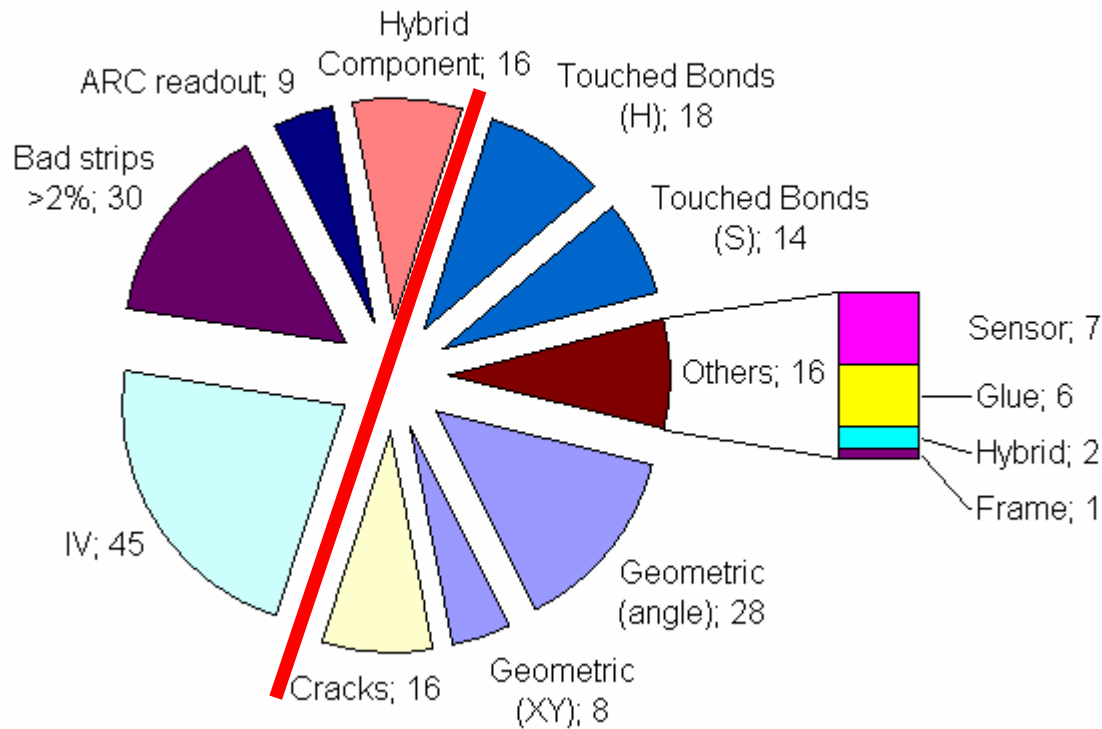
- Most Modules are set to “*faulty*” by a *Special action*
- Reason for the faultyness is obscured
- Vienna made an effort to better understand these problems

See also: Stephan Hänsel, CMS Week September 05, TEC meeting, “Module Production Yield and Analysis of faulty modules”

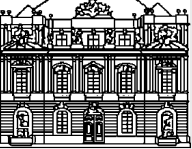
Distribution of Problems



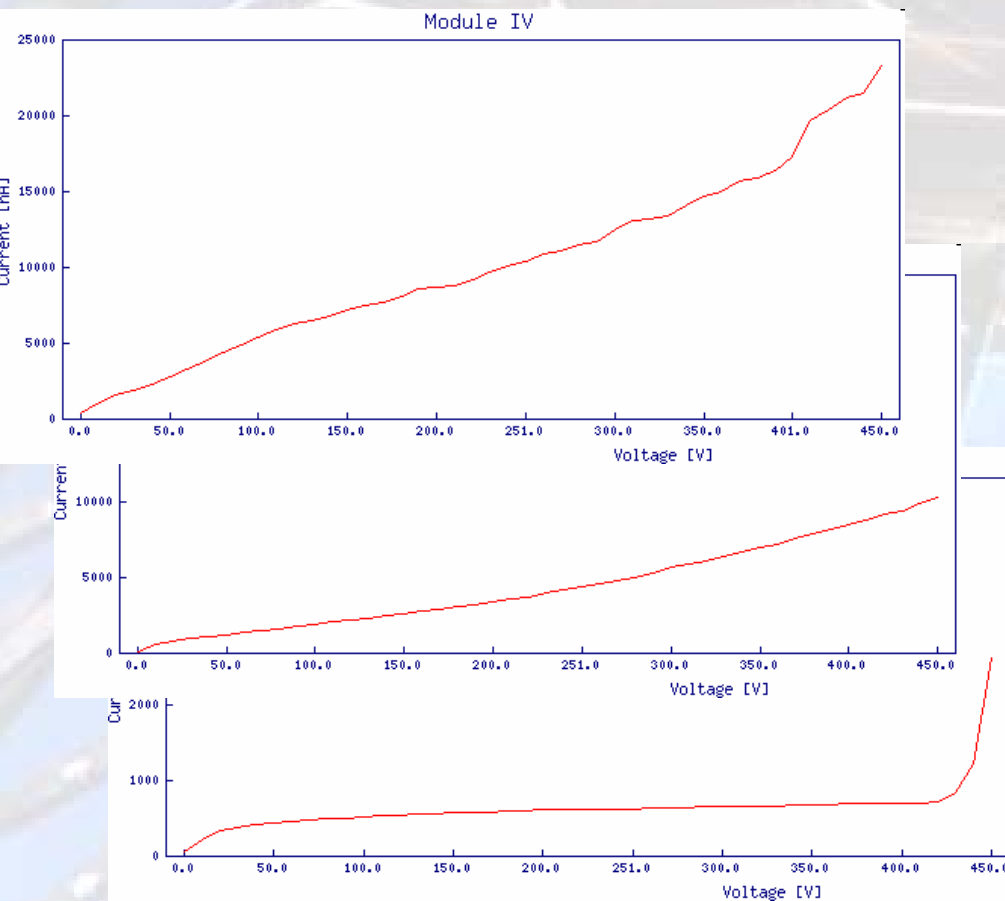
Distribution of Problems (from localDB)



- Most Problems should be recognized by ARCS
- Some problems may also be related to wrong storage of the sensor (humidity – IV)
- Communication problems between the ARC Board and the Hybrid may encourage wrong test results (too many bad strips, readout problems)



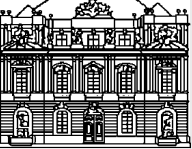
IV Problems (HPK Sensors)



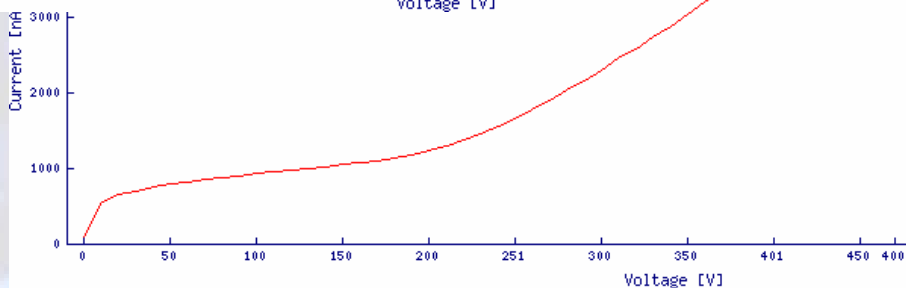
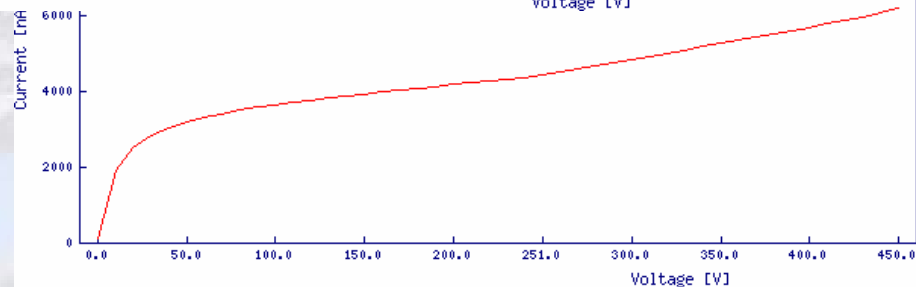
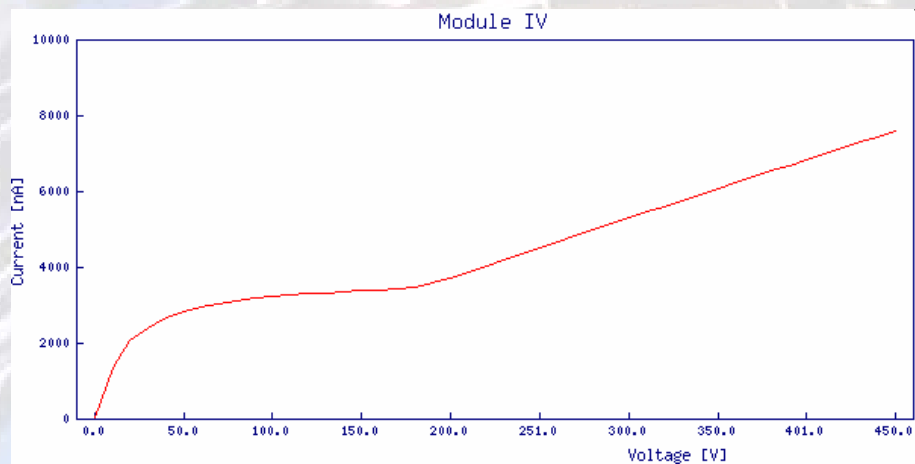
Whenever you see IV curves like that on a Module with HPK Sensors:

1. Suspect it to be a humidity problem
→ Put it in a dry environment (10% - 15%) for at least 48h.
2. Retest it
3. If the IV is still bad, take care to do the right TrackerDB action, see next slides.
4. Send it to Vienna. If you do not have the time to do the drying and the retests, you can send them directly to Vienna.

Note: Alignment Sensors are exceedingly sensitive on humidity!



IV Problems (STM Sensors)



Whenever you see IV curves like that on a Module with STM Sensors:

1. **Don't be scared!** Remember: STM Sensor easily draw **a few μA per Sensor**. On a two Sensor Module the cut is $20 \mu\text{A}$.
2. Follow the same procedures as with HPK Sensors

IV Problems and TrackerDB



TrackerDB action:

If a module shows a bad IV after all efforts:

- Upload the *.XML* file from the last bad ARCS test. This should set the Module automatically to “faulty” with the right flag.
(modulebasic_val = :-2:)
- If you do not have an *.XML* file from the ARCS test, set it to “faulty” with a *Special action*.
(BigBrowser: Workstations/Special action).
→ Provide a descriptive comment!
E.g.: “IV Breakthrough at 270V. Several days in dry environment (~10%), ARC tested several times.”
- Email Vienna and send the module there at the next possible opportunity.
(Don’t forget to issue the *Transfer* in the TrackerDB)

Readout Problems



Sometimes ARCS is not able to establish stable readout from the hybrid

- This may already screw the initialisation phase of ARCS
- Individual hybrid components may fail during the “Fast Test”
- It is also possible, that only a single APV is affected → may result in 128 bad channels on the concerned APV!

TrackerDB action:

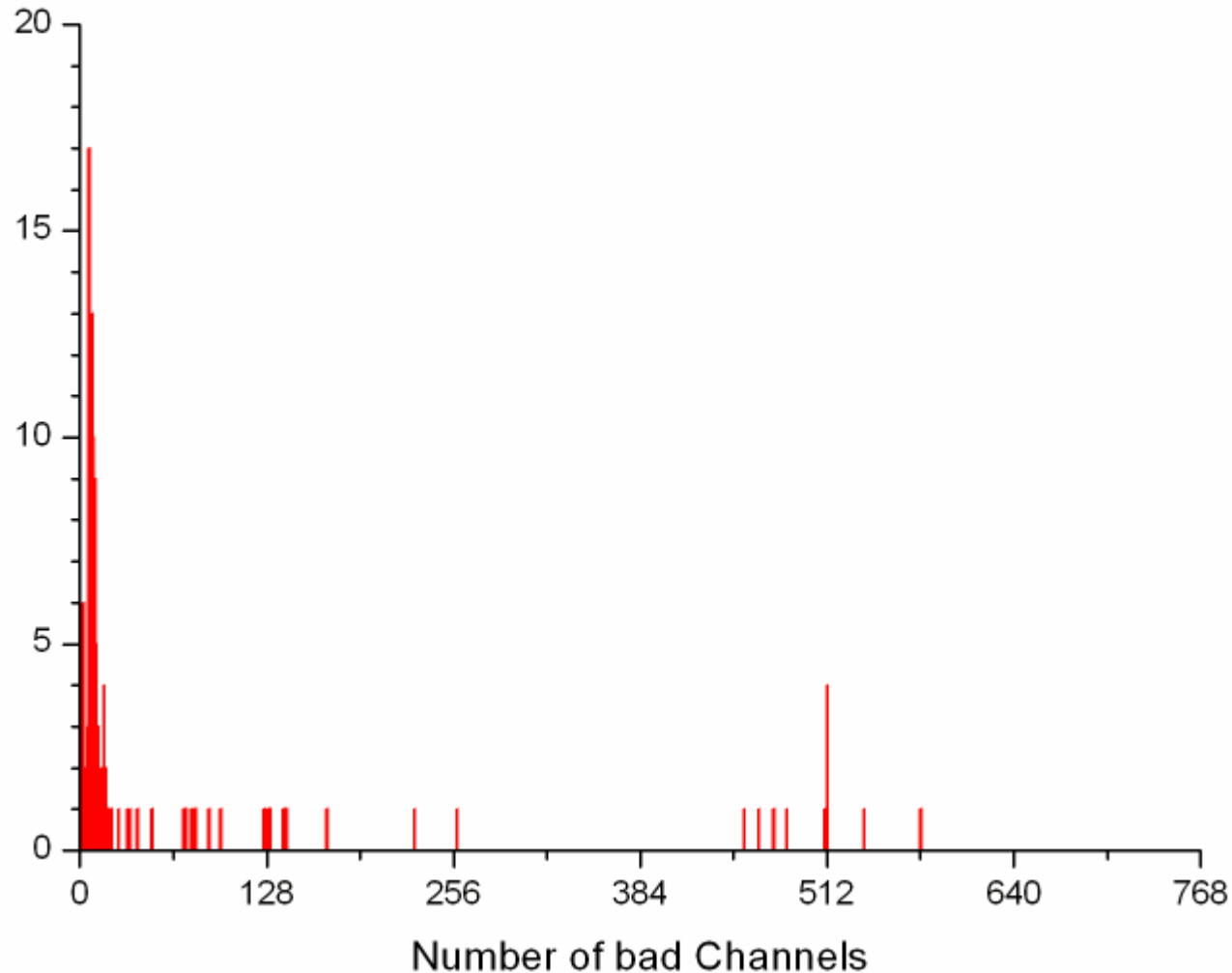
If your are experiencing readout problems:

- If possible, try to use a different ARC setup.
- Upload the *.XML* file from the last bad ARCS test. This should set the Module automatically to “faulty” with the right flag.
(`modulebasic_val = :-8:`)
- If the problem persists, set the module to “*faulty*” in the TrackerDB and provide a verbose comment.
→E.g.: “No readout with ARCS. Tested several times on 2 different setups”
- File in a report in Salvatores *Failure Report Interface*
<http://cms.ct.infn.it/failures/>
- Send the module to AACHEN-REPAIR

Number of Bad Channels



Number of "bad channels" for modules which failed the ARCS Test



Why?...



...is it so important to keep information in TrackerDB up-to-date?

We have to assess the amount of spare parts to place reorders **NOW!**

For each Module we have to decide **NOW!** if it is good for the Tracker (“*valid*”) or not (“*faulty*”).

So AACHEN-REPAIR (and VIENNA for IVs) is the latest possible place where this decision **must be made**.

We cannot afford to lose modules because they are kept at an Institute for dubious reasons.

In the end it may still be necessary to go back to the faulty modules and **select the best ones** to be put in the Tracker for the lack of “*valid*” ones.

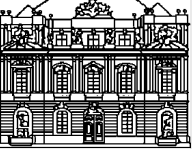
Selecting the best of the “*faulty*” modules can only be done, if the data in the TrackerDB is **valid** and **verbose**.

How?



TrackerDB action:

1. Try to assess the reason for a bad ARC result.
E.g.: could it be a humidity related problem? A readout problem? Wrong cuts?
2. Try to remedy this problem, but don't invest too much effort.
E.g.: Dry up the module. Use a different ARC setup. Use the appropriate cuts.
3. If the problem persists, take care to set the module "*faulty*"! If the ARCS test produced a valid XML file, (with a "*faulty*" result) uploading it will take care of that automatically.
4. If you do not have a XML file from the ARCS test use the *Special Action* of the BigBrowser and provide a verbose description of the problem in the comment field.
5. If it is an IV Problem, send the module to Vienna (short notice via email would be nice).
6. Any other problem, file in a report at <http://cms.ct.infn.it/failures/> and send the module too AACHEN-REPAIR.



Reminders!



Known problem(s) : 7: Cracks in positioning holes

Selection criteria and showing properties

Center: * [dropdown] Last action: * [dropdown] Show: obj. count obj. IDs obj. history

Position: * [dropdown] Faulty: * [dropdown]

Known Problems

All Without known problem With known problem Concerned by: [dropdown: Bad 2D label position]

Composite status: complete Assembly status: NOT assembled

OBJECT_ID	CENTER	LASTACTION	POSITION	FAULTY	WHEN
30200020016502	AACHEN-3B	shipping	ready	valid	2005-01-27 17:13:16.0
30200020016502	AACHEN-3B	MODVALIDATION	ready	valid	2005-06-15 09:54:40.0
30200020016502	AACHEN-3B	CHANGEID	ready	valid	2005-07-09 06:45:39.0
30200020016502	AACHEN-3B	FAILURES	running	valid	2005-07-12 16:17:57.0
30200020016502	COURIER	FAILURES	shipping	valid	2005-07-25 19:59:37.0
30200020016502	AACHEN-REPAIR	shipping	ready	valid	2005-07-25 20:00:22.0
30200020016502	AACHEN-REPAIR	FAILURES	ready	valid	2005-07-28 15:36:52.0
30200020016502	AACHEN-REPAIR	FREEACTION	faulty	faulty	2005-10-12 12:49:09.0

ready
connected to production DB

How to check the status of a Module:

1. Use *BigBrowser: Production Status/Inventory*.
2. Enter the Barcode of the Module.
3. Scroll down the list to the last entry.
4. The last entry in the FAULTY column is the actual status of the module!

Remember: Just uploading a "valid" ARC Test will not automatically set the module to "valid". A "faulty" module stays faulty unless you do a *Repair Action*.
(BigBrowser/Workstations/Repair Object)

➔ Upload the new "valid" test result, then do the *Repair Action*.

...and Then?



VIENNA and AACHEN-REPAIR will test the modules and decide for each one an appropriate action:

- Apparently good modules will be set back to “*valid*” and sent to the next PIC Center.
- Repairable modules will be treated immediately (Drying, Sensor recuperation, ...) and then set back to “*valid*” and sent to the next PIC Center
 - ➔ Time consuming repair actions will be done when “*valid*” modules are not available anymore.
- Only modules past recovery will stay at “*faulty*” and will never be used for the Tracker.