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Noise studies using redundancy with the system test setup

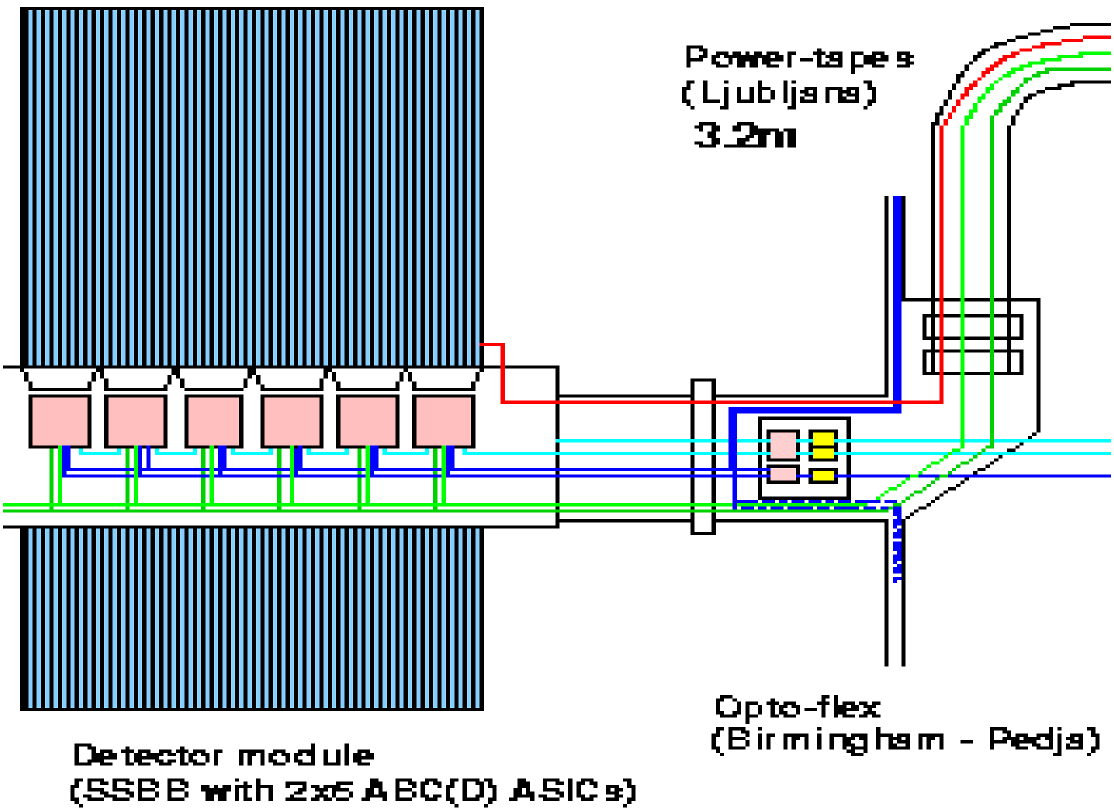
- Purpose of study
- Setup for measurements
- Run settings and results
- Conclusions

SCT week – September 1999

Purpose of study

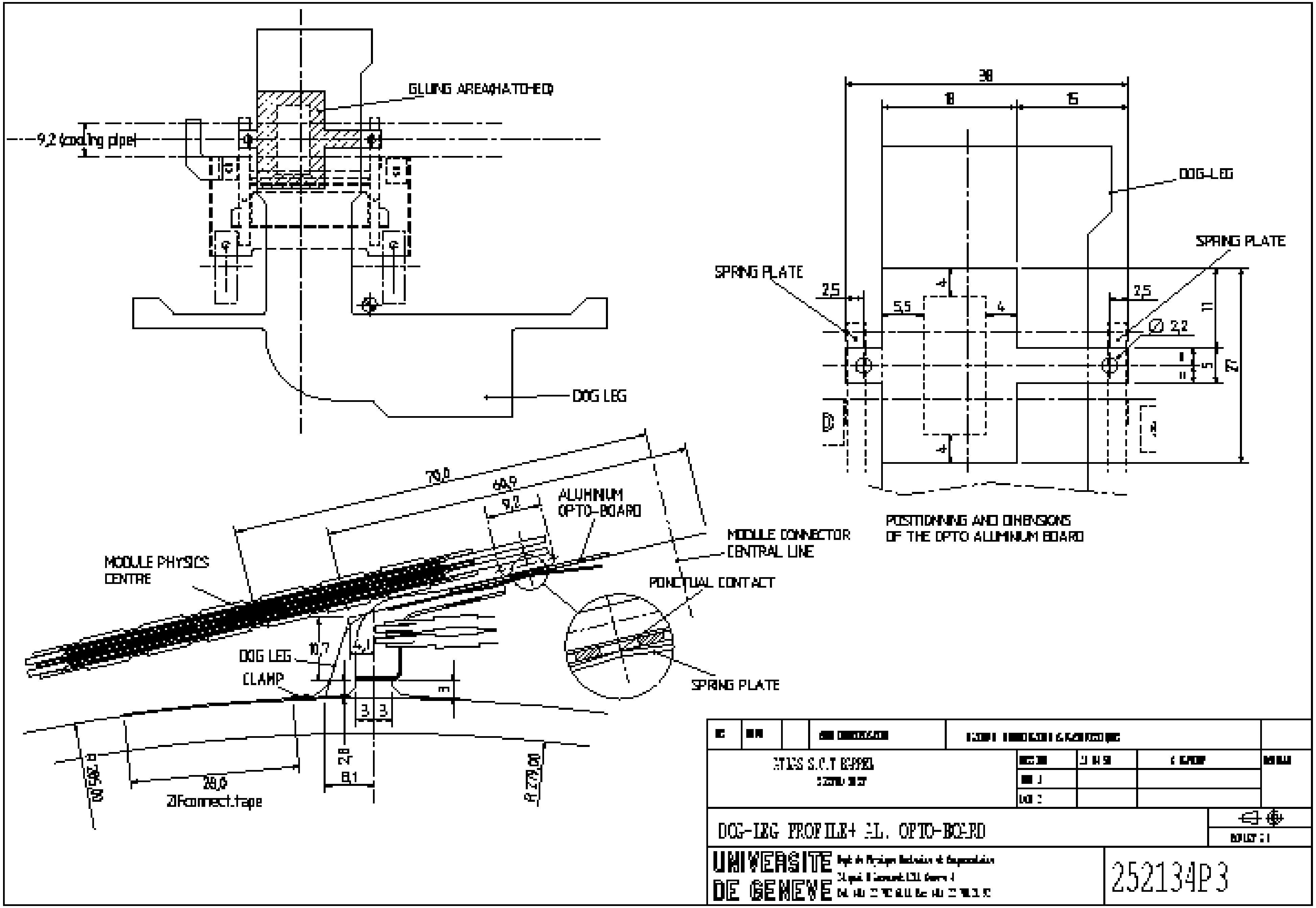
Redundancy implies the capability of using the clock and command signals provided by the adjacent module

Redundant clock and command signals are provi–ded by adjacent module via dogleg extension



Lines running underneath of the sensors

➢ transmission of signals through those lines may have an impact on the output noise


GLUING AREA(HATCHED)
9,2 (cooling pipe)
DOG LEG
30
18
15
DOG-LEG
SPRING PLATE
2,5
5,5
4
Ø 2,2
11
5
27
POSITIONNING AND DIMENSIONS
OF THE OPTO ALUMINIUM BOARD
70,0
60,9
9,2
ALUMINIUM
OPTO-BOARD
MODULE CONNECTOR
CENTRAL LINE
MODULE PHYSICS
CENTRE
PONCTUAL CONTACT
10,7
4,1
DOG LEG
CLAMP
3
2,8
8,1
28,0
ZIFconnect.tape
R 279,00
DOG-LEG PROFILE+ AL. OPTO-BOARD
UNIVERSITE
DE GENEVE
252134P3

Setup for measurements

The setup in building 186 allows to study detectors using optical links

Our tests were performed with the help of a single sided module where the 6 ABCD2 chips had been bonded to 12 cm strips

To simplify our setup we used a loopback device ⇨ small PCB that allows to send back clock and command through output lines for testing purposes

The loopback is attached to a dogleg so that it provides also redundant signals

Both devices were mounted on the c/f structure built for system test studies at B186

Run settings and results

3 different conditions were used to take the data :

- ☛Module using clock and commands provided by own DORIC. Loopback powered off

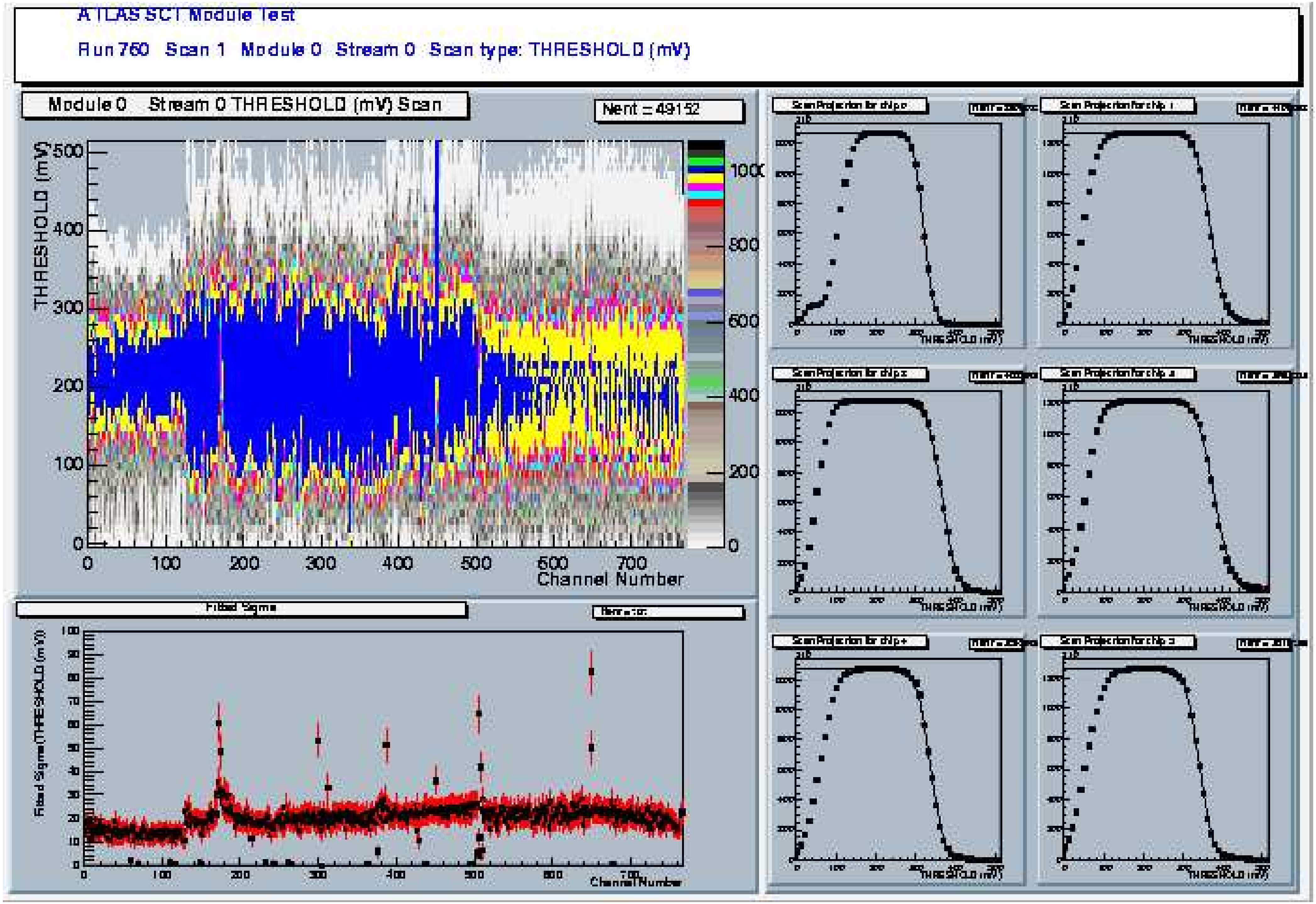
- ☛Module using clock and commands provided by own DORIC. Loopback powered on

- ☛Module using redundant clock and commands provided by loopback's DORIC

5 threshold scans were taken for each of the described conditions

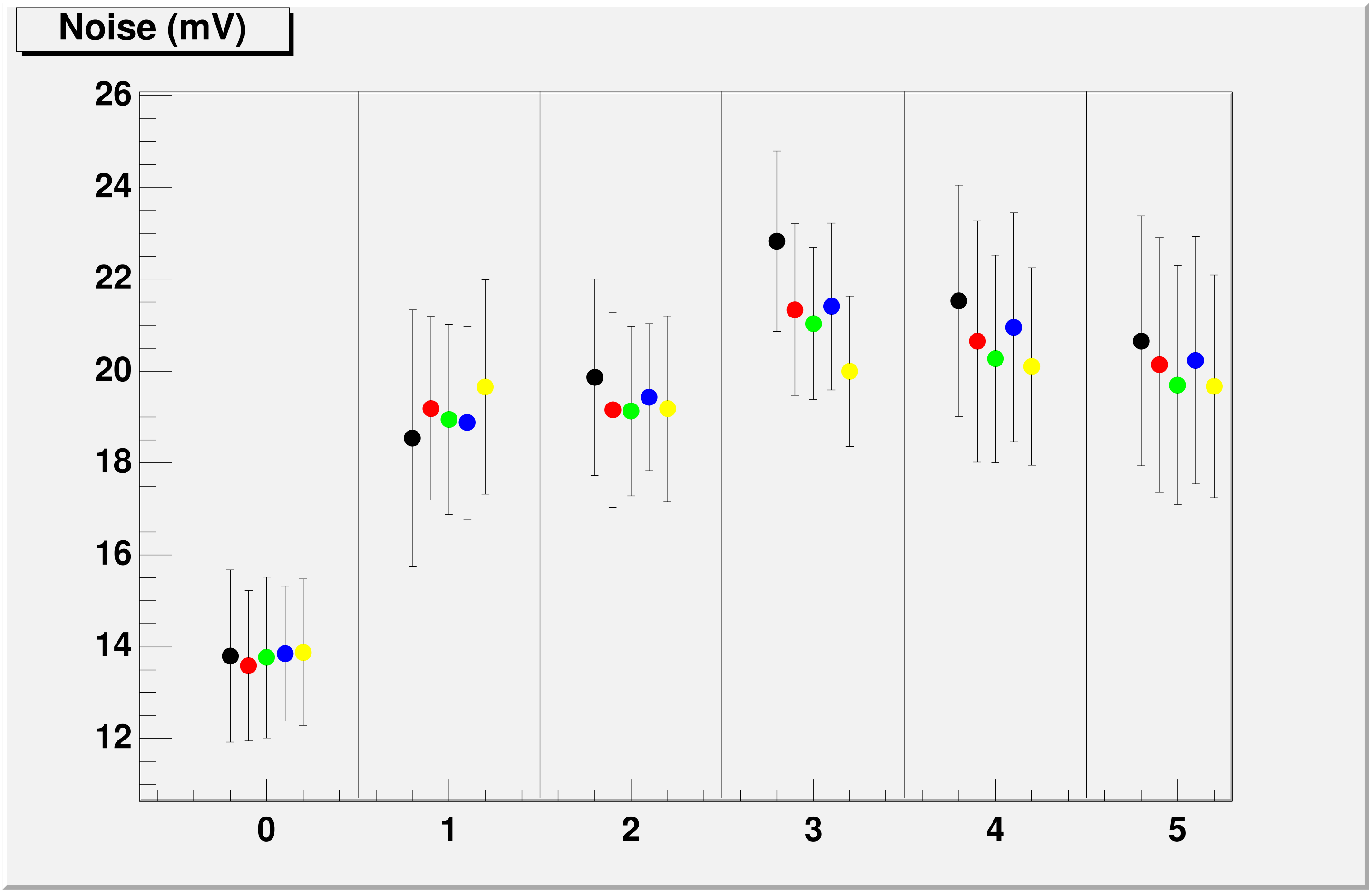
The chips were operated in the low gain region
⇨ 60/70 mV per fC

Detector was biased to 100V

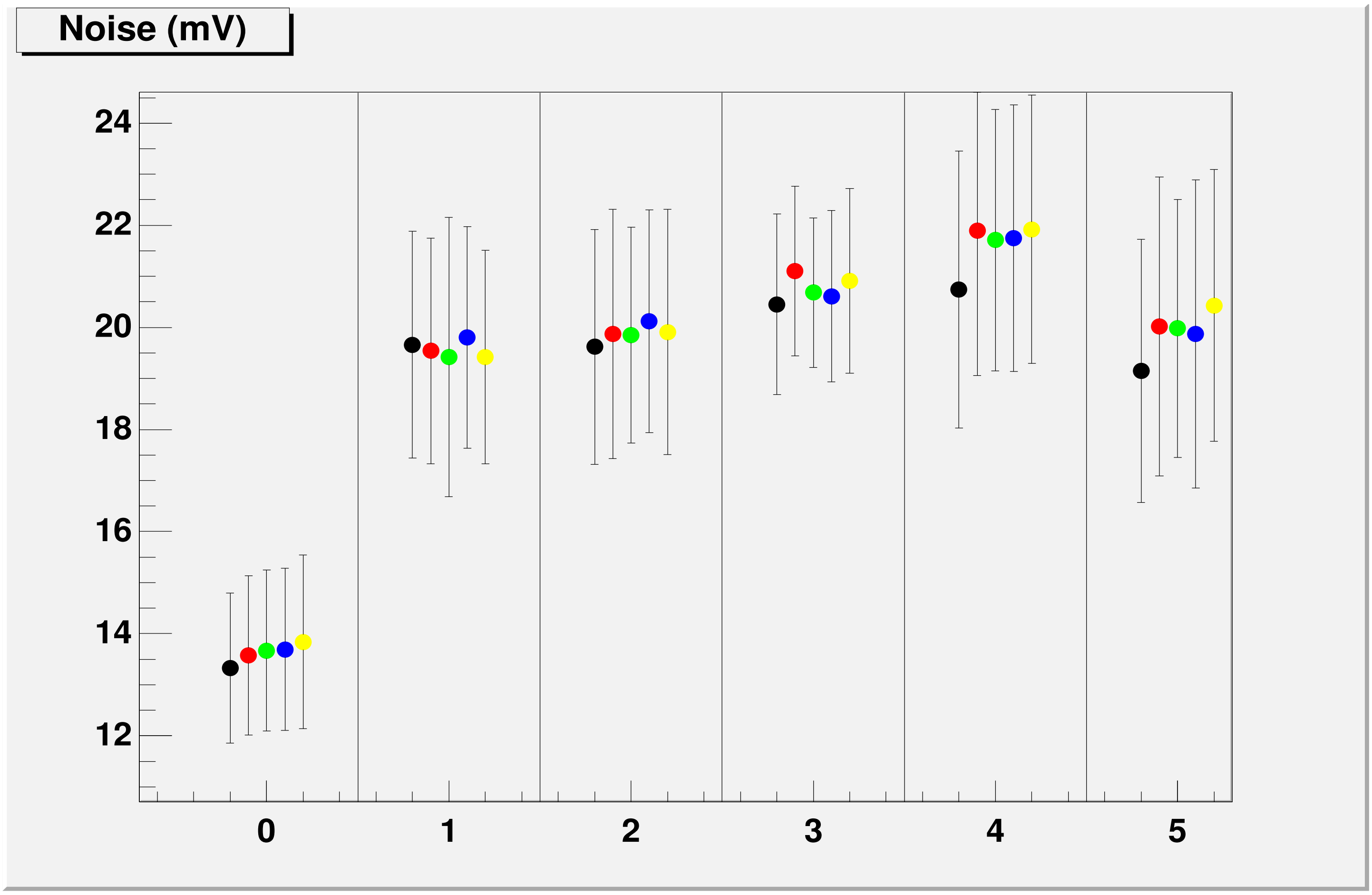


ATLAS SCT Module Test
Run 760 Scan 1 Module 0 Stream 0 Scan type: THRESHOLD (mV)
Module 0 Stream 0 THRESHOLD (mV) Scan
Nent = 49152
THRESHOLD (mV)
Channel Number
Fitted Sigma
Fitted Sigma(THRESHOLD (mV))
Channel Number

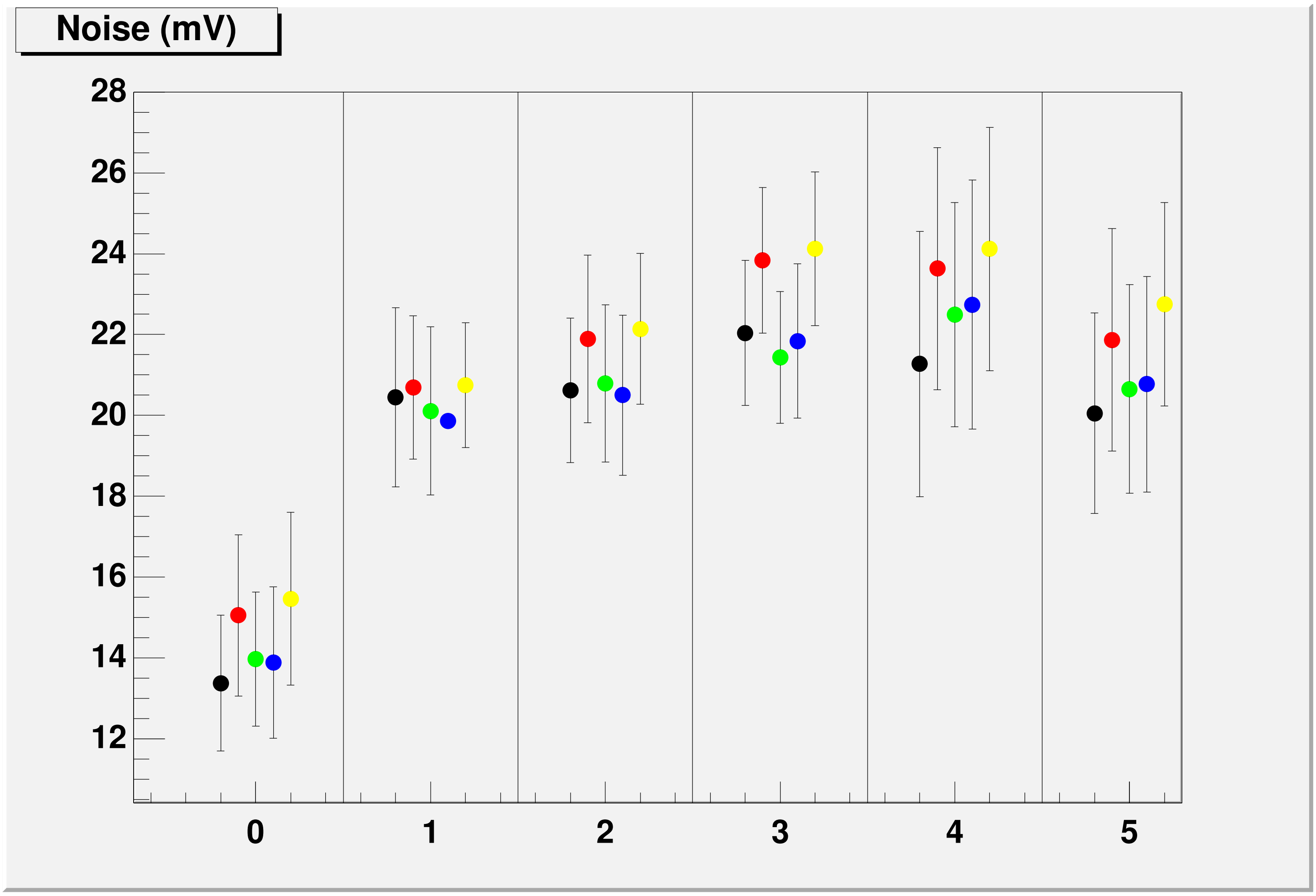
Own clock+command; loopback powered off



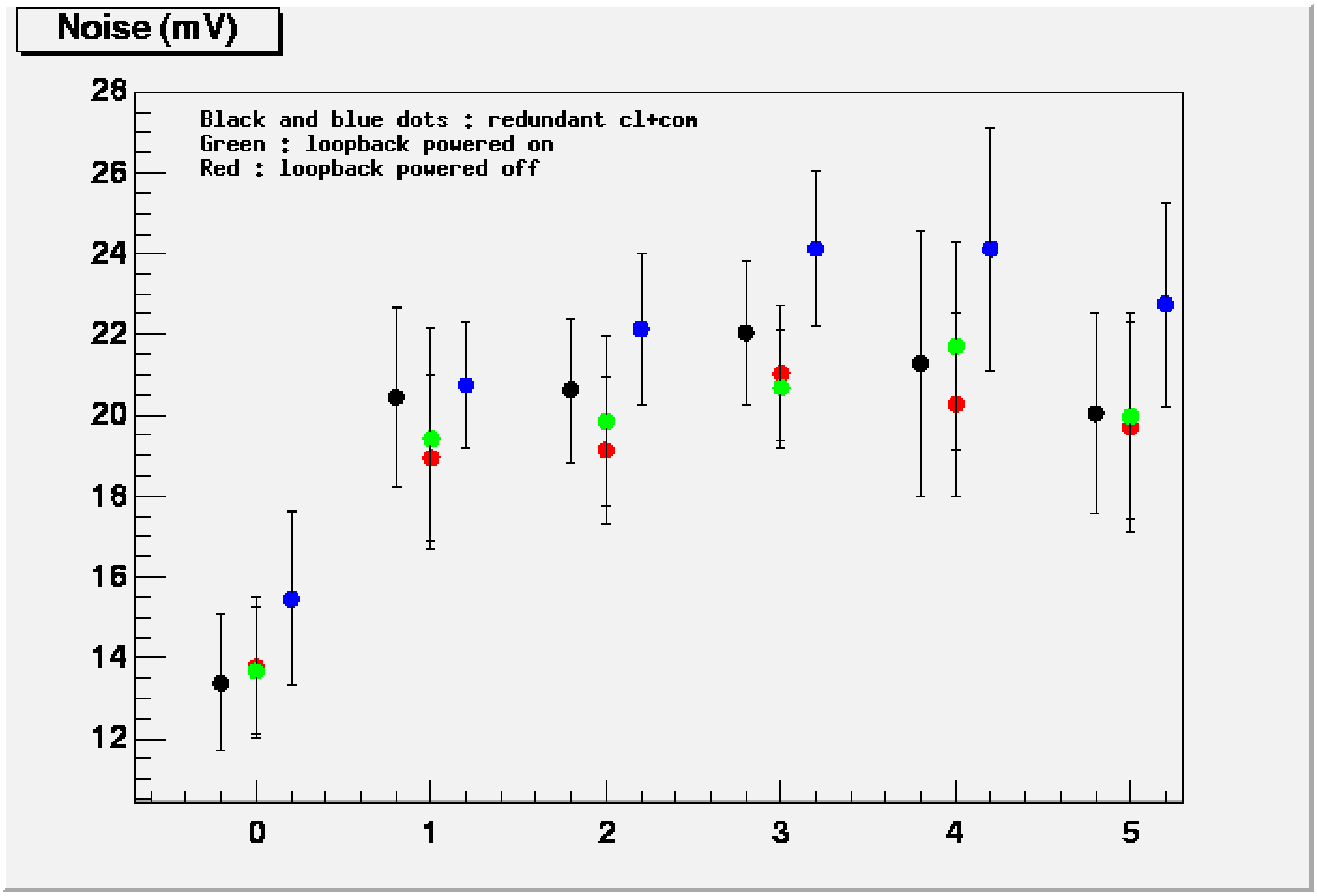
Own clock+command; loopback powered on



Redundant clock+command



Comparison for runs taken at different conditions



Conclusions

- There is a noticeable variation from run to run that is of the same order as the effect that we observe for runs at different conditions

- There is a tendency towards higher noise using redundancy but it's only evident in 2 out of 5 runs

- Nevertheless, the noise increase, if at all present, wouldn't contribute more than an additional 5/10% increase

- It will require further study with new chips and a double sided module