

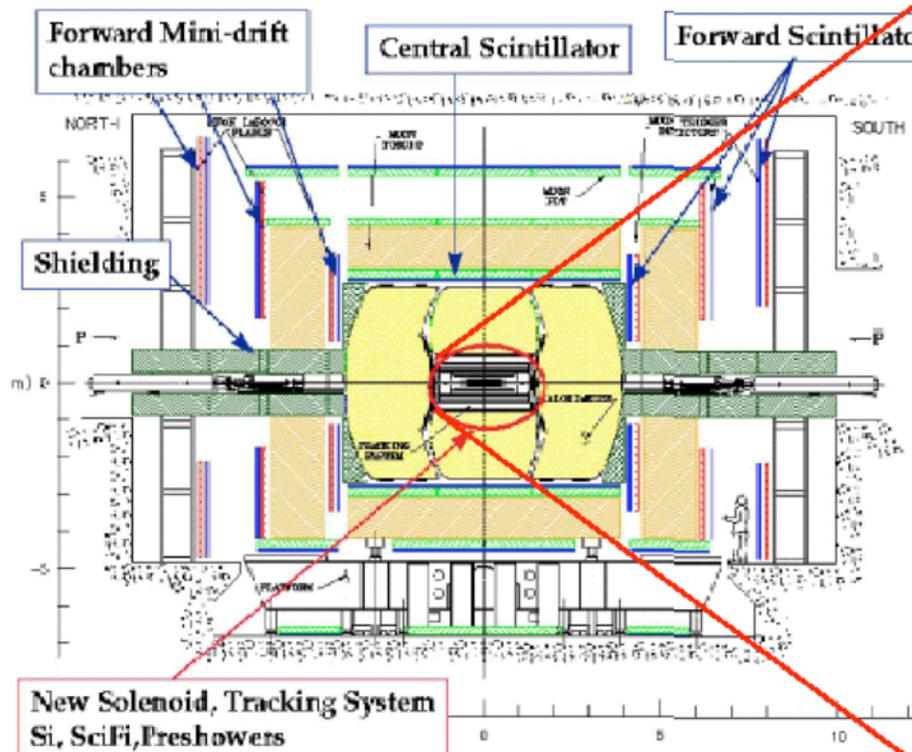
Troubleshooting Guide and Sensor measurements

Guillermo López Hinojosa
August 8, 2004

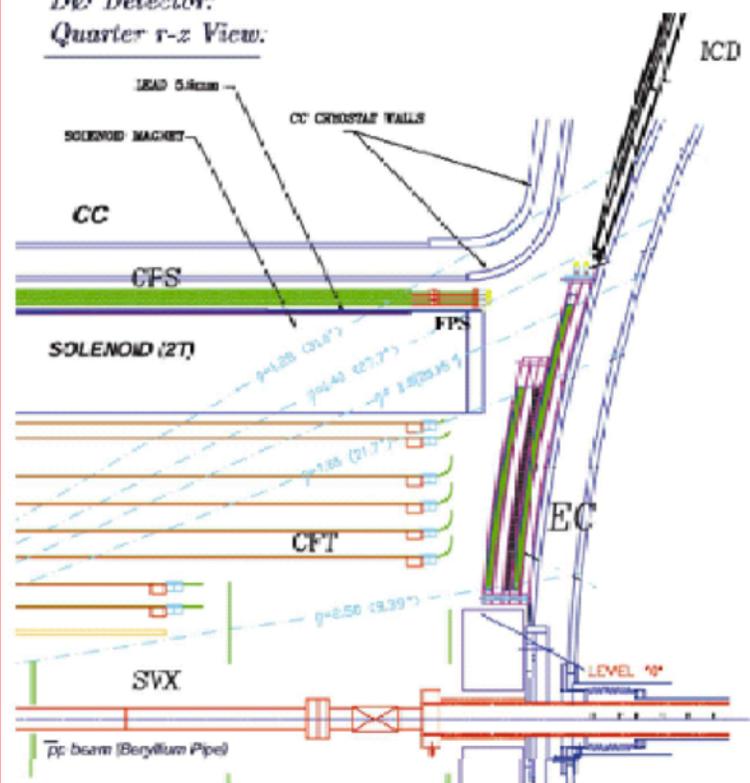
D0 is an international collaboration of university scientists and students from 19 nations who operate one of the two main detectors in Fermilab.



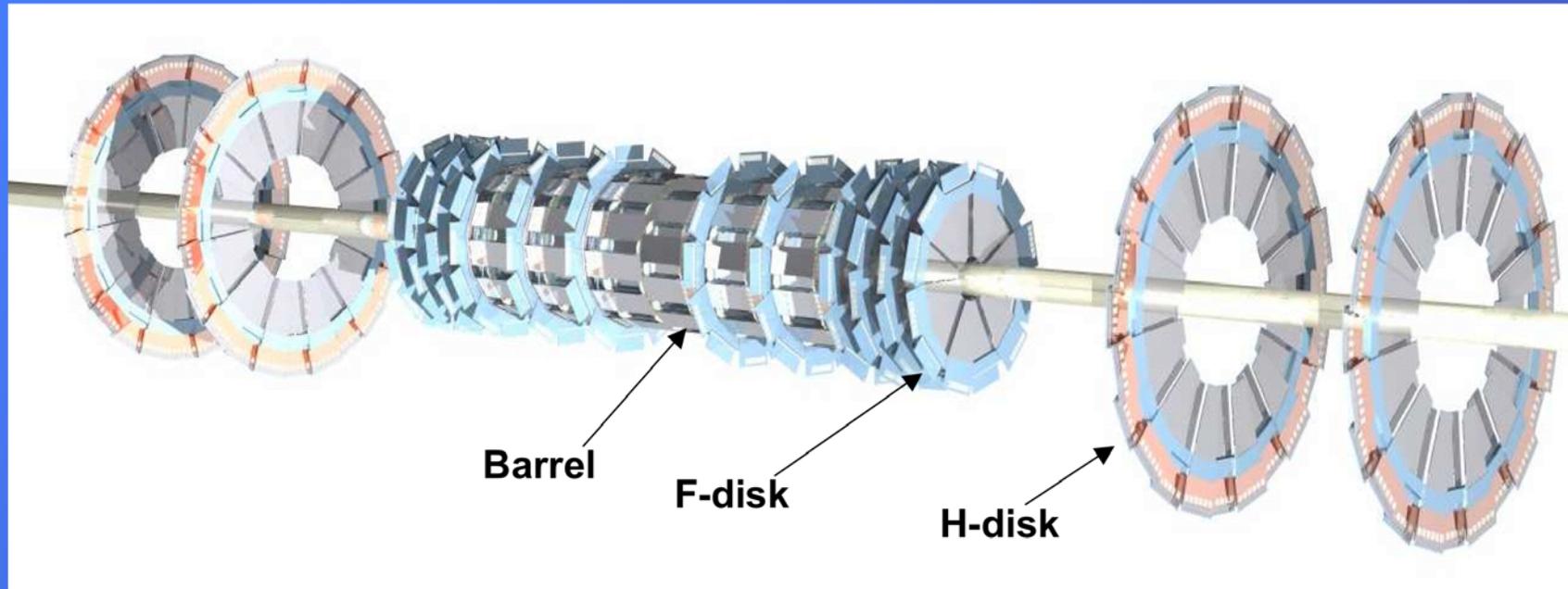
D0 Detector



*D0 Detector:
Quarter r-z View:*

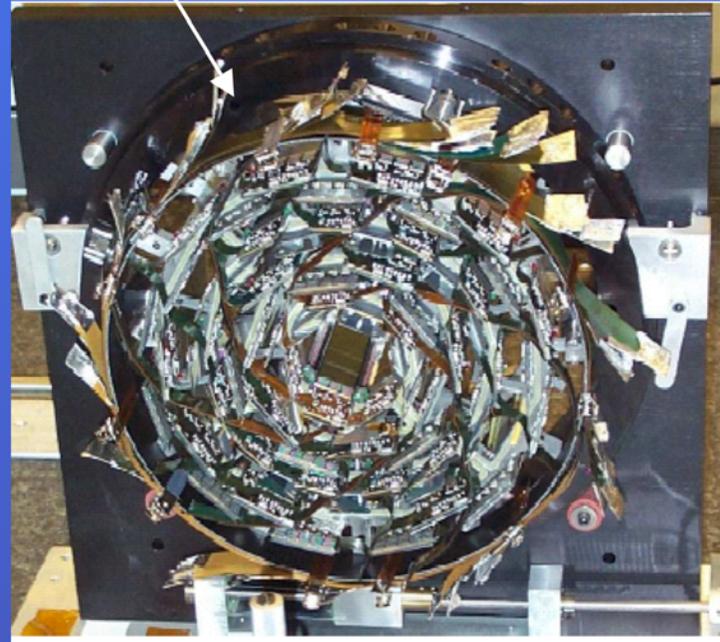


Silicon Microstrip Tracker Design

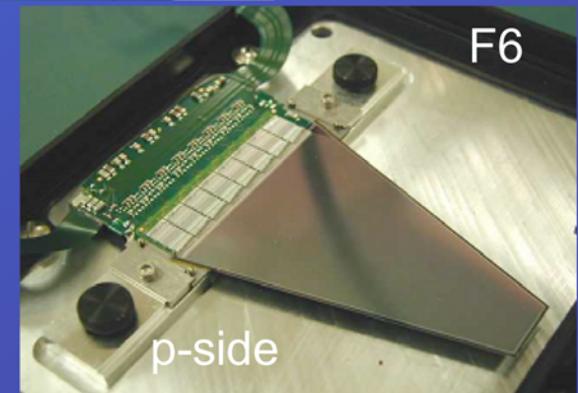
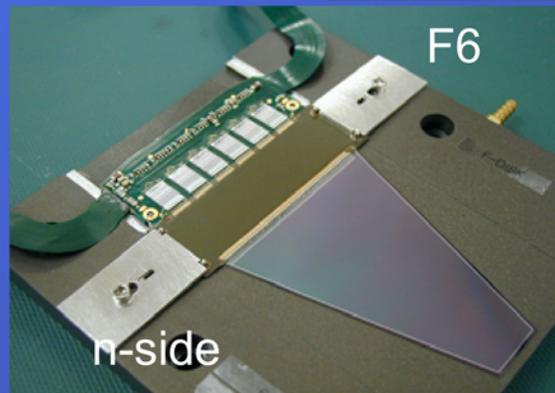
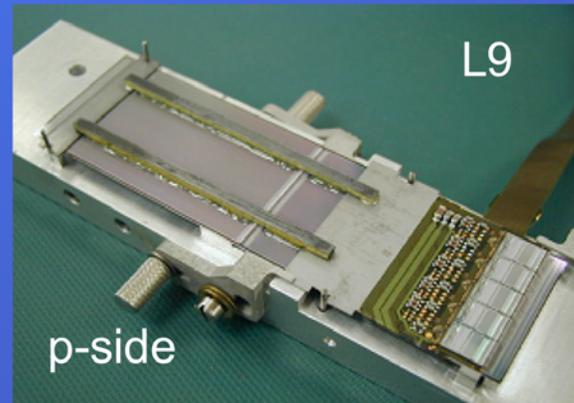
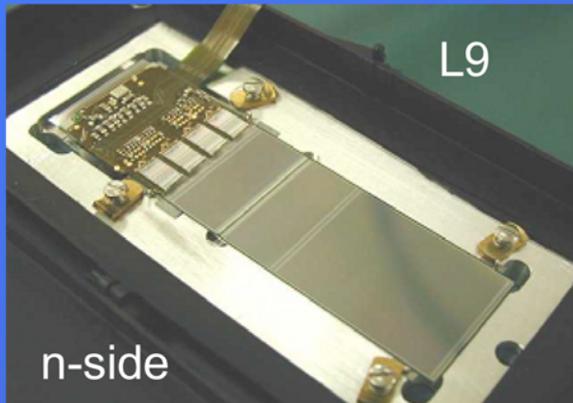
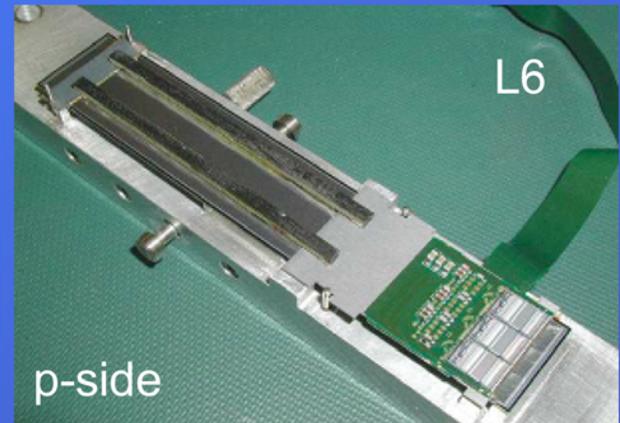
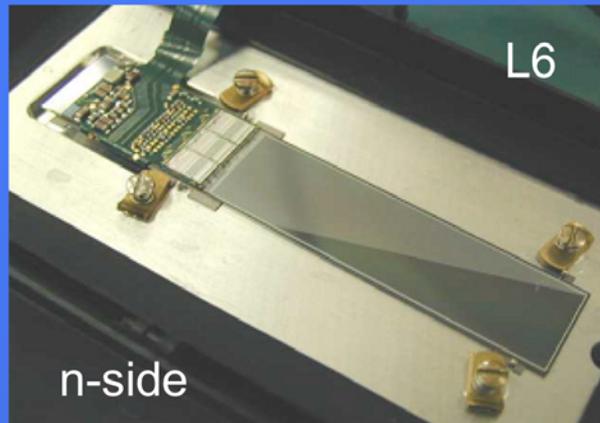
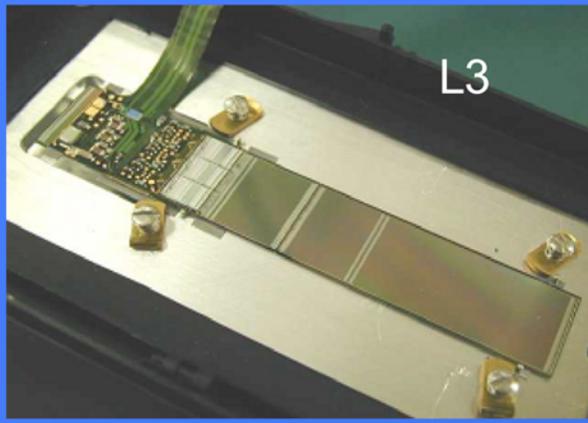


792576 channels are being read out by 6192 svxIIe chips on 912 read out modules (HDI)

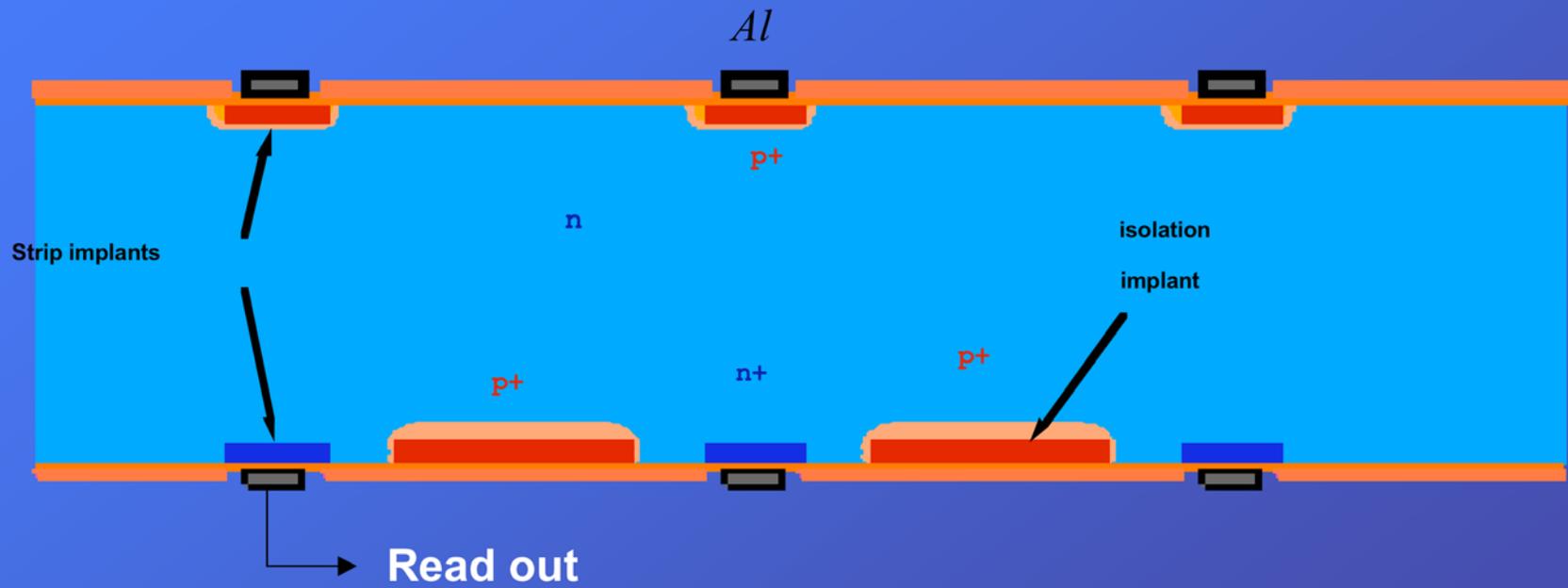
Barrels



Different types of Silicon modules



Double sided devices



Troubleshooting Guide

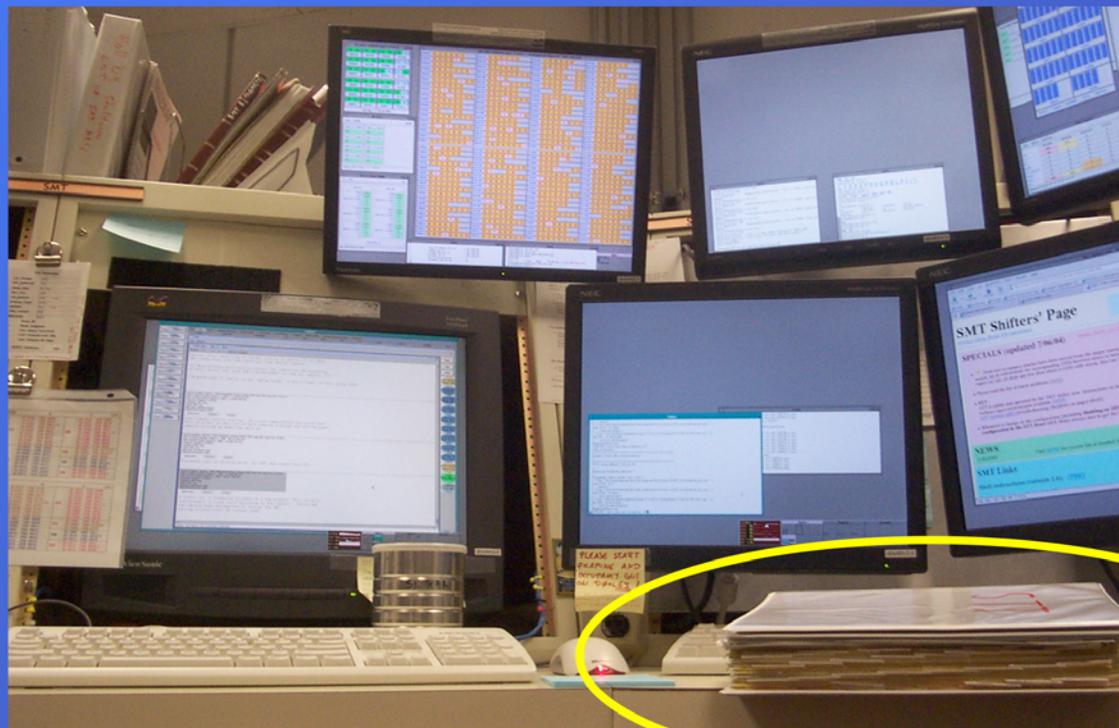
The detector is operated from a Control Room located in the first floor of the D0 Assembly Building.



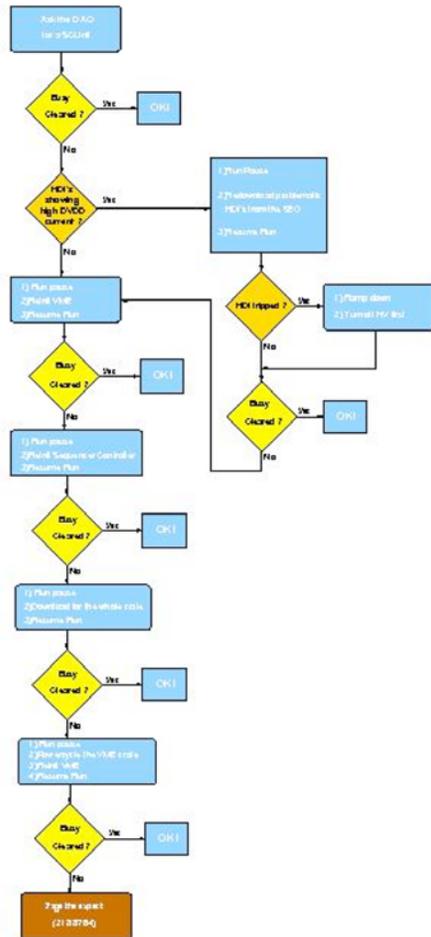
The SMT shifter is in charge of monitoring the performance of the Silicon Tracker.



- The shifter relies on a manual that gives the procedures needed to monitor the SMT.
- Usually fast and concrete answers are required.
- A Troubleshooting Guide was needed.



What to do if one of the VRB crates is 100% Front End Busy?!



The Troubleshooting Guide consists of simple flow charts which give the shifter precise and clear information on what to do when certain situations appear.

Sensor measurements



The test stand simulates physical events, so that sensors and electronic equipment can be tested.

Microsoft Excel - VRB_DAB_3_16_04_PP.xls

File Edit View Insert Format Tools Data Window Help

Arial 10

AA79

Column	Row	Value	Unit	Chip ID	VRB ID	VRB Name	VRB Type	VRB Mode	VRB Status	VRB Data
1	6	re-u	36							
2	57									
3	3.84E+09	145	at S/Dat							
4	142	at RU								
5										
6	922	145								
7	129	B900	B1							
8	250	B300	B2							
9	317	B300	B3							
10	516	B400	B4							
11	640	B500	B5							
12	776	B000	B0							
13	905	B900	B1							
14	1034	B000	B0							
15	1162	B900	B1							
16	1292	B300	B2							
17	1421	B300	B3							
18	1550	B400	B4							
19	1679	B500	B5							
20	1808	C000	C0							
21	1937	0.0	0.0							
22	2066	0.0	0.0							
23	2195	0.0	0.0							
24	2324	0.0	0.0							
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Number of VRB: 10

Sim. Req. SLOTE Enable: 10

Channel Req Gray Enable: 10

Match plot to data

Continuous Event Using PDAQ:

- INIT VRB
- RESET & INIT VRBC PDAQ
- USE 53 MHz Clock
- VRBC Acquire
- Continuous to lv3

Stop this mode?

Press the stop-continuous to lv3 Button.

One more Event

One trigger event

Initialize Digital I/O

SCL Init

Generate Trigger

to PDAQ

to SDAQ

Read One Event Using SDAQ

Set VRBC to SDAQ

VRBC ACQUIRE to take data

VRBC IDLE For Downloading

SDAQ mode-Get One SCL Event

Read Register

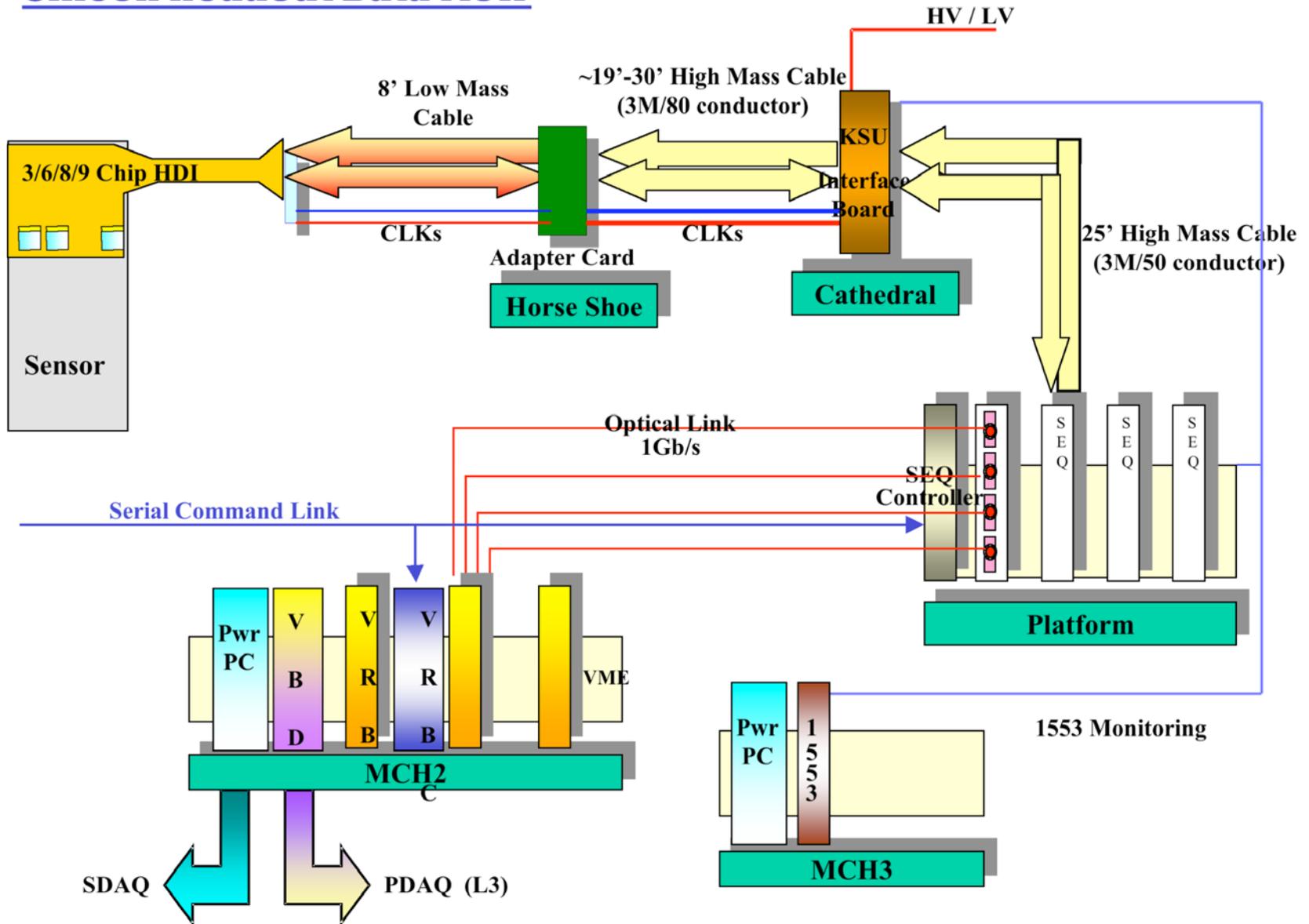
continuous to lv3 stop continuous to lv3

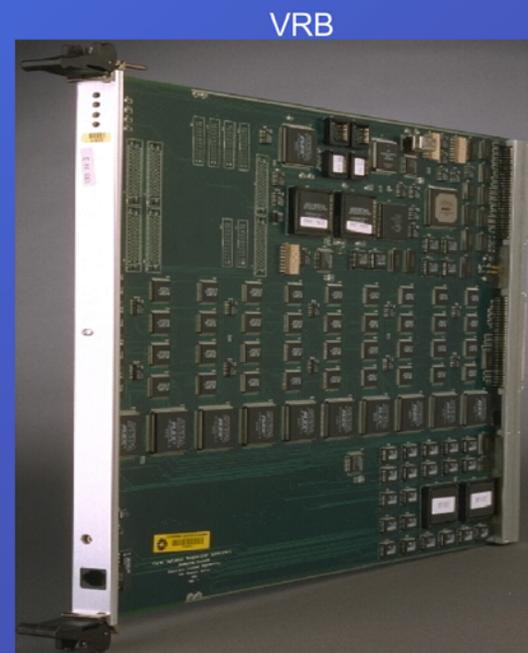
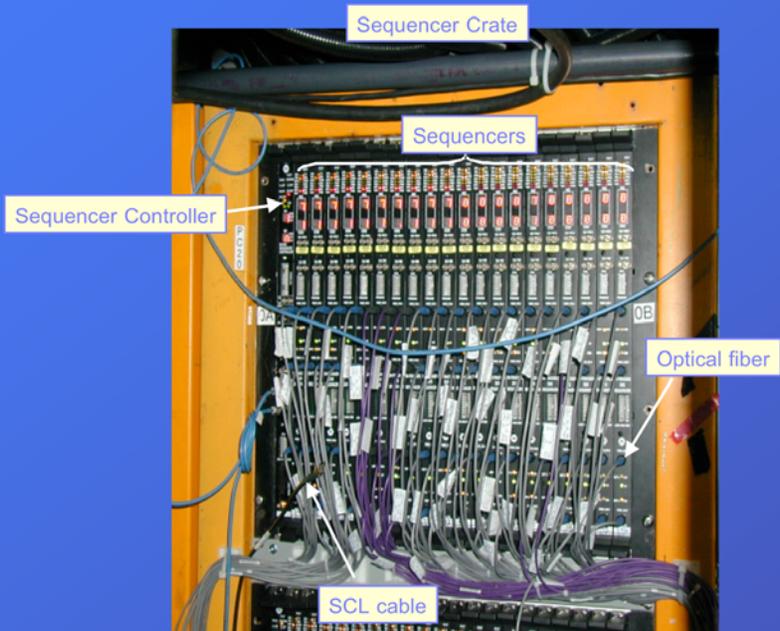
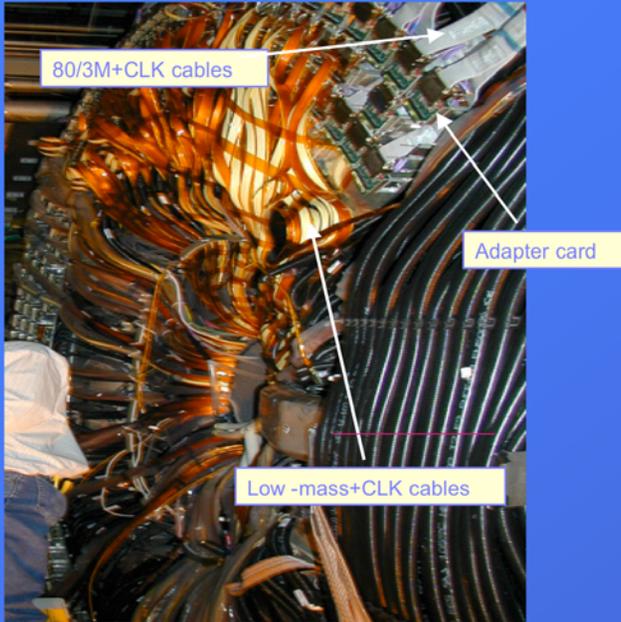
Press the stop-continuous to lv3 Button

Press the Read One Event VRBC PDAQ Button

Spread sheet used to analyze data

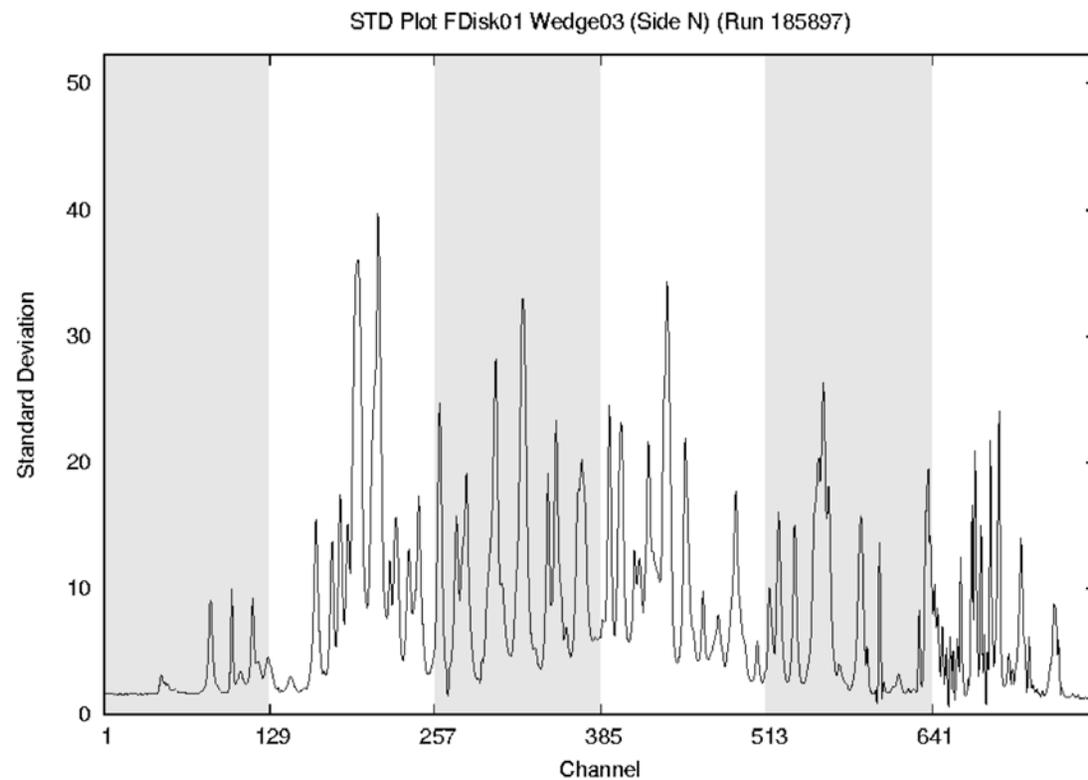
Silicon Readout Data Flow





Problem

- Some sensors are too noisy.
- The reasons for this noise are under study.



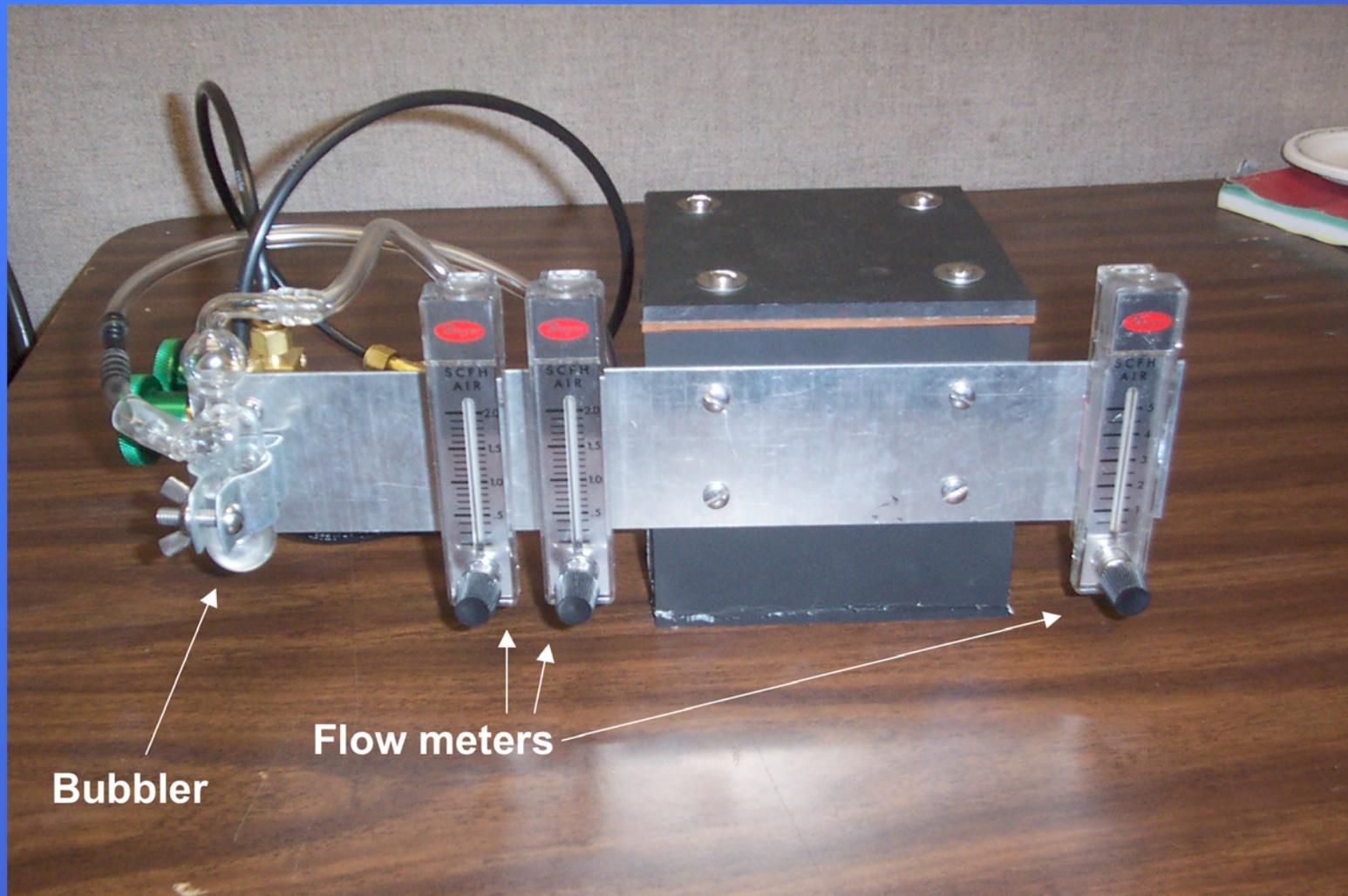
Objective

**Find noise changes as a function of humidity
(Dependence of humidity on grassy noise)**

Collaboration

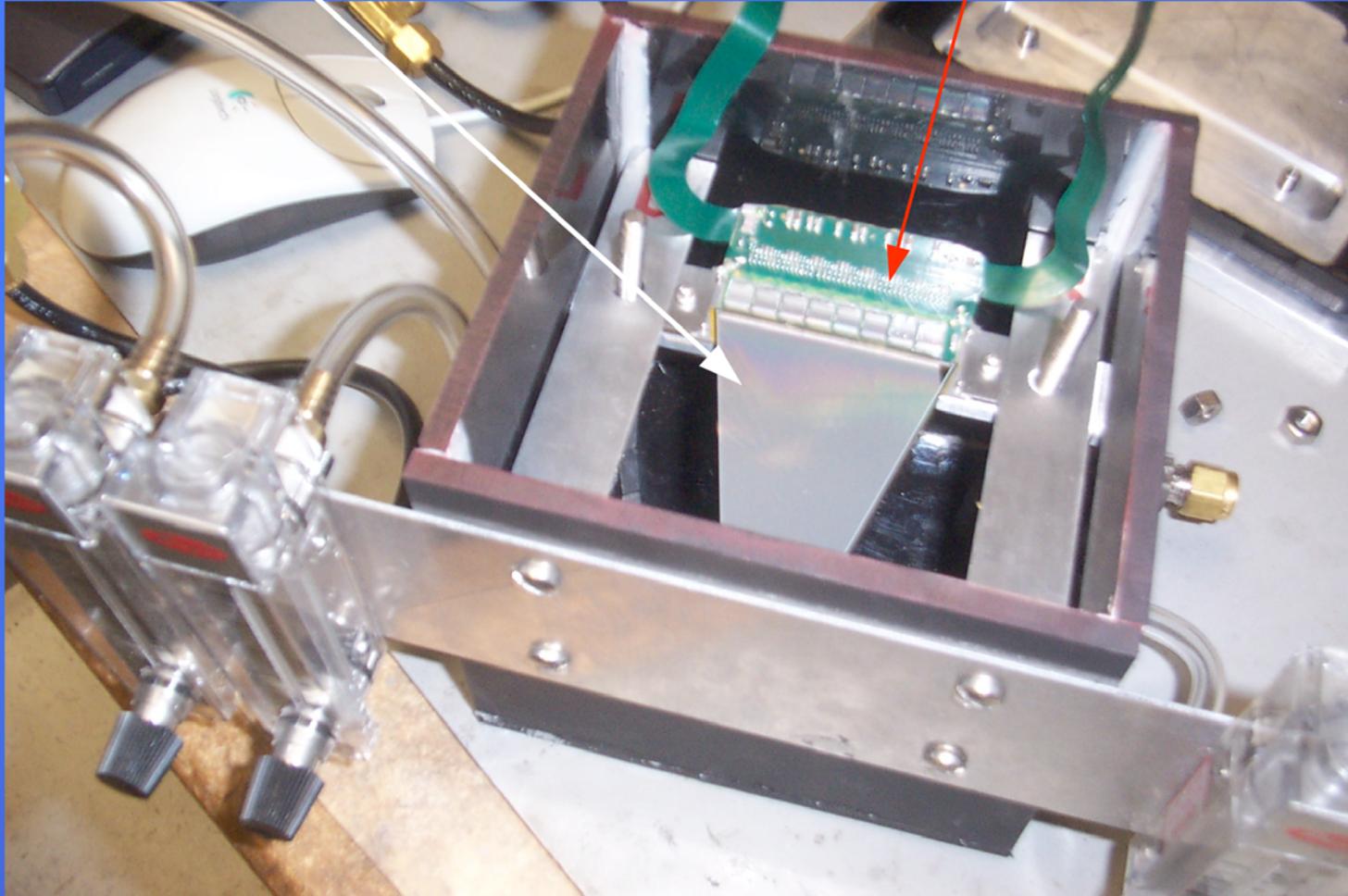
- **We constructed a device that could simulate certain physical conditions.**
- **The test of data acquisition are in progress.**

A box was built so that the sensor could be tested

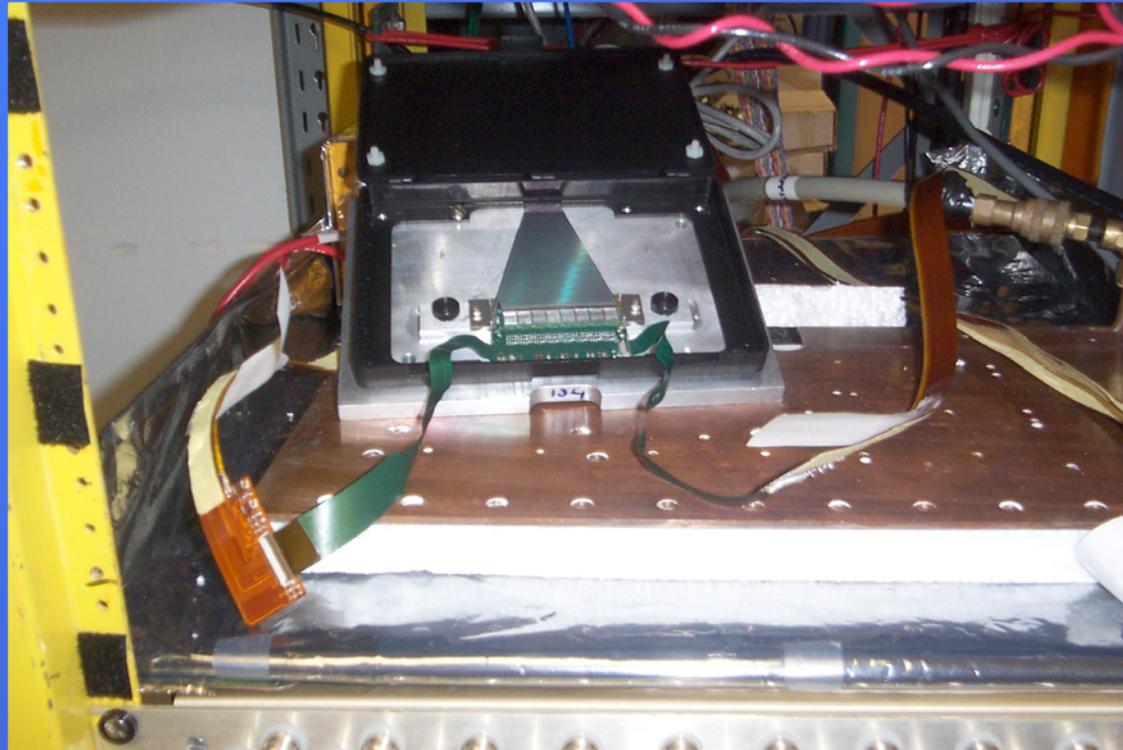


Silicon Sensor

HDI



The wedges are not downloading correctly inside the box.



The box could be causing damage.

Some wire bonds are loose.

Conclusions

The Troubleshooting Guide will be used and updated according to the shifter's necessities.

The box needs to be evaluated by the experts.

More tests need to be done.