Status of MFT Disks

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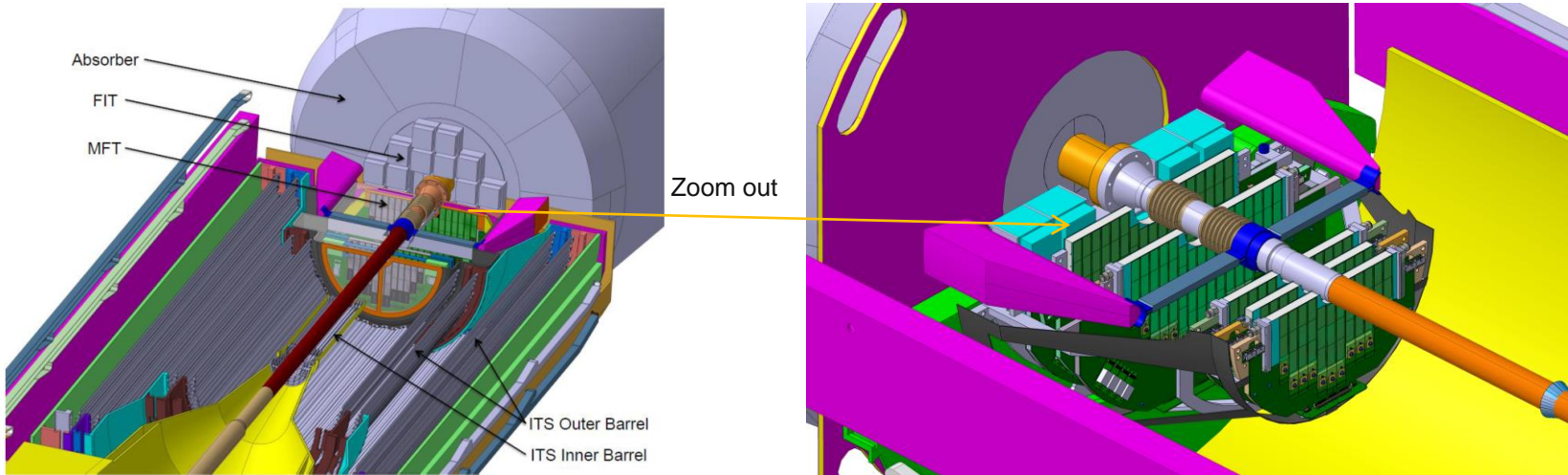
Outline

- Status of electronics in the cone area of MFT

  - disk0~disk4

- Disk Power dropout testing

- Plan

The MFT Detector

General layout of the MFT half-barrel and its environment

Zoom out of the MFT half-barrel

- MFT is a sub detector of ALICE in front of the FIT and absorber
- MFT is composed by 5 disks
- Each disk is a couple of front and back PCB space fixed on a mechanical support
- Several FPC with detection sensors are connected on each PCB(front & back)

Structure of MFT

disk0   disk1   disk2   disk3   disk4
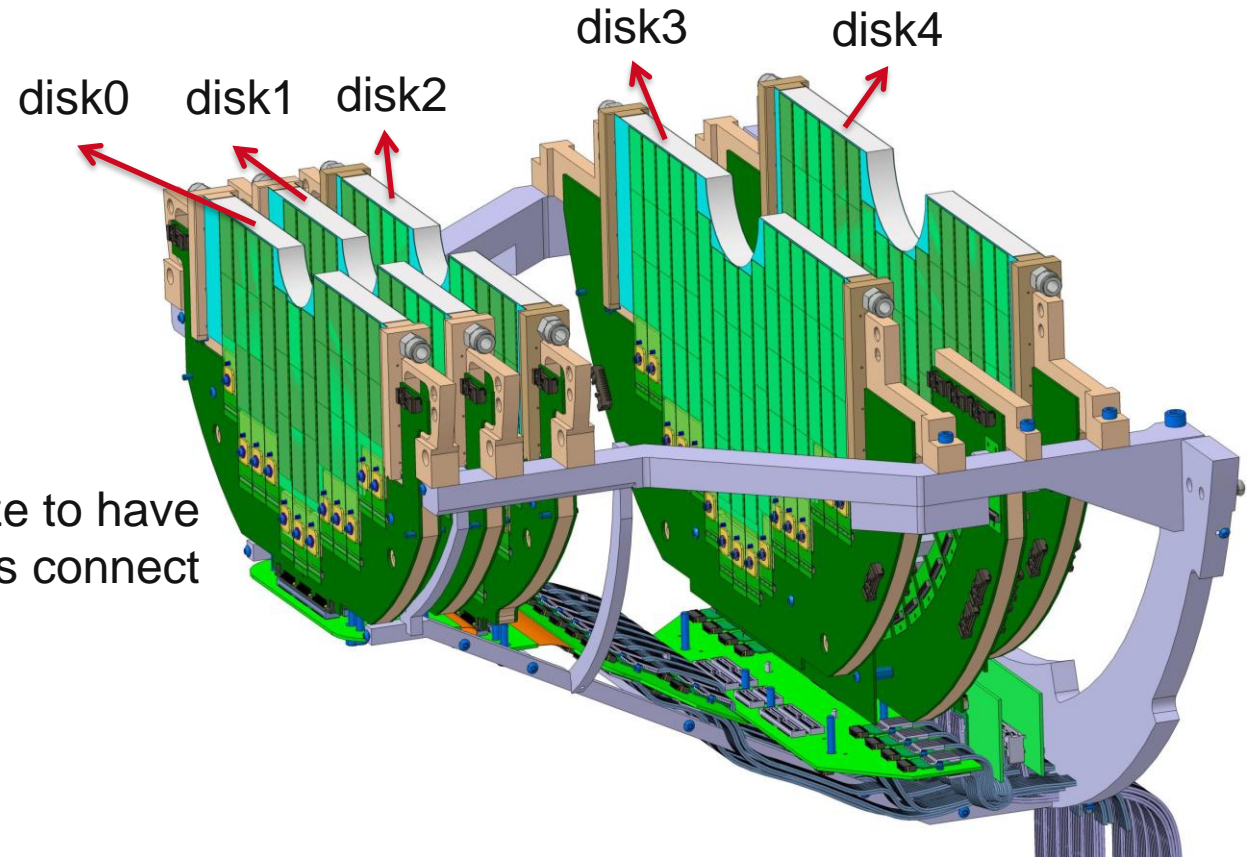
Each disk has different size to have different number of ladders connect with FPCs

The bottom picture shows mother boards for those five disks
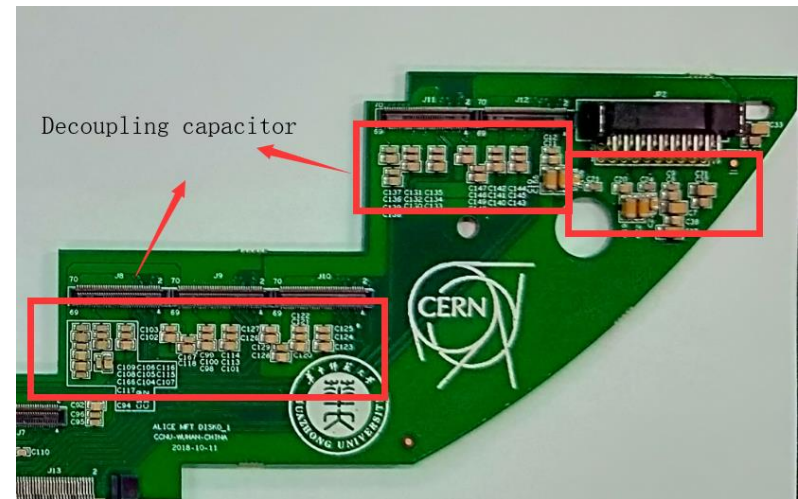The connect disks and readout units

Layout update information

We revised the specifications of the decoupling capacitor according to the French colleague's proposal.

The specific modifications are as follows：
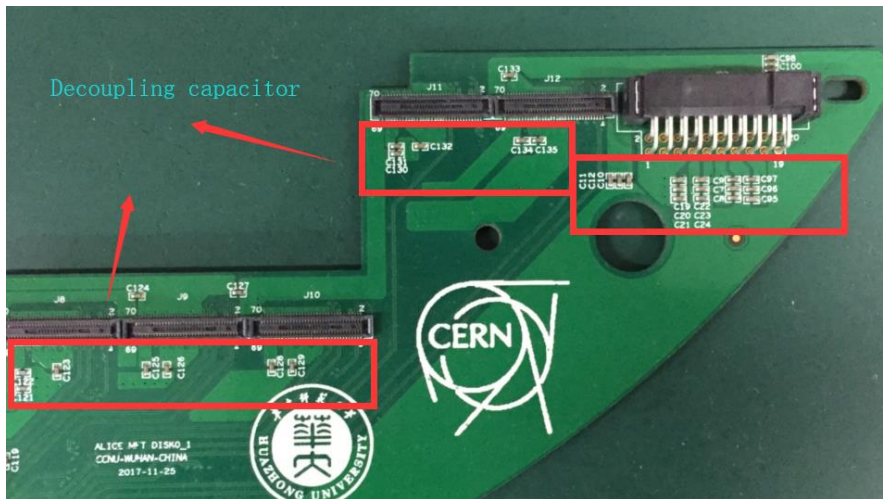
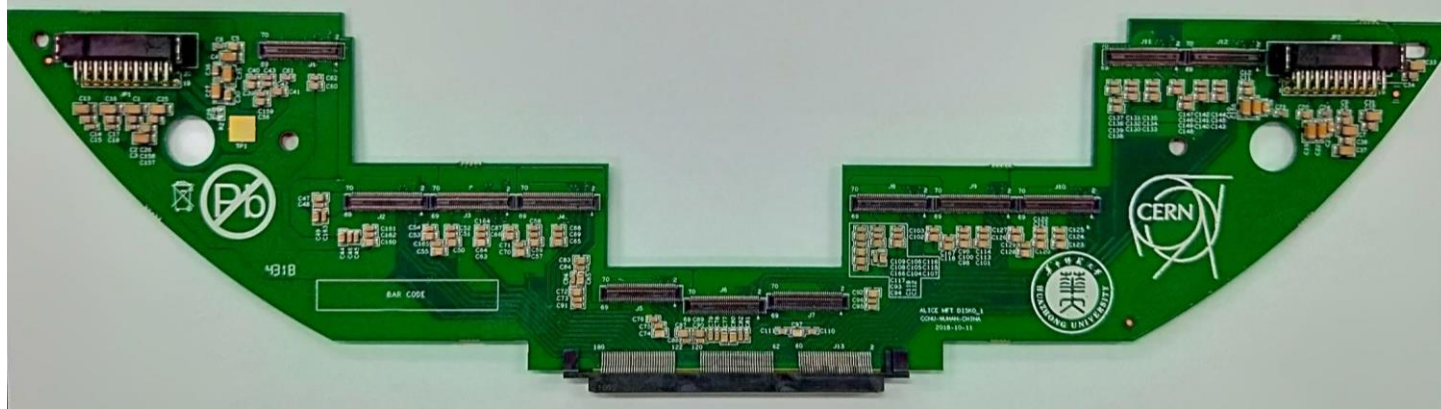the Original version of disk0/1   the Current version of disk0/1

Use different packaging specifications
This is mainly for the modification of the decoupling capacitor around the power supply

Disk0/1

status:

- This is the fourth version of disk0/1
- This prototype has been produced in November, 2018.
- We have sent three pieces to France for test.

Disk2

status:

- This is disk2
- The prototype has been produced in January, 2018
- We have sent 8 pieces of PCB to France
- Now version of the schematic has been modified and ready for layout

Disk3
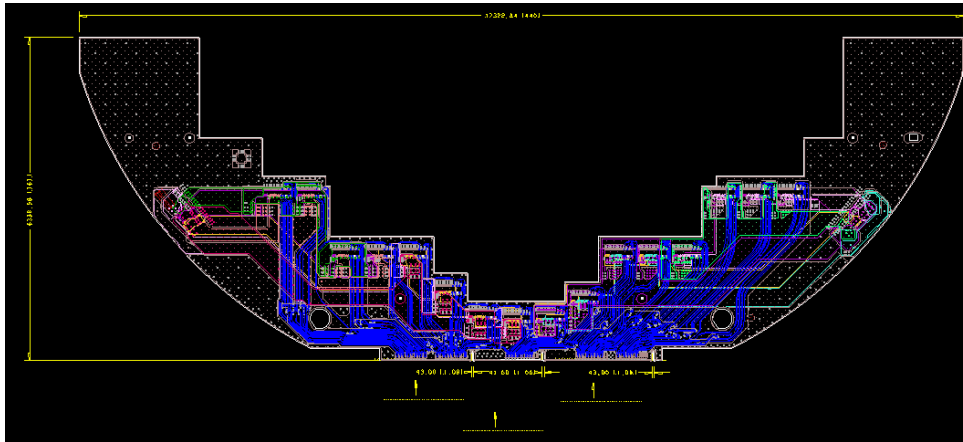
First vision
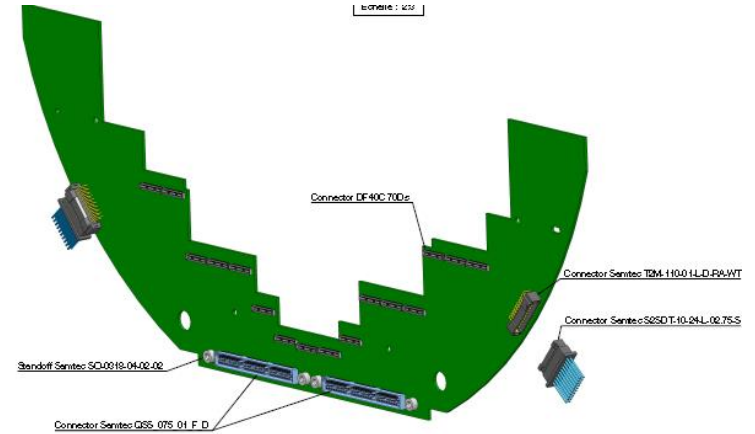
Second vision

Status:

- This is disk3
- The layout of first vision is finished.
- Because the space between disk3 and disk4 is too limited to integrate all the cables, we modify disk3 and disk4
- We have finished the schematic for new version.

Disk4

First vision
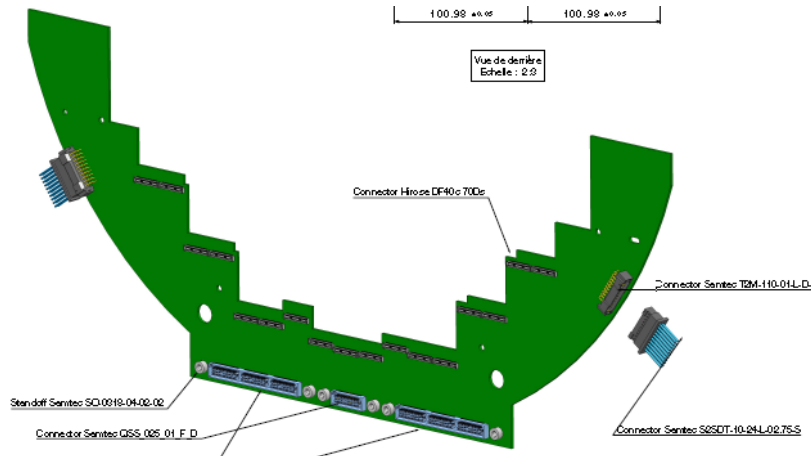
Second vision

Status:
- We have produced the prototype of disk4 and sent 8 pieces to France
- For same reason with disk3, we modify disk4
- We have finished the schematic for the new version.
- Comparing to the first one, the second version uses different contactors and has different structure

Status

Electronic Boards	Waiting	Schematic Under design	PCB layout Under design	Prototype Produced
disk0/1 PCB--version 1				🟩
disk0/1 PCB--version 2				🟩
disk0/1 PCB--version 3				🟩
disk0/1 PCB--version 4				🟩
disk2 PCB--version 1				🟩
disk2 PCB--version 2				🟩
disk2 PCB--version 3				🟩
disk2 PCB--version 4			🟨	
disk3 PCB--version 1				🟩
disk3 PCB--version 2				🟩
disk3 PCB--version 3			🟨	
disk4 PCB--version 1				🟩
disk4 PCB--version 2				🟩
disk4 PCB--version 3			🟨	

Disk Power dropout testing

Measured current

1.85V 0.831A

Input voltage

Output voltage

- the boards power dropout should be controled in 5%
- This shows a test for the second version of disk0/1.
- We use this power to provide power, and a Sliding resistance as load.
- The difference between Actual input and Actual output should be smaller than 5 percent of Actual input.
- The system is in a stable state

We made a small board to help test power dropout

Disk Power dropout testing

PCB disk01 - AVDD

PCB disk01 - Back-bias

PCB disk01 - DVDD
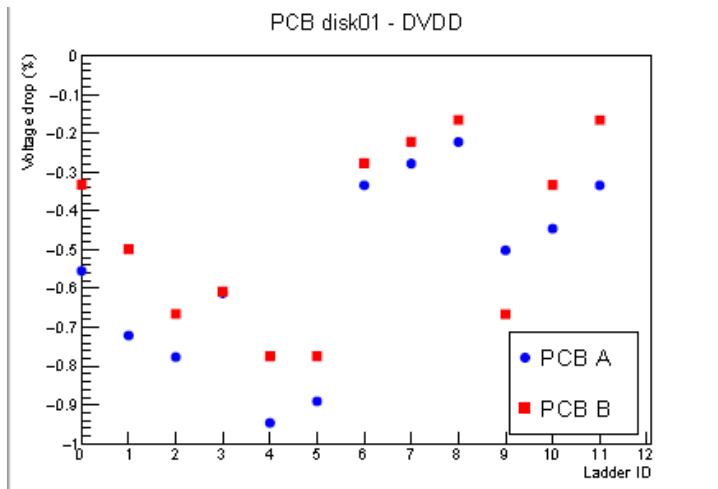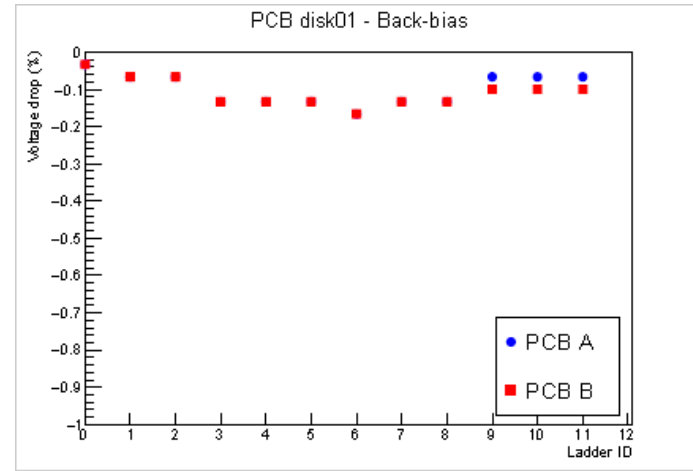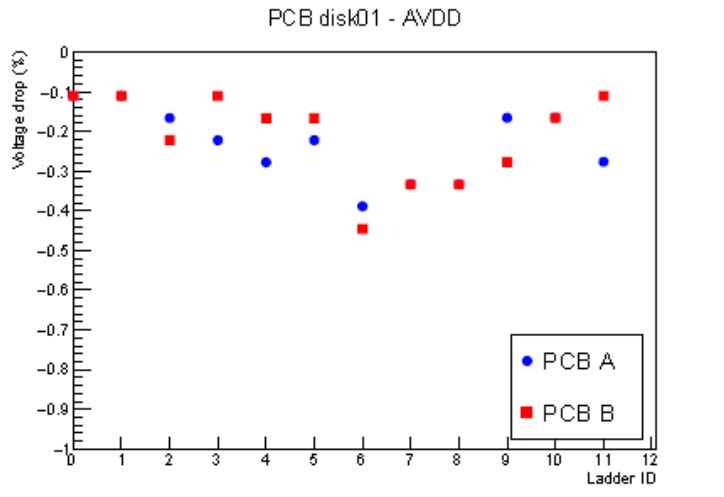
- This is the Power dropout reasult for disk01.
- The power for every zone is different and they have different shape copper on the layers, which reasults the Irregularity between zones.
- For every zone, the voltage drop is Declines

Disk Power dropout testing

disk0/1   A

Zone	Ladder	Analog				
		Rated current (A)	Measured current (A)	Input voltage (V)	Output voltage (V)	Difference (%)
0	0	0.035	0.038	1.804	1.802	-0.110864745
	1	0.0525	0.055	1.804	1.802	-0.110864745
	2	0.0525	0.055	1.804	1.802	-0.110864745
1	3	0.0525	0.054	1.799	1.794	-0.277932185
	4	0.0525	0.056	1.799	1.793	-0.333518621
	5	0.0525	0.057	1.799	1.791	-0.444691495
2	6	0.0525	0.056	1.801	1.786	-0.832870627
	7	0.35	0.362	1.801	1.78	-1.166018878
	8	0.0525	0.057	1.801	1.787	-0.777345919
3	9	0.0525	0.054	1.803	1.8	-0.887409872
	10	0.035	0.038	1.803	1.801	-0.166389351
	11	0.035	0.036	1.803	1.802	-0.055463117

Zone	Ladder	Digital				
		Rated current (A)	Measured current (A)	Input voltage (V)	Output voltage (V)	Difference (%)
0	0	0.215	0.22	1.804	1.802	-0.110864745
	1	0.3225	0.329	1.804	1.799	-0.277161863
	2	0.3225	0.324	1.804	1.797	-0.388026608
1	3	0.3225	0.324	1.805	1.798	-0.387811634
	4	0.3225	0.322	1.805	1.797	-0.443213296
	5	0.3225	0.324	1.805	1.792	-0.720221607
2	6	0.3225	0.323	1.805	1.798	-0.387811634
	7	0.3225	0.324	1.805	1.798	-0.387811634
	8	0.3225	0.324	1.805	1.799	-0.332409972
3	9	0.3225	0.323	1.804	1.796	-0.44345898
	10	0.215	0.219	1.804	1.797	-0.388026608
	11	0.215	0.216	1.804	1.799	-0.277161863

It is obvious from the board's voltage drop is designed to meet the design requirements.

Plan in the near future

- Produce all the PCB of Disk2,3,4 in parallel after the testing of Disk0.

- Verify the power voltage drop out on all Disks.

Thanks for your attention