PDS Report on APA 3 Colbox

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Summary

1. We must make correct isolation between the chassis and the board to prevent short circuits.

2. We should develop a mechanism for isolation between the connector's housing and the chassis.

3. For the new version of the layout, it would be necessary to constrain the paths of the AFEs.

4. BOM in the schematic should match the final board. (I'm not sure there's a protocol for this, I know Altium has a way to track changes in the BOM)

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Summary

5. Short cables on the warm side are desirable, but we couldn't demonstrate a significant impact in the s/n.

6. We can implement a more sophisticated trigger, but the full streaming feature is excellent for getting general information about the number of cosmics, wavelength, calibration, module characterization, and DCR.

7. With this information, we can be more confident about the trigger algorithms.

8. An upgrade to a faster streaming interface is desirable to provide only one protocol among the FEB to the DAQ. This can reduce the operative cost of the experiment. But this increases the budget for the production of the boards 30% to 50 %. (Pinout and device size consideration)

Summary

9. Using an algorithm with 320 windows and recovery of the pedestal, we can open a new window only for the pulses truncated on the right. This can increase the bandwidth a lot.

10. A remapping should be done in firmware to give the user a friendly mapping of the channels among all the interfaces (uC, FPGA, PD Modules, Cables...) It's hazardous to work with the confusing pinout because it may lead to errors in biasing the modules or getting data from the wrong device.

11. Distribution of PD modules in the APAs should be in even numbers to optimize the channels on the boards.

Summary

12. If we notice CRC errors between DAPHNE and FELIX, the first action should be to test the polarization and mechanical disposition of the optical fibers. A short radius produces power losses and CRC errors.

13. The grounding scheme will be our next big challenge.

14. I remember Terry mentioned the addition of some beads on the flange to mitigate noise. I don't know if the flange has those at the moment.
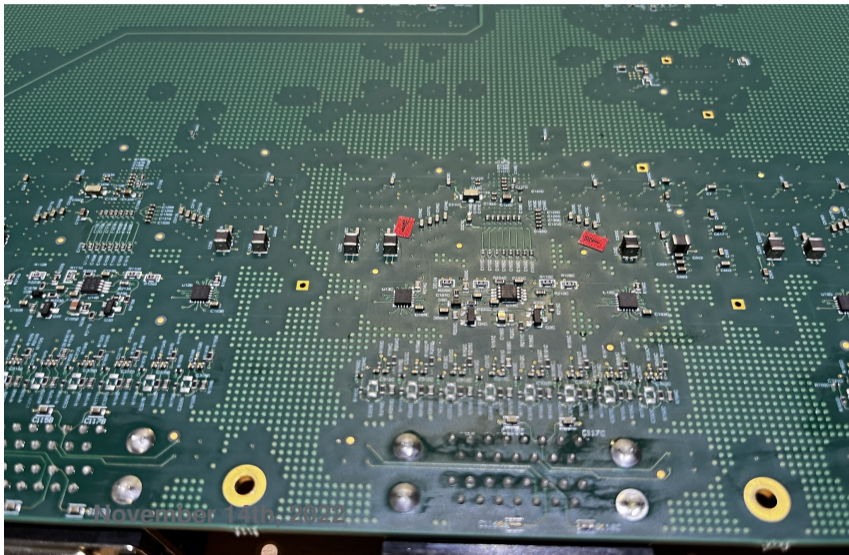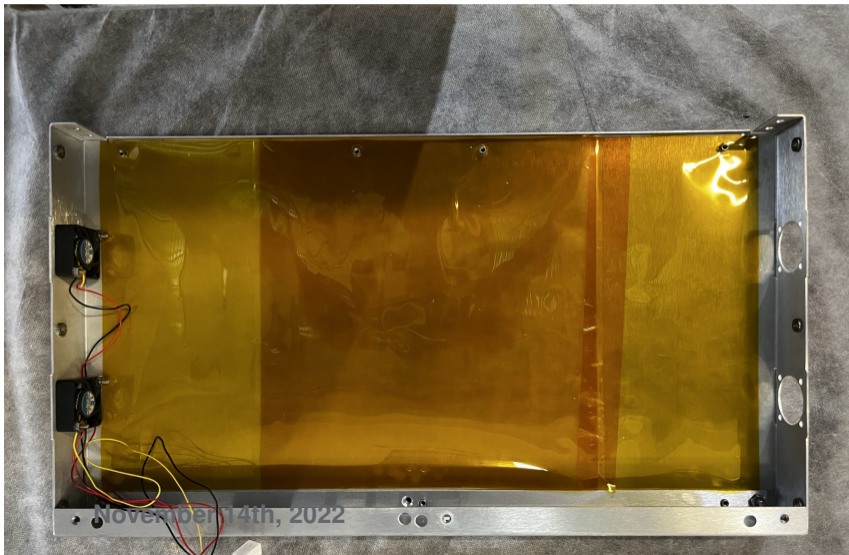
Cleaning

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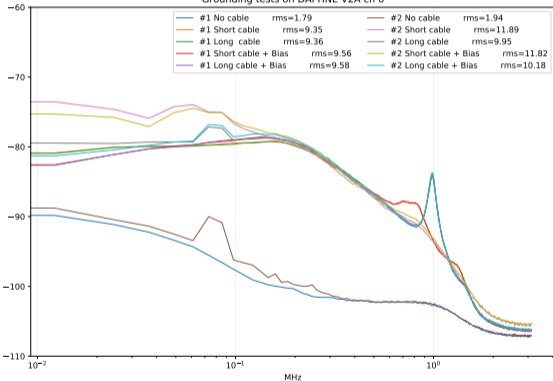
Chassis

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Chassis

Chassis

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Noise studies with short and long cables properly shielded

Grounding tests on DAPHNE V2A ch 0
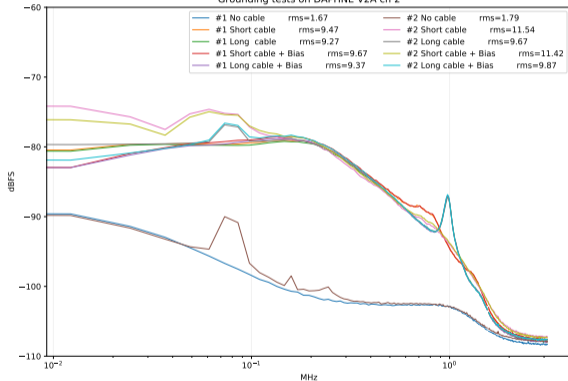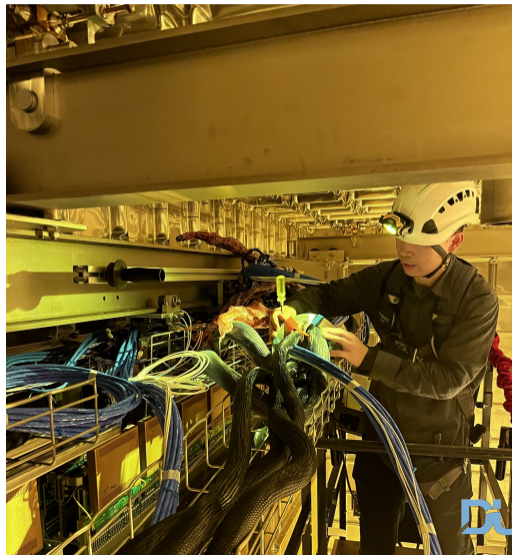
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#1 Short cable	rms=9.35		#2 Short cable	rms=11.89
#1 Long cable	rms=9.36		#2 Long cable	rms=9.95
#1 Short cable + Bias	rms=9.56		#2 Short cable + Bias	rms=11.82
#1 Long cable + Bias	rms=9.58		#2 Long cable + Bias	rms=10.18

Grounding tests on DAPHNE V2A ch 2

#1 No cable	rms=1.67		#2 No cable	rms=1.79
#1 Short cable	rms=9.47		#2 Short cable	rms=11.54
#1 Long cable	rms=9.27		#2 Long cable	rms=9.67
#1 Short cable + Bias	rms=9.67		#2 Short cable + Bias	rms=11.42
#1 Long cable + Bias	rms=9.37		#2 Long cable + Bias	rms=9.87
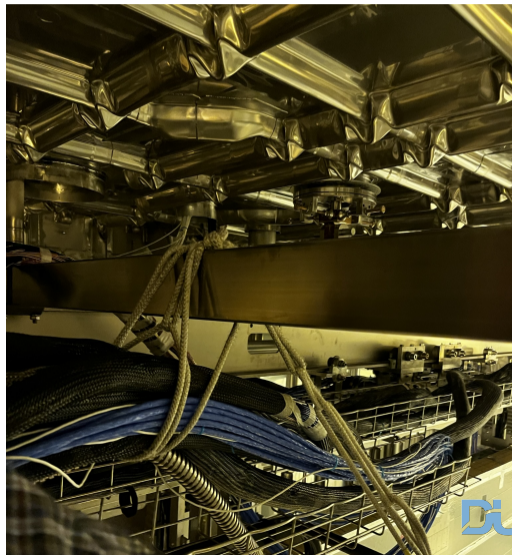
Penetration
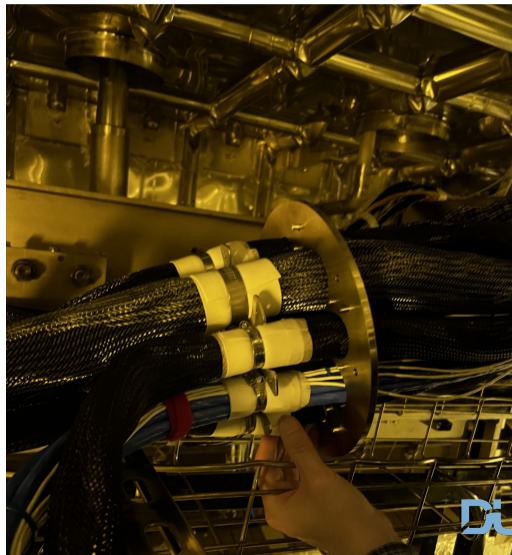
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Penetration

Penetration

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Penetration

DEEP UNDERGROUND
NEUTRINO EXPERIMENT