PDS Report on APA 3 Colbox

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Summary

- Cold box of APA3 finished with successfully results
- Noise studies were conducted at cold temperature.
- LED acquisition to prove alignment between channels
- Tested different grounding configurations of grounding in DAPHNE
- Cold cables for APAs 3 and 4 are at CERN and will be installed next week.
- Flange and lifting of the cables is planed for the 1st 2nd week of November

Setup for Integration

DAPHNE V2A Integration with DAQ

Procedure:

For this test we used the gateware provided by FERMILAB.

This prove of concept includes:

- Analog chain with proper alignment [1]
- 4 Channel streaming on each SFP
- Gb ETH Spy Buffers
- Timing Interface (using CDR chip)
- Prove of slow control response of the gateware (using the Gb ETH)

[1] Some readout errors using software trigger

DAPHNE V2A Integration with DAQ

Procedure:

We made a set of unitary tests on the DAQ barracks

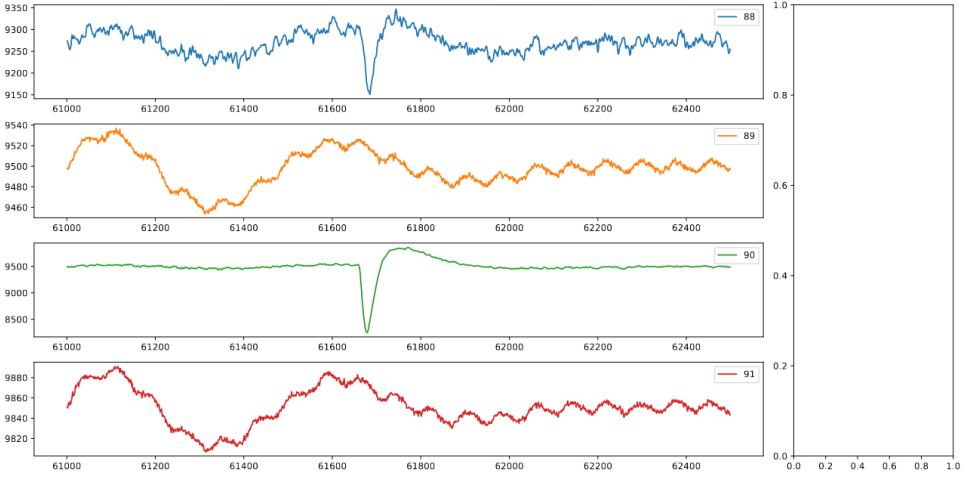
1. Using internal clock and streaming of Skew pattern
2. Using timing clock and streaming of different patterns
3. No CRC errors founded.

On top of NP04 Cryostat boards were programmed using the full streaming

We found the following issues:

1. CRC errors were present on some fibers
2. Software trigger produce some readout errors
3. Synchronization on different channels was proved

Alignment prove (DAQ Plots provided by Alessandro Thea)



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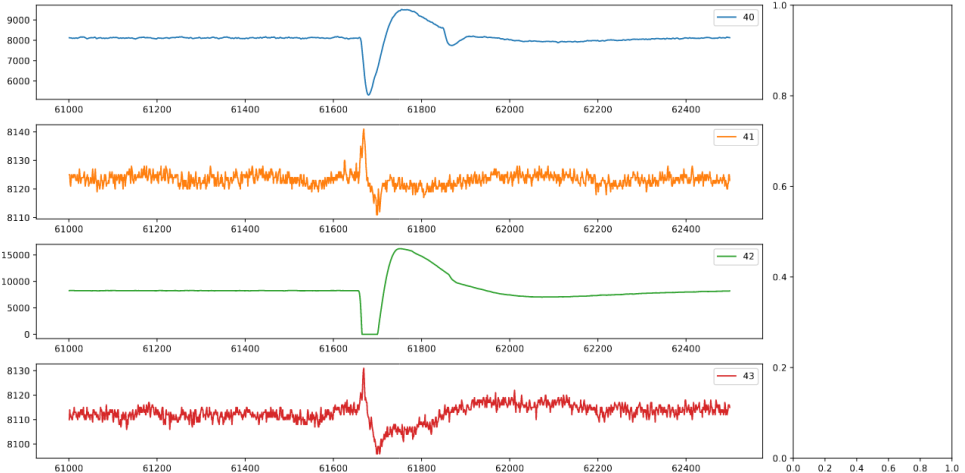
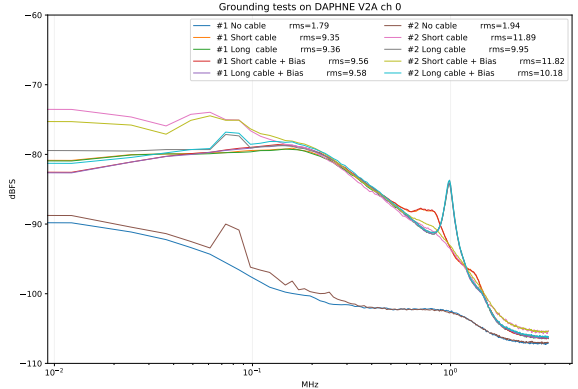
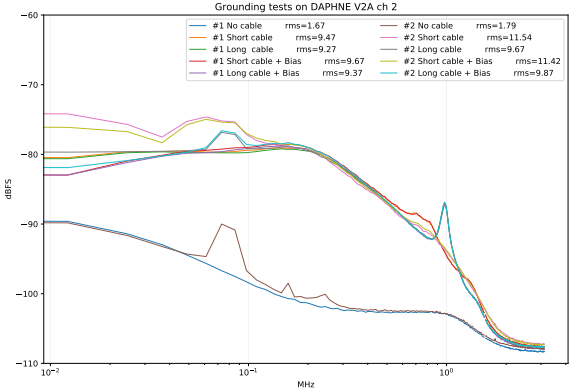


Noise studies with short and long cables properly shielded





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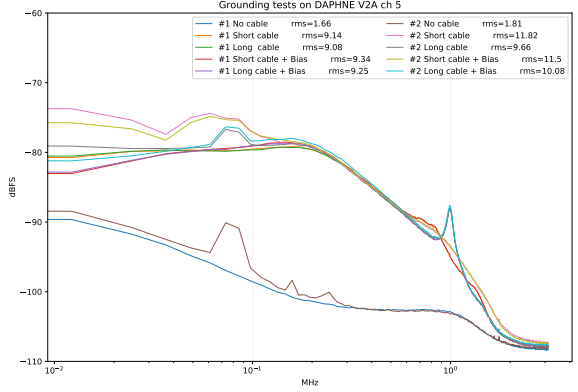

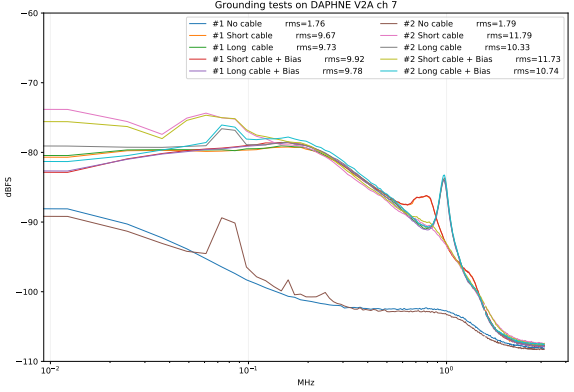

Conclusions:

- System version of the firmware for ProtoDUNE II has been tested using streaming
- Self trigger has NOT been integrated
- Time interface uses CDR version
- Noise studies suggest multiple noise sources
- Regardless the noise, the gain spread on APA3 PD modules is so big we cannot estimate gain factor on those, as we did on previous modules f.e. APA 1 or 2
- Cable length and noise relation studies are not conclusive.
- further studies with grounding should be conducted at lab conditions

APA3 FFT data can be found here


DEEP UNDERGROUND
NEUTRINO EXPERIMENT