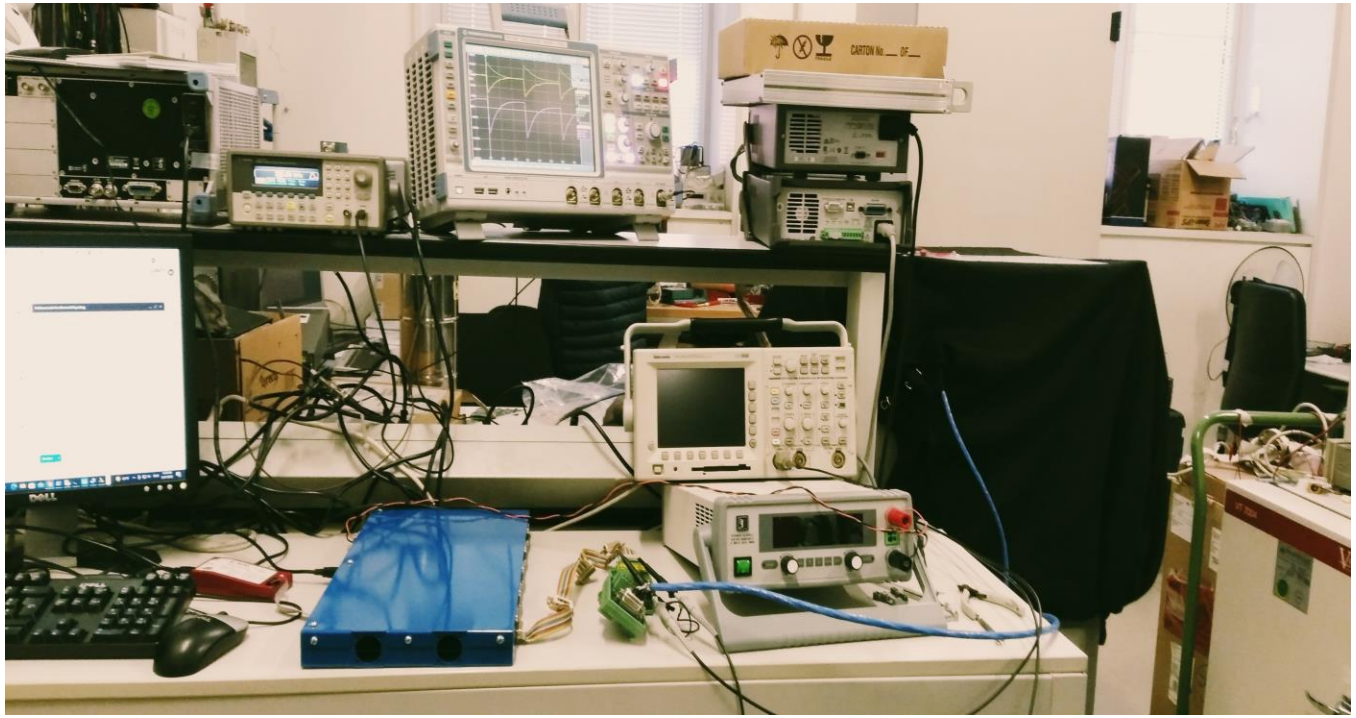
DAPHNE at Italy initial tests.

21 February, 2022

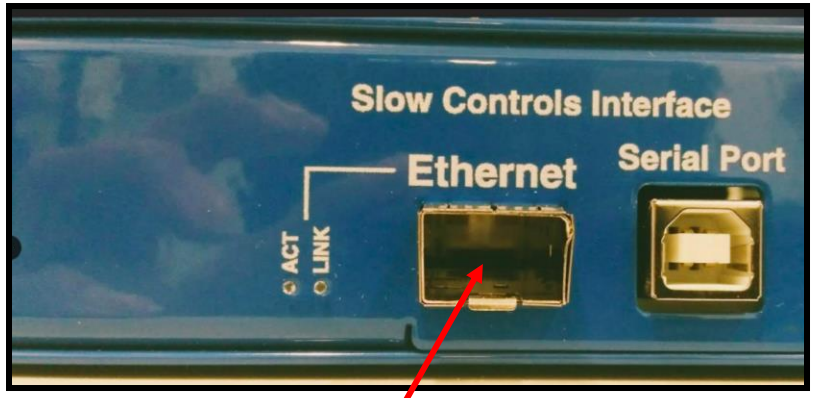
Daphne testing in Italy

- DAPHNE arrived in Italy on February 3.
- DAPHNE: #8, #9, #10.
- Testing started 2 weeks ago.



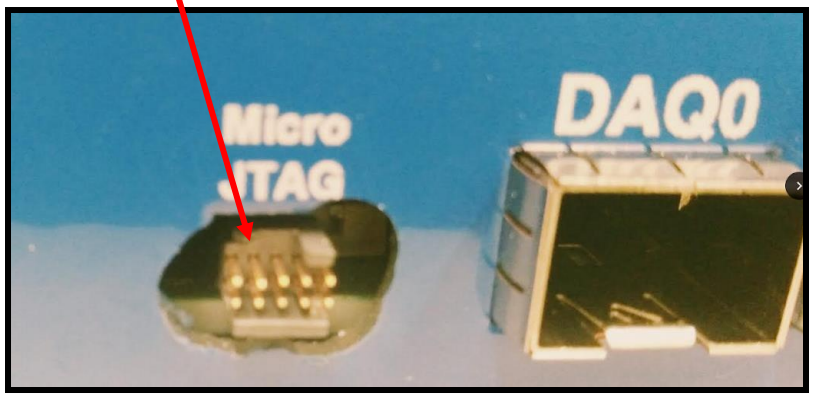
1.General visual inspection:

DAPHNE #8



The SFP Slow Control input is bent, preventing the correct insertion of the SFP Module.

The JTAG Connector (Micro JTAG) is broken.



2. DAPHNE #8 and #9 the following tests were performed:

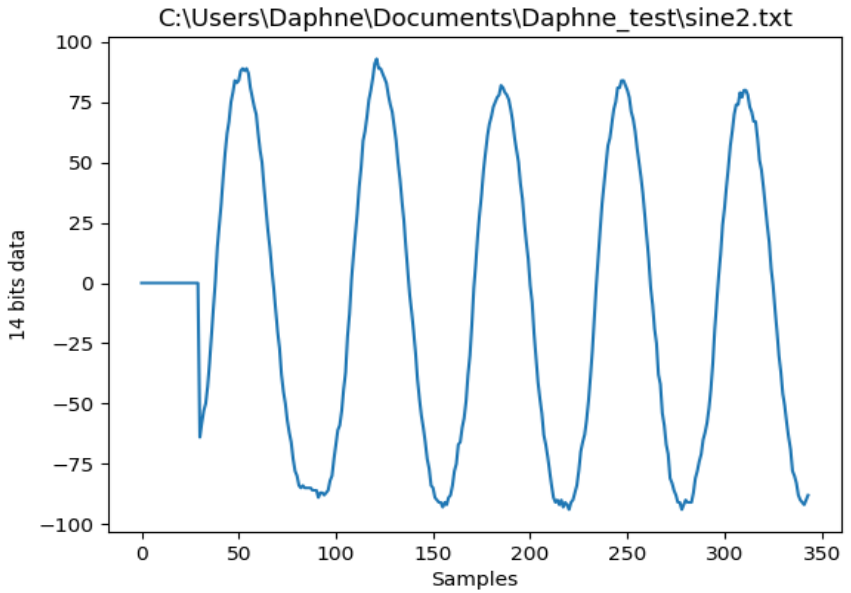
1. Power consumption is around 19 watts at idle.
2. Serial communication with the microcontroller was established.
3. The microcontroller and FPGA was programmed.
4. The response of the microcontroller and the PFGA was verified.
5. FPGA clock verified:

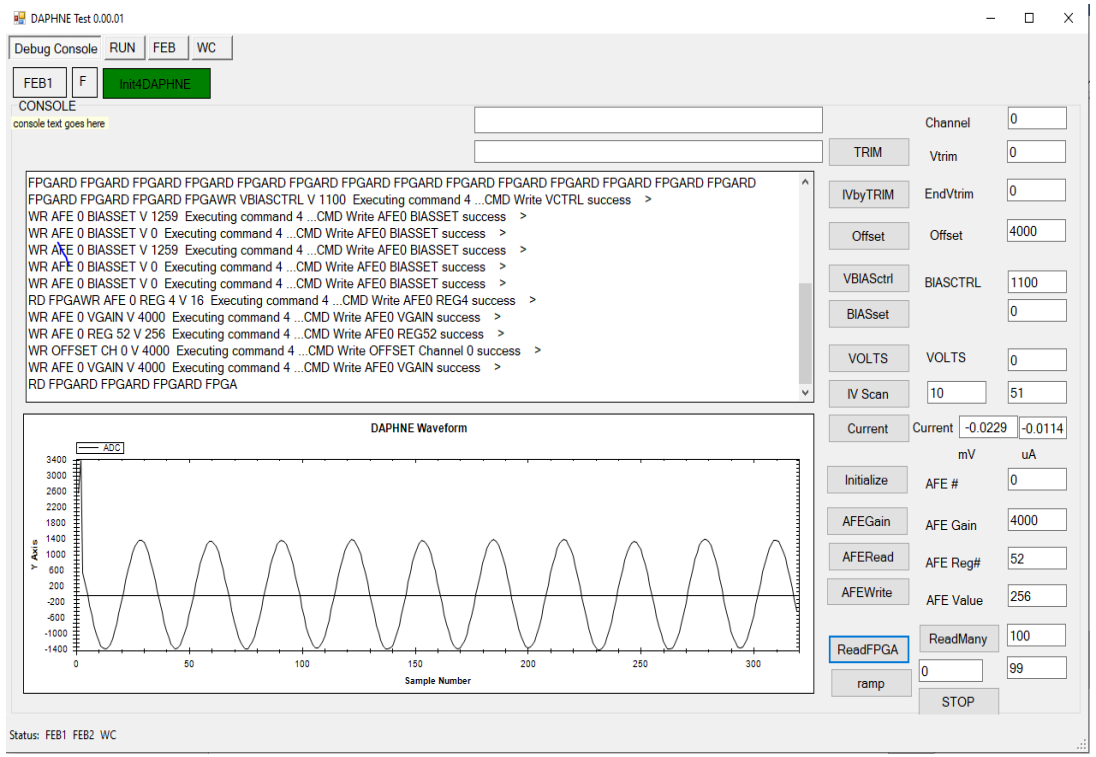
- Alignment in the AFE of the 8 channels with the clock.
- Alignment with the frame clock.

6. Verified and calibrated Trim and Bias.
7. Verified 3.3V supply for the cold electronics

3. Analogic test:

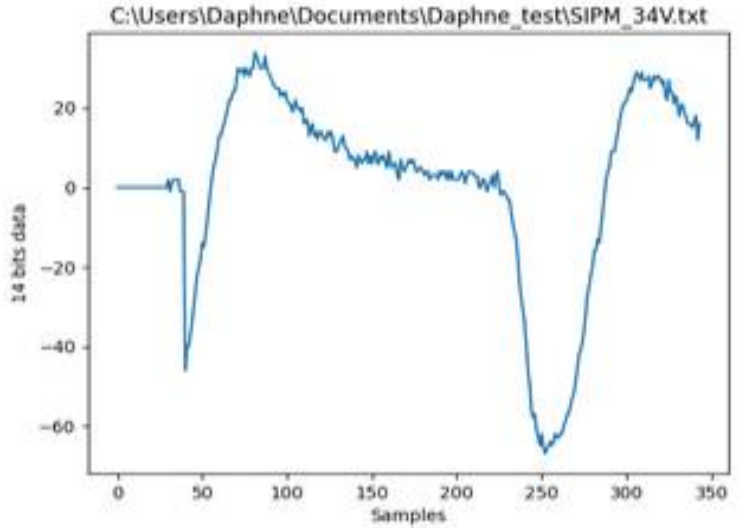
1.The AFE 0 channel 0 was fed with a sinusoidal analog signal of 200 mV with a frequency of 1MHz.
2.The FPGA data was read and graphed. (See Figure)





4. Connect the cold amplifier to the DAPHNE.

- Digitalized Channel 0
- LED pulse on 48 SiPMs (FBK) in liquid nitrogen, 31.6V (+4.5V overvoltage), readout with cold amplifier
- 150mV amplitude (300 mV differential) corresponds to roughly 750 photons (1 p.e. = 400 uV peak differential)
- could be due to crosstalk in the DAPHNE input transformer (CM pins not yet grounded), if we are reading out the neighbouring channel instead of the correct one



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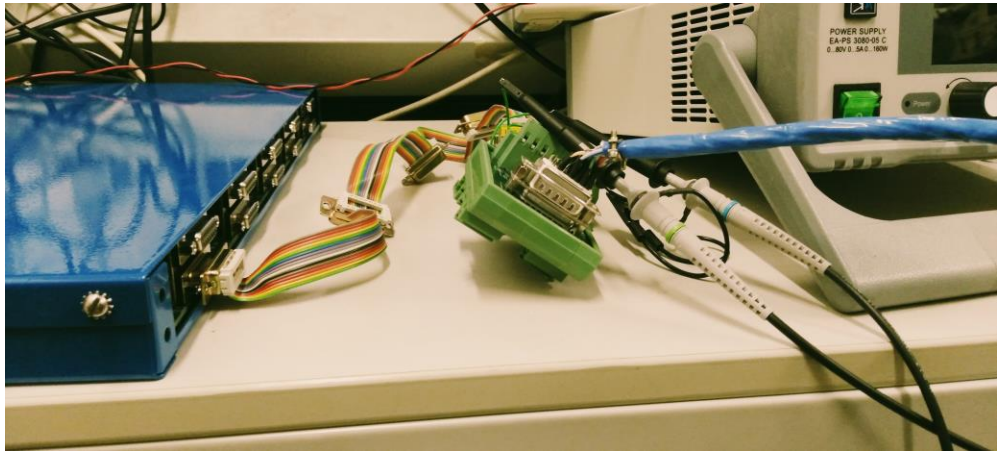
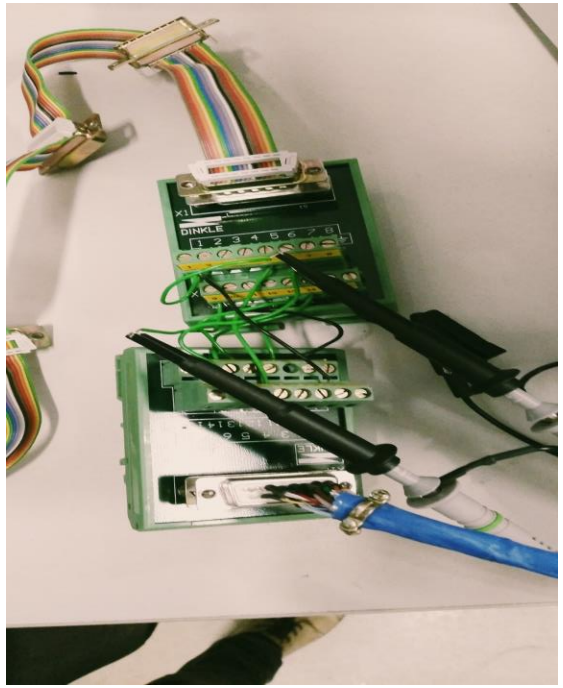
- We tried to remap the cold amplifier wires to channel 0





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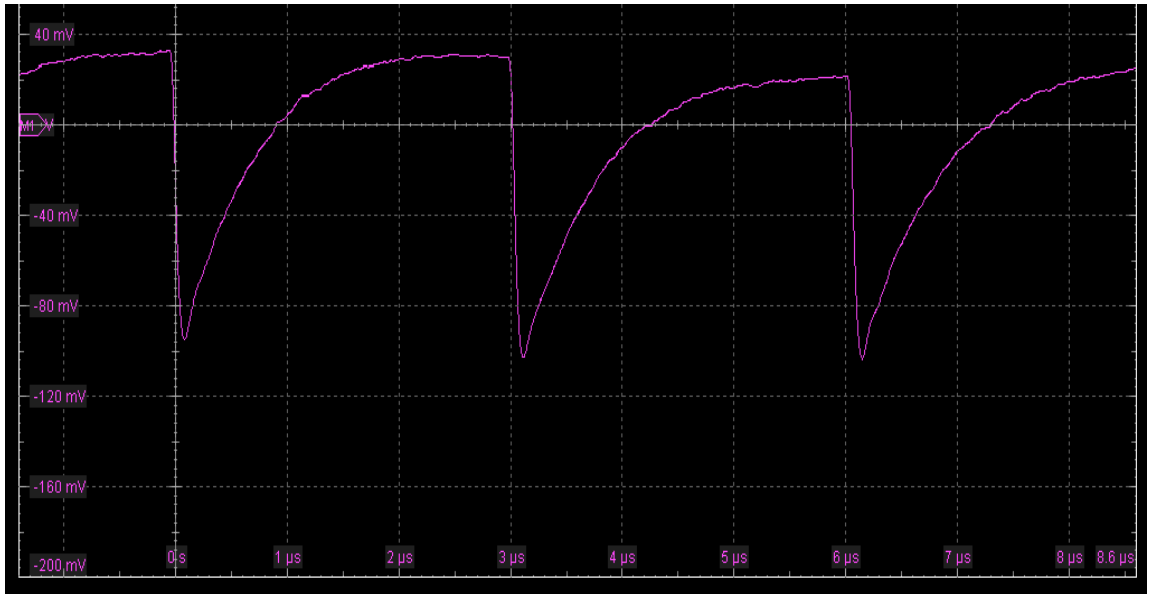

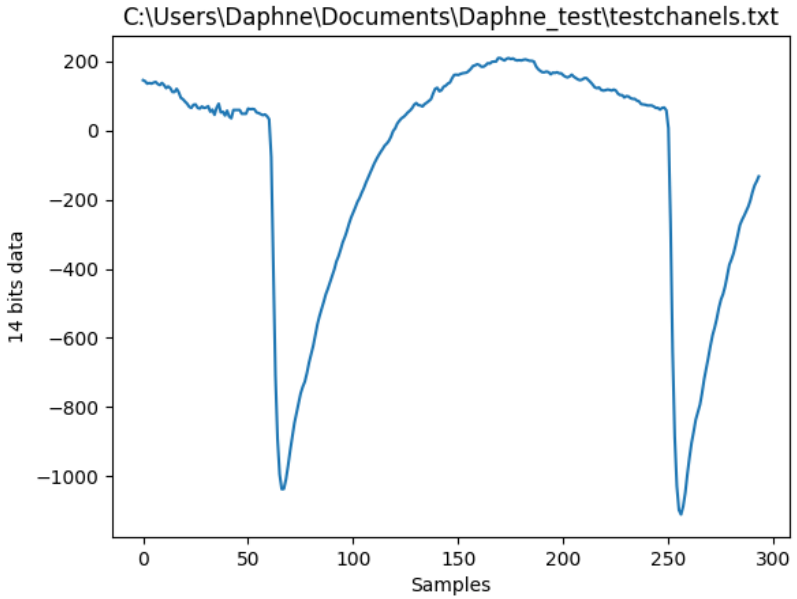

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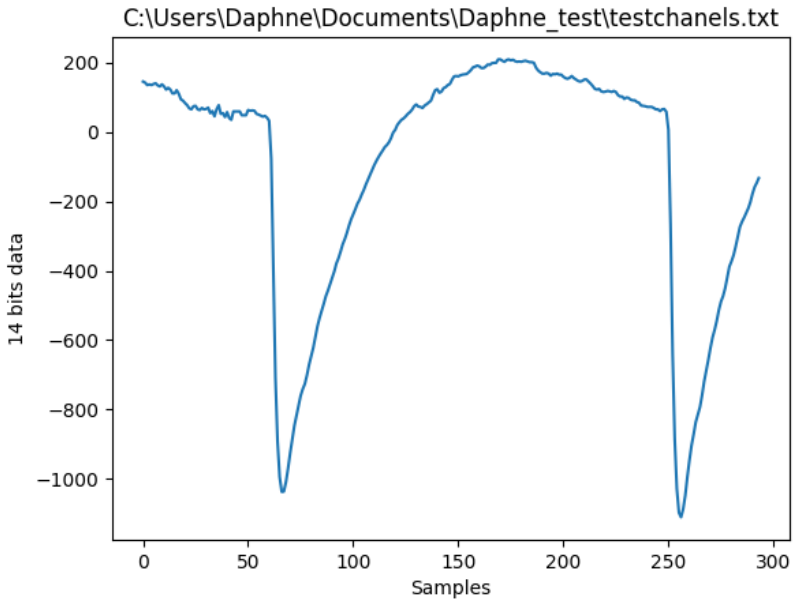
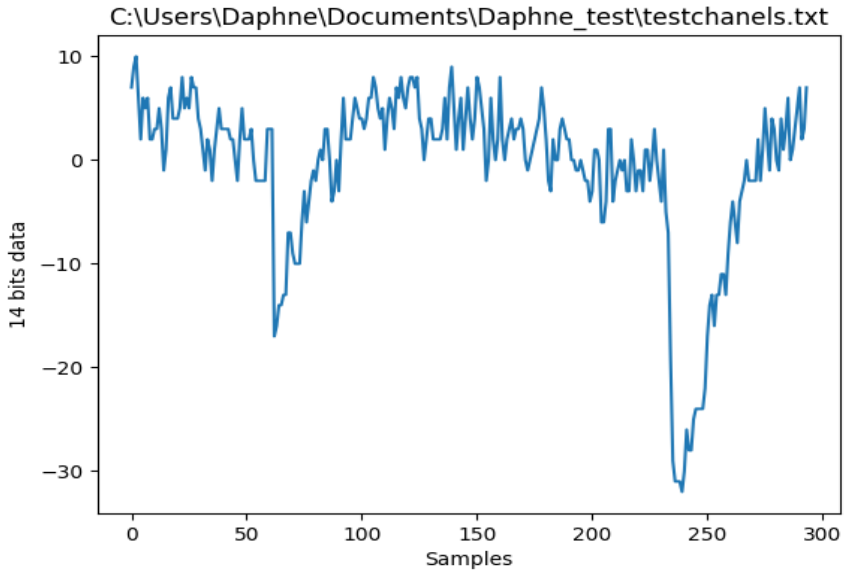
When we set the offset to channel zero, we get a change in the amplitude of the pulse. (WR OFFSET CH 0 V1000, WR AFE 0 REG 52 V 256)





Next Steps

- Undestand our signal: Test offset.
- Now the digitalization is fix in the channel zero (AFE 0), and this is in conflict with our cold amplifier setup, which is accesible through channel 4 or 5.
- We don't know if there is a command to aquire data per individual channel different that channel zero. (We believe that this feature is very important for upcoming test).
- Make the modification to the differential to single ended transformer at the input of the AFEs to supress the know crosstalk issue.
- Calibrate the gain and the offset per channel with the cold amplifier.
- Determine the signal to noise ratio.
- We'll need the external trigger.