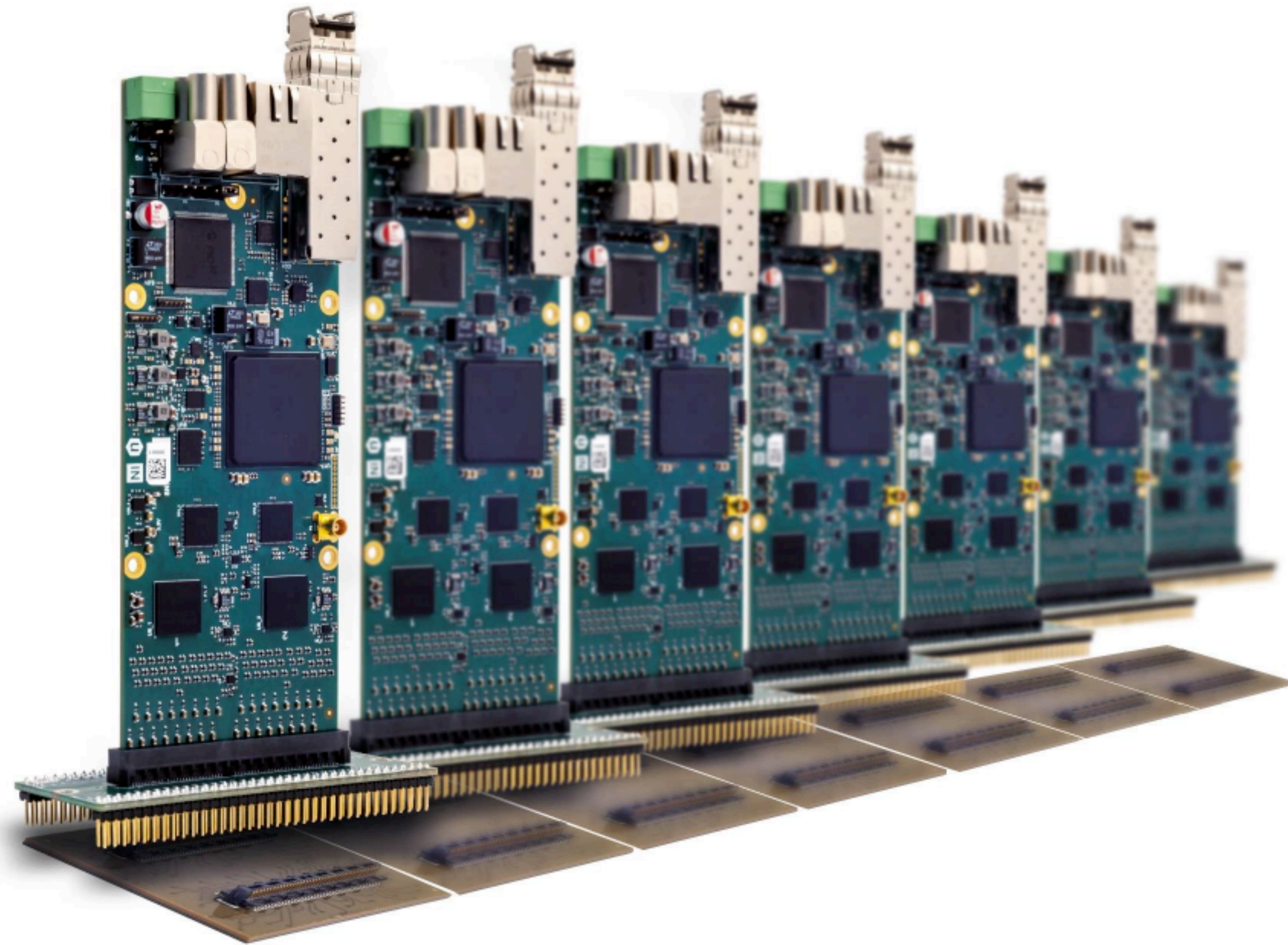# DAQ for muEDM precursor

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muEDM CM Pisa, 04/04/2024

INFN
PISA

Outlook

- The FERS A5202 board

  - *adaptions to CHET readout*

- Scifi electronics for the June test beam

  - *WaveDAQ configuration*

  - *Ideas for real time event display*

CAEN A5202 board

- Extendible up to 8192 channels
  - *SiPM bias and front end amplification included*
  - *synchronisation circuit developed by CAEN*
- Timing @200ps level
  - *Time Over Threshold available*
- Read out up > 100 kHz
- One board ordered for September test beam
  - *refer to Giovanni Gallucci's slide for preliminary tests*
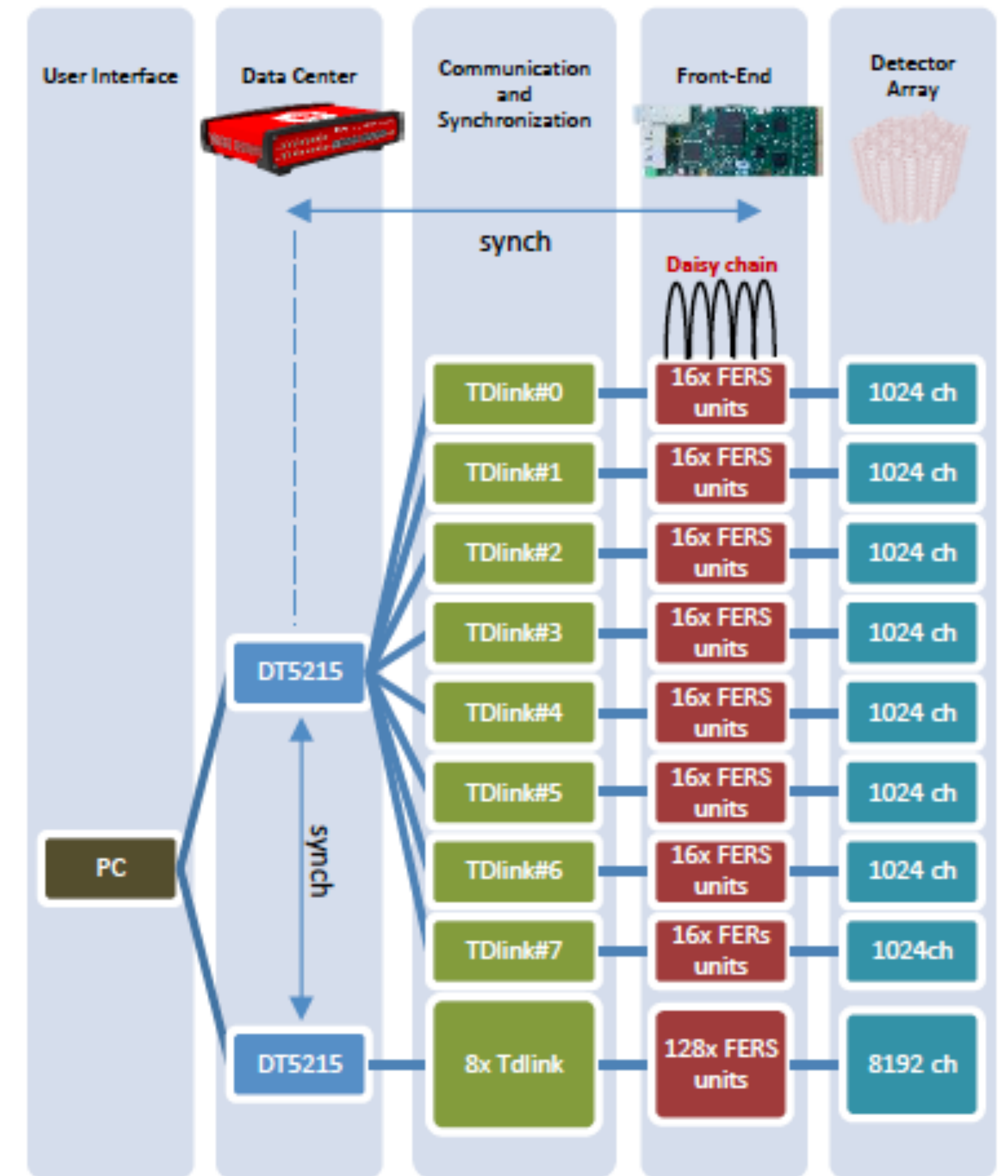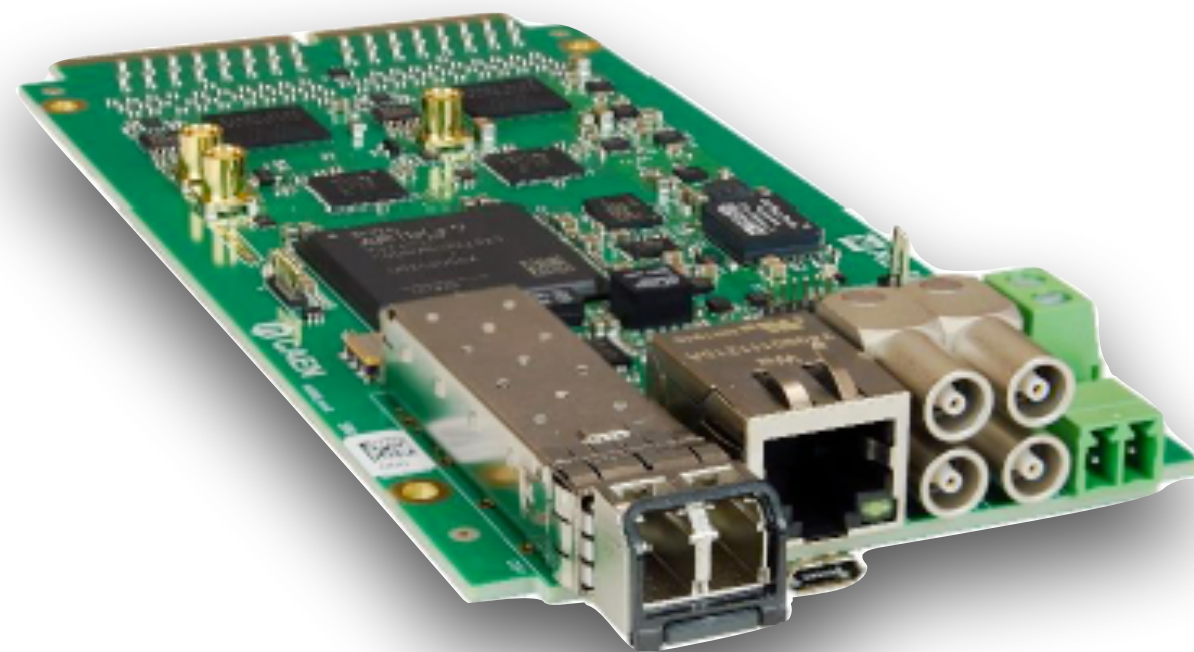
Configuration for muEDM

- FERS used for the CHET readout

  - *1000 - 2000 channels: yet to be defined*

  - *the trigger signal used to open a 20μs gate looking for hits in the fibre-tracker (common start)*

    - the signal is received on one of the LEMO input

  - *hits sent in push mode*

- Trigger signal distribution to be designed

  - *16 (32) copies are needed for 1024 (2048) read out channels*

    - we should agree on how/who can do this
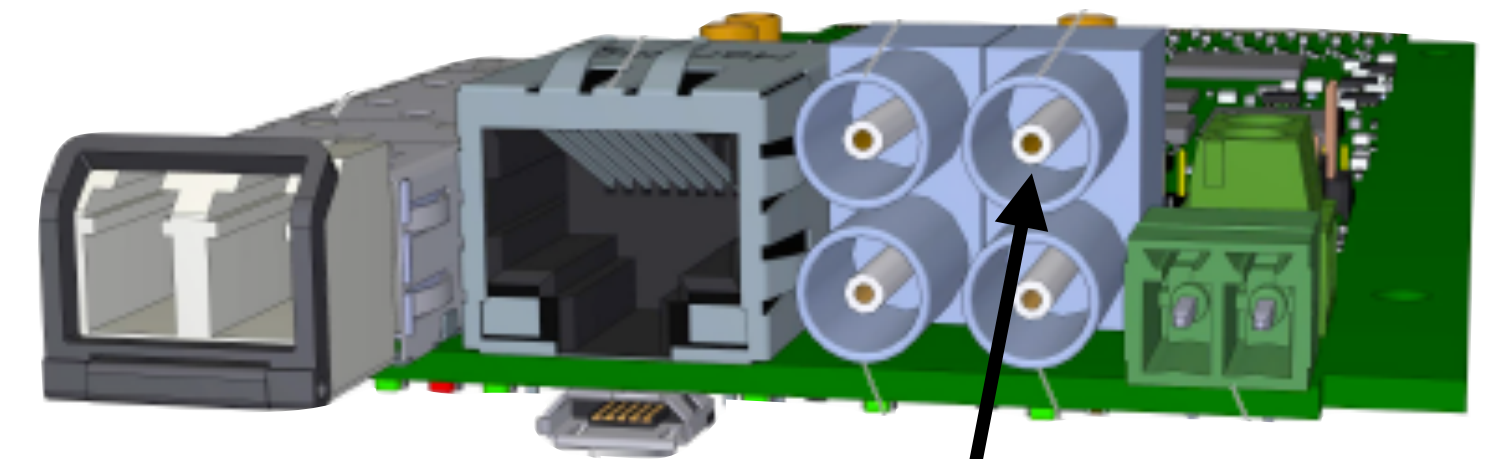
TRG (TDC gate) input

Connection to SiPMs

- A5253 ordered for 2024 test beam

- SiPM to FERS connection as in the picture below

A5253 Views
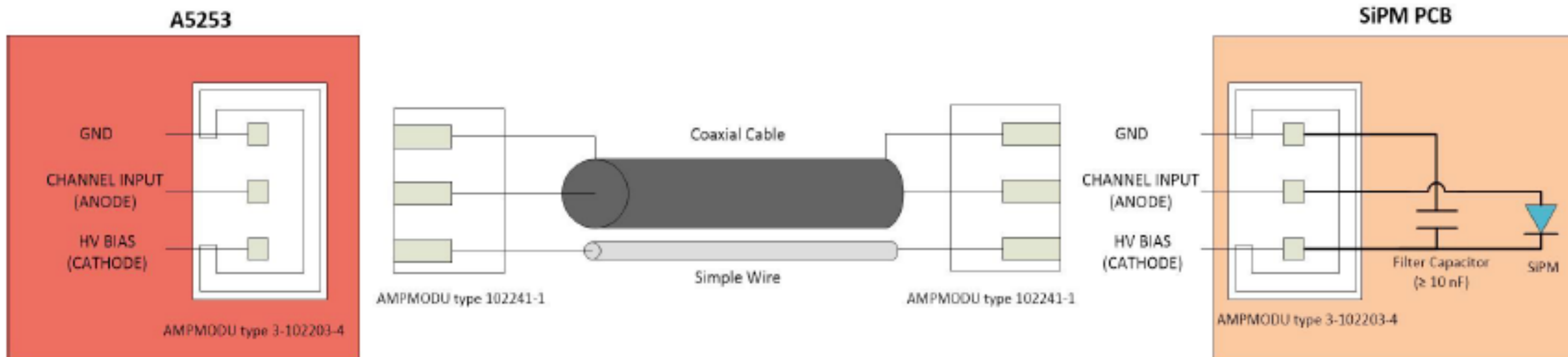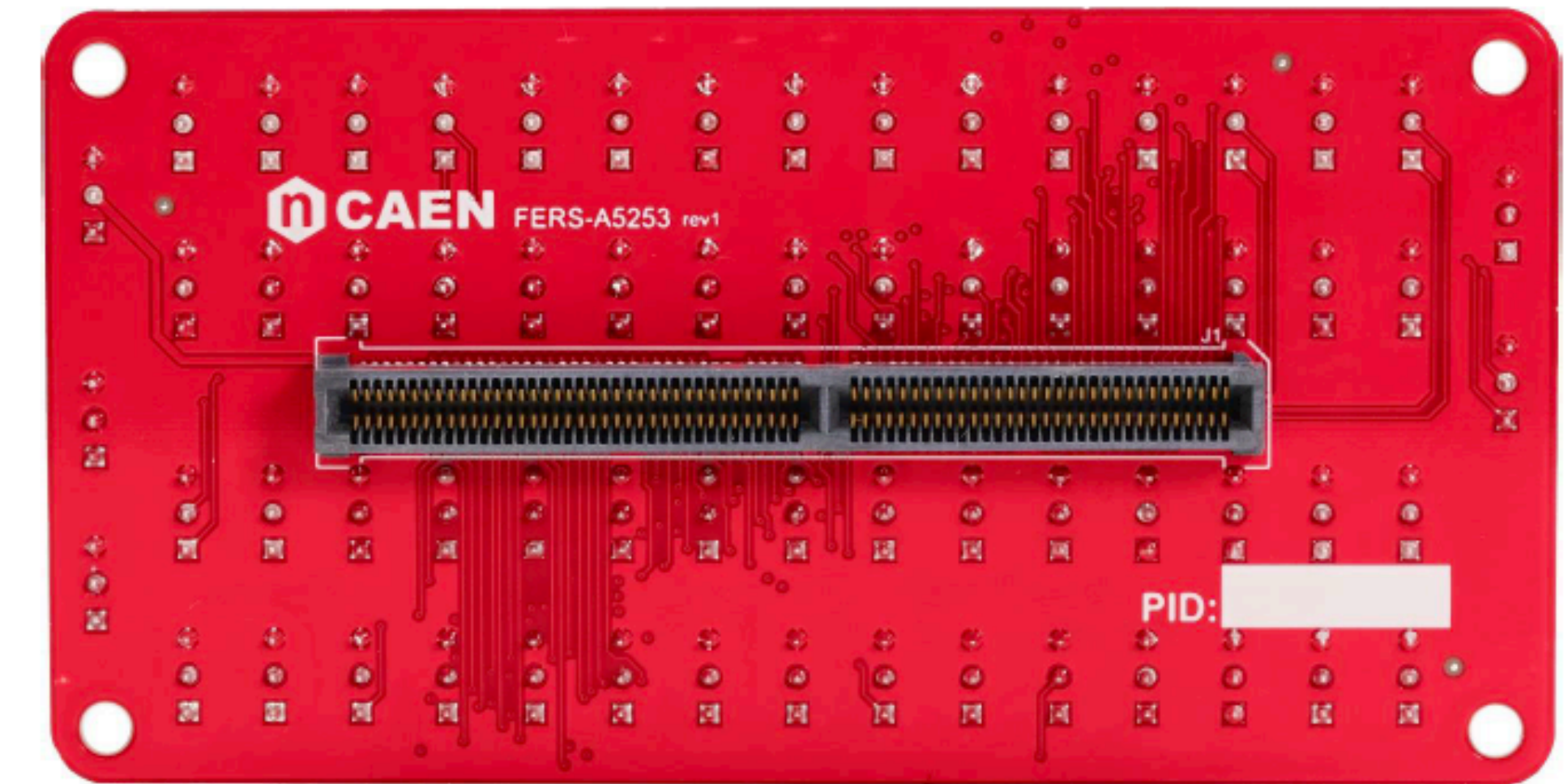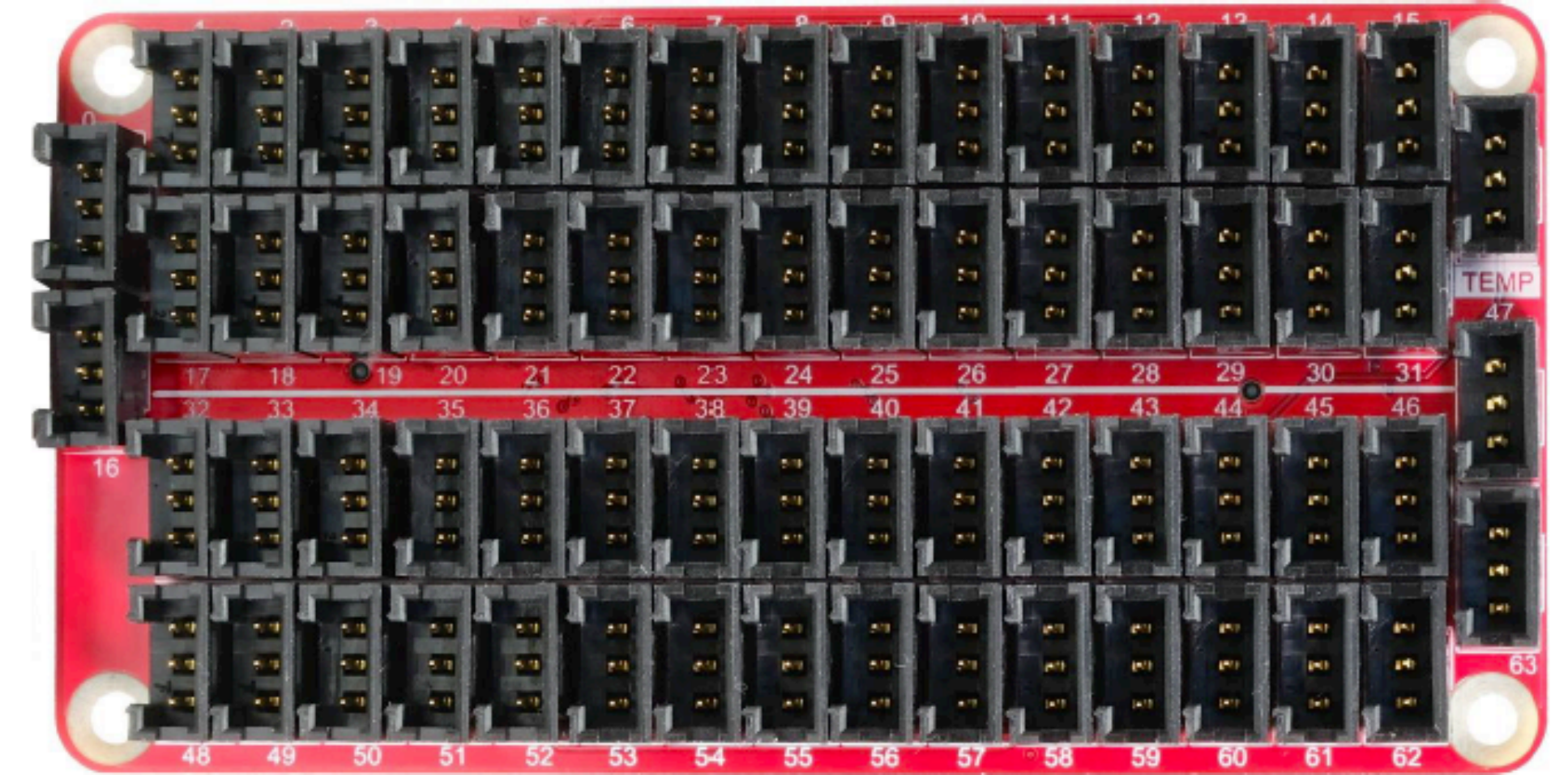
Other thoughts on the DAQ

- Beam monitor scintillators required hit rate

  - *this is not straightforward to have with the FERS in parallel to TDC use*

    - to be clarified

  - *The WaveDAQ option still open*

    - could be used for continuous rate readout during DAQ

      - *"slow control" mode*

    - for calibration waveform read out could be possible

- The DAQ will be on MIDAS

  - *the FERS read out will be imported there, non trivial task...*

WaveDAQ for SciFi

Electronics HW

- Prepared by Marco Francesconi and myself and available to test in the office

- In contact with Diego to

  - *install MIDAS: done*

  - *prepare a configuration file for the system: done*

  - *test the DAQ: partially done*

- As soon as possibile I suggest to test the electronics with the SciFi HW for threshold setup

  - *also just as an exercise*

Refer to Angela's slides for the SciFi HW
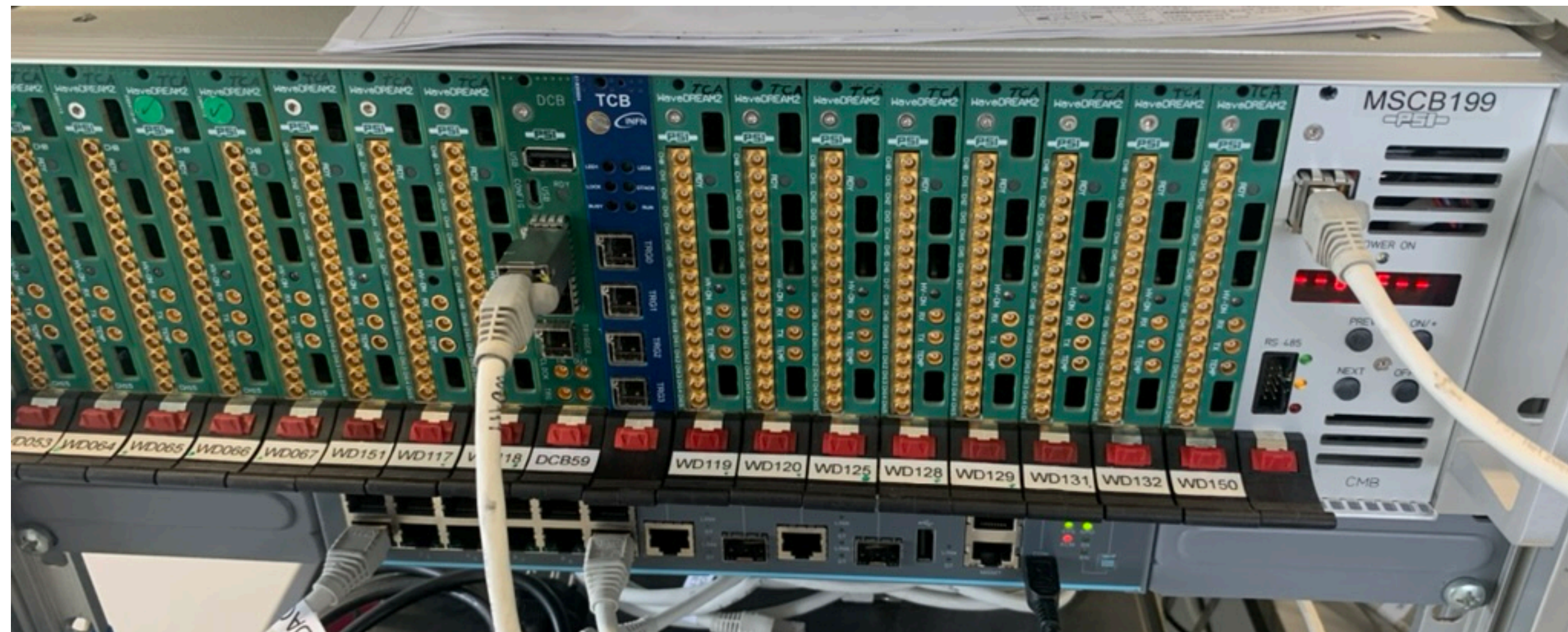
Cabling

- 21 fibres per side, 42 fibres in total (84 channels)

  - *first 42 WaveDAQ channels for side 0...*

  - *SiPMs pairs to (2*N, 2*N+1) inputs*

SCIFI-0	SCIFI-1	SCIFI-2	SCIFI-3	SCIFI-4	SCIFI-5	SCIFI-6	SCIFI-7	DCB59	SCIFI	SCIFI-8	SCIFI-9	SCIFI-10	SCIFI-11					
						MATRIX-0	MATRIX-1		SCIFI-T	MATRIX-2	MATRIXI-3	MATRIX-4	MATRIX-5					
			MSCB199															MSCB199
								TRGBUS										
WD599	WD601	WD604	WD605	WD606	WD607	WD816	WD850			WD851	WD852	WD853	WD856					

Data collection and analysis

- The DAQ work as follows

  - *periodic rate at a frequency of 0.1Hz (enough to integrate some beam...)*

  - *every 10secs the number of hits per fibre and per fibre-crossing (i.e. pairs of channels and pair of pairs) together with a time counter*

    - to have the rates we "just" have to compute the ratio of the differential hit rate divided by the elapsed time

    - the info are contained in available midas bansk

      - *so far we could take data but as far as I know the banks were missing*

Hints for online display

- You could try to write the rates in the ODB a design a custom page…