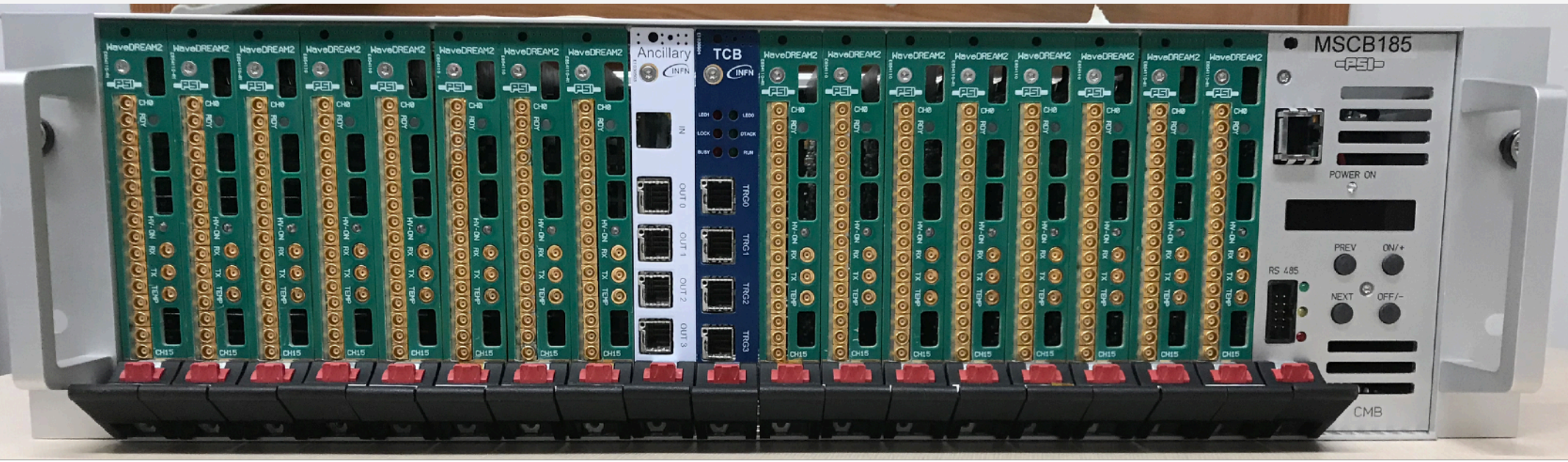
ΔE-TOF DAQ updates



Luca Galli
INFN Sezione di Pisa

FOOT meeting 03-12-2018

Istituto Nazionale di Fisica Nucleare

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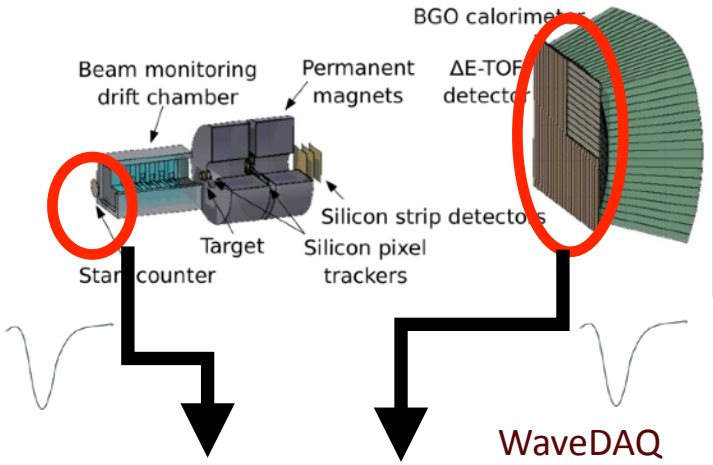
WaveDAQ reminder

- WaveDREAM
  - connected to ΔE-TOF and Start Counter SiPM arrays
  - HV, amplification, GSPS digitisation, zero suppression on FW
  - channel based scaler
- TCB
  - crate trigger generation and rate counter
  - interfaced with FOOT trigger board

- DCB
  - connected to ΔE-TOF DAQ
  - readout of WDB and TCB data from backplane

The ΔE-TOF DAQ is then connected to the FOOT DAQ

WaveDAQ - FOOT connections

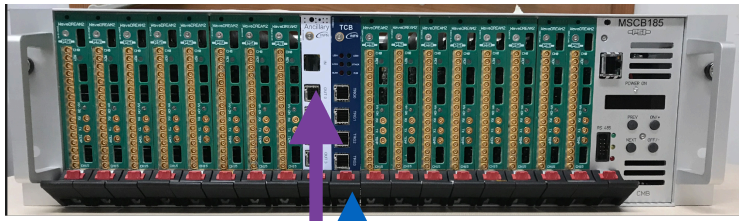


to PC waveforms, to crate configs.

WaveDAQ PC

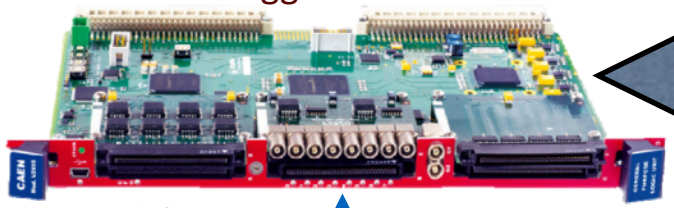
FOOT DAQ

WaveDAQ



to PC waveforms, to crate configs.

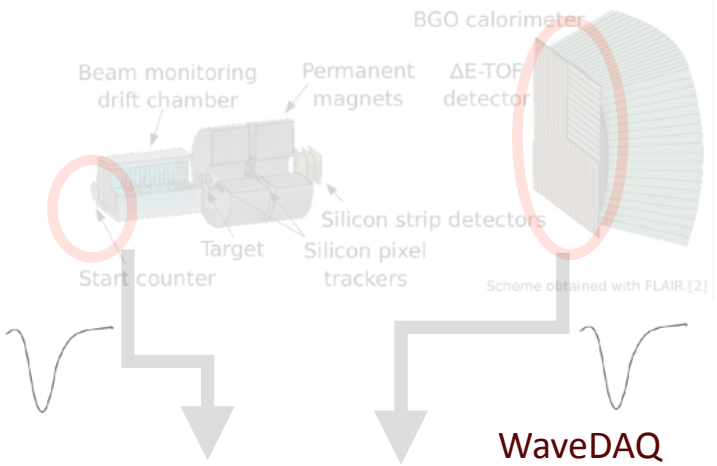
trigger board



Other detectors

trigger, busy, SYNC CLK and pulse

WaveDAQ - FOOT connections

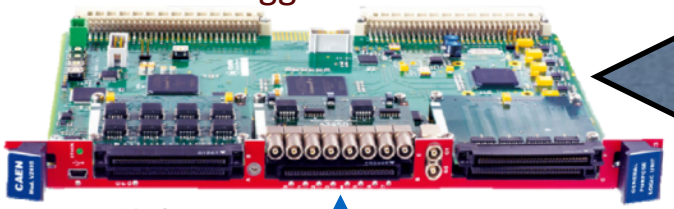


WaveDAQ

to PC waveforms, to crate configs.

FOOT DAQ

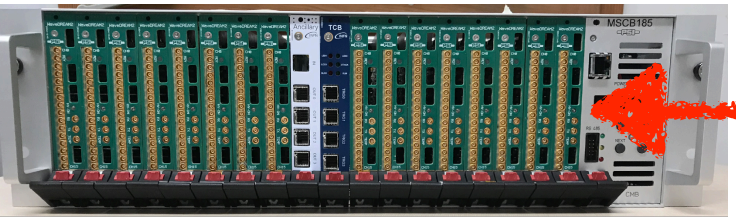
trigger board



Other detectors

trigger, busy, SYNC CLK and pulse

WDAQ-trigger board interface: Opt 1



WaveDAQ

Others

trigger board

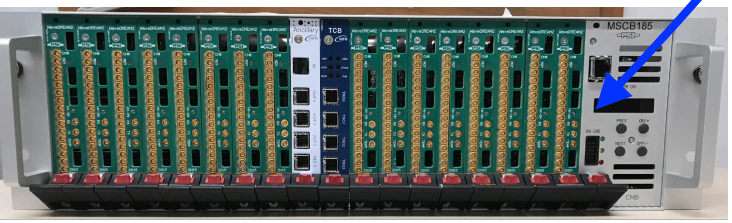
Local

Global

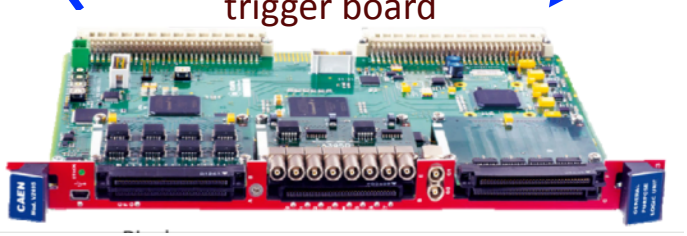
trigger

busy

WDAQ-trigger board interface: Opt 2



Others



Local

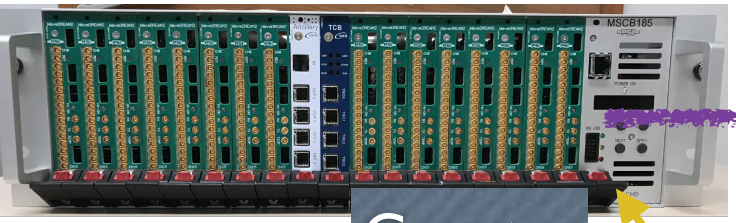
Global

trigger

busy

1MHz counter

WaveDAQ



Counter

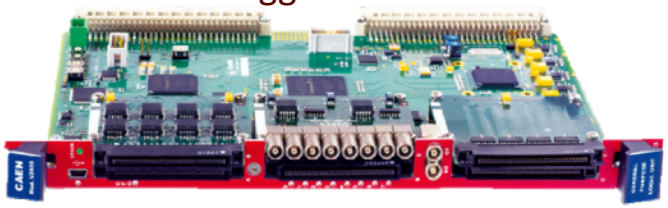
Others

Counter

Local

Global

trigger board

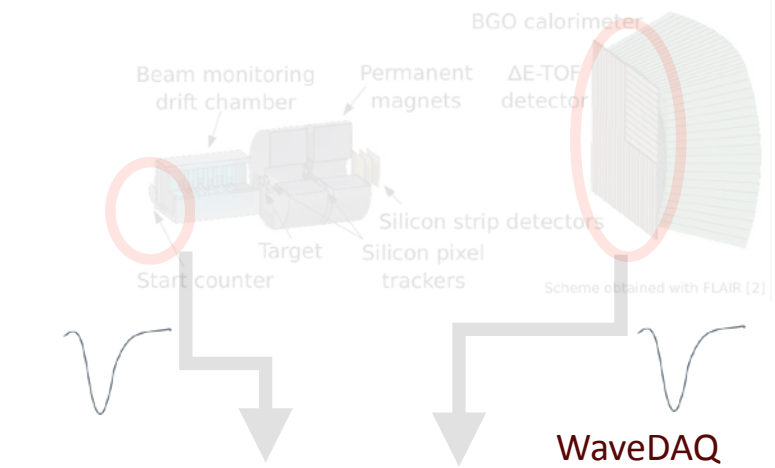


reset

clock

time

WaveDAQ - FOOT connections



to PC waveforms, to crate configs.

TCP

WaveDAQ

WaveDAQ PC

FOOT DAQ

to PC waveforms, to crate configs.

UDP

trigger board

Other detectors

trigger, busy, SYNC CLK and pulse

Read out SW status

- developed for single crate read out for MEG II tests, wd_cl
  - *board configuration from file*
  - *data collection and calibration*
  - *storage to disk*

- we can reuse the SW with some modifications:
  - *configuration from commands sent through ethernet*
  - *data transmission via ethernet*
    - client-server implementation as prescript by Bologna's group

Read-out SW status

from wd_cl

```
/* main loop on the options */
 do {
    printf("\n  --- options: \n");
    printf("[ 1]: configure system      \t \t  [ 2]: draw system          \n");
    printf("[ 3]: system start          \t \t  [ 4]: get busy            \n");
    printf("[ 5]: system stop           \t \t  [ 6]: system sync         \n");
    printf("[ 7]: turn on               \t \t  [ 8]: turn off           \n");
    printf("[ 9]: train serdes          \t \t  [10]: print serdes state  \n");
    printf("[11]: spawn daq             \t \t  [12]: stop daq            \n");
    printf("[13]: sync dly scan         \t \t  [14]:                     \n");
    ……
```

```
class WDServerInterface: public DAQServerInterface {
public:
   WDServerInterface(bool verbose);
   ~WDServerInterface();

   int initialize();
   int shutdown();

   void configure(std::vector<uint32_t> & param);

   void GoToRun();
   void StopDC();
   void publish(std::vector<uint32_t> & param, std::vector<uint32_t> & results);

   uint32_t bytesAvailable();
   void readData(std::vector<uint32_t> & evt, int maxValues=10000);

protected:
   bool m_isRunning;
};

#endif
```

this will be discussed with Bologna people very soon

from TDAQ interface

Conclusions

- Inclusion of the WaveDAQ in FOOT looks defined and in good shape
  - *there shouldn't be any showstopper for the GSI test beam*
- TOF-DAQ group: Giancarlo Sportelli, Pietro Carra, Marco Francesconi, Luca Galli (+ Pisa group in general)

- Anyway we expect to have a temporary set up, we may still miss:
  - *DCB still under prototyping phase, probably not ready for April*
    - i.e. read out in ~pull mode instead of push
      - *may slow down the data rate*
    - no zero-suppression