

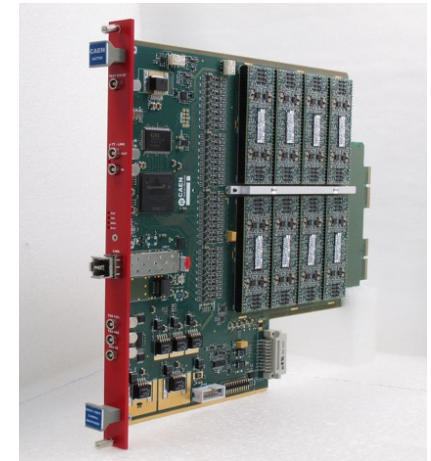
# TPC\_WG FNAL

*Sandro Centro, Guang Meng  
INFN Padova, 19 Sept. 2018*

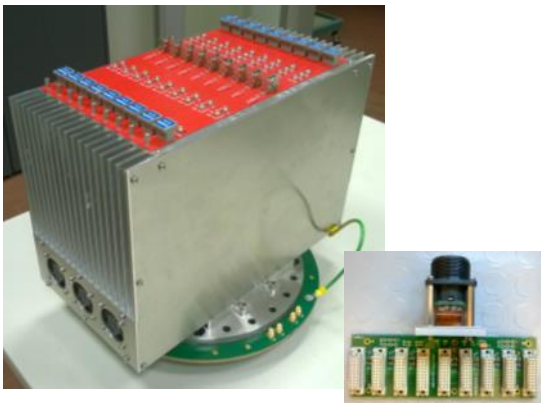
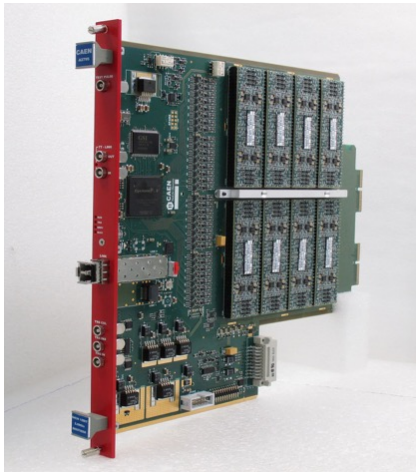
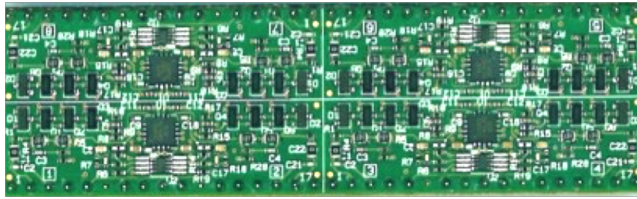


# TPC readout electronics boards test in CERN

- ❖ Total 532 A2795 boards have been mounted preamplifiers modules and tested in CERN.
- ❖ The test system consists of:
  - ✓ one mini crate that can host 9 A2795 boards;
  - ✓ one flange as a backplane for the mini crate;
  - ✓ the cables (~2m) connected on the internal side of the flange and enclosed in a metal container as a faraday cage.
- ❖ The mini-crate is connected using the optical fiber to a PC (through a CAEN A3818 PCI-express card) for the read-out of the data streams generated by the A2795.
- ❖ The test pulse (2kHz, 100mV square wave) is generated internally at the A2795.
- ❖ One test procedures with three DAQ runs:
  - ✓ without test pulse for measuring the noise;
  - ✓ test pulse on even channels for measuring the gain;
  - ✓ test pulse on odd channels for measuring the gain.
- ❖ The problems, found on 10 boards, are:
  - ✓ mechanical problem that prevents the insertion of the board;
  - ✓ some channels have high noise;
  - ✓ some channels don't work.



# Status of the parts



## ❖ Preamplifier status:

- ✓ 7400 preamplifiers modules (each modules servers 8 channels) have been produced and tested in Elec. Lab. in Padova;
- ✓ 4256 preamplifiers modules have been mounted on the A2795 boards;

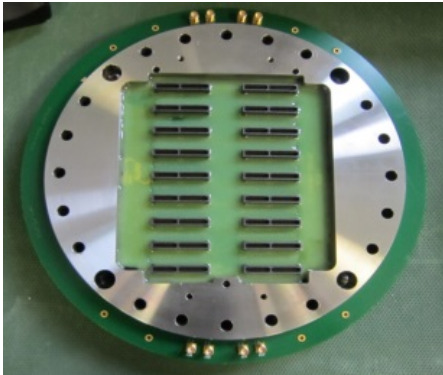
## ❖ A2795 status:

- ✓ 532 boards with amplifiers mounted and fully tested in CERN;
- ✓ 112 boards will be delivered by October 2018;

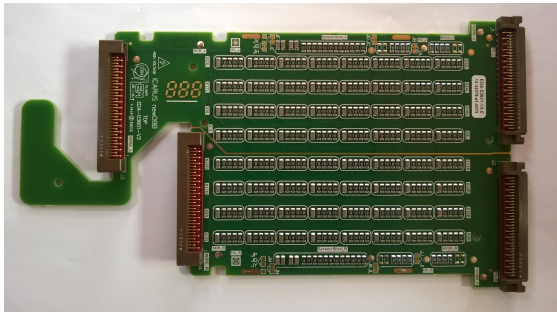
## ❖ Mini crates and backplane status:

- ✓ 105 mini crates already delivered to CERN;
- ✓ 50 backplanes will be assembled and installed in mini crates by October 2018.
- ✓ Remaining backplanes will be ready by December 2018.

# Status of the parts



- ❖ **Flanges status:**
  - ✓ Full delivery in CERN by September 2018.



- ❖ **DBBs (864 required) and cage (96) status:**
  - ✓ 900 DBBs successfully tested in CERN;
  - ✓ Cage in production: expected delivery by September 2018;

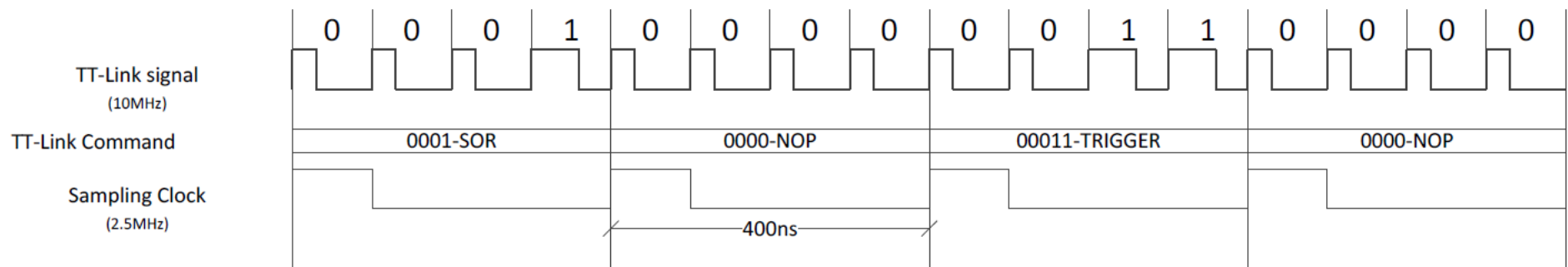


- ❖ **Power Supply status:**
  - ✓ 50 will be ready by September 2018;
  - ✓ Remaining power supply will be ready by January 2019.

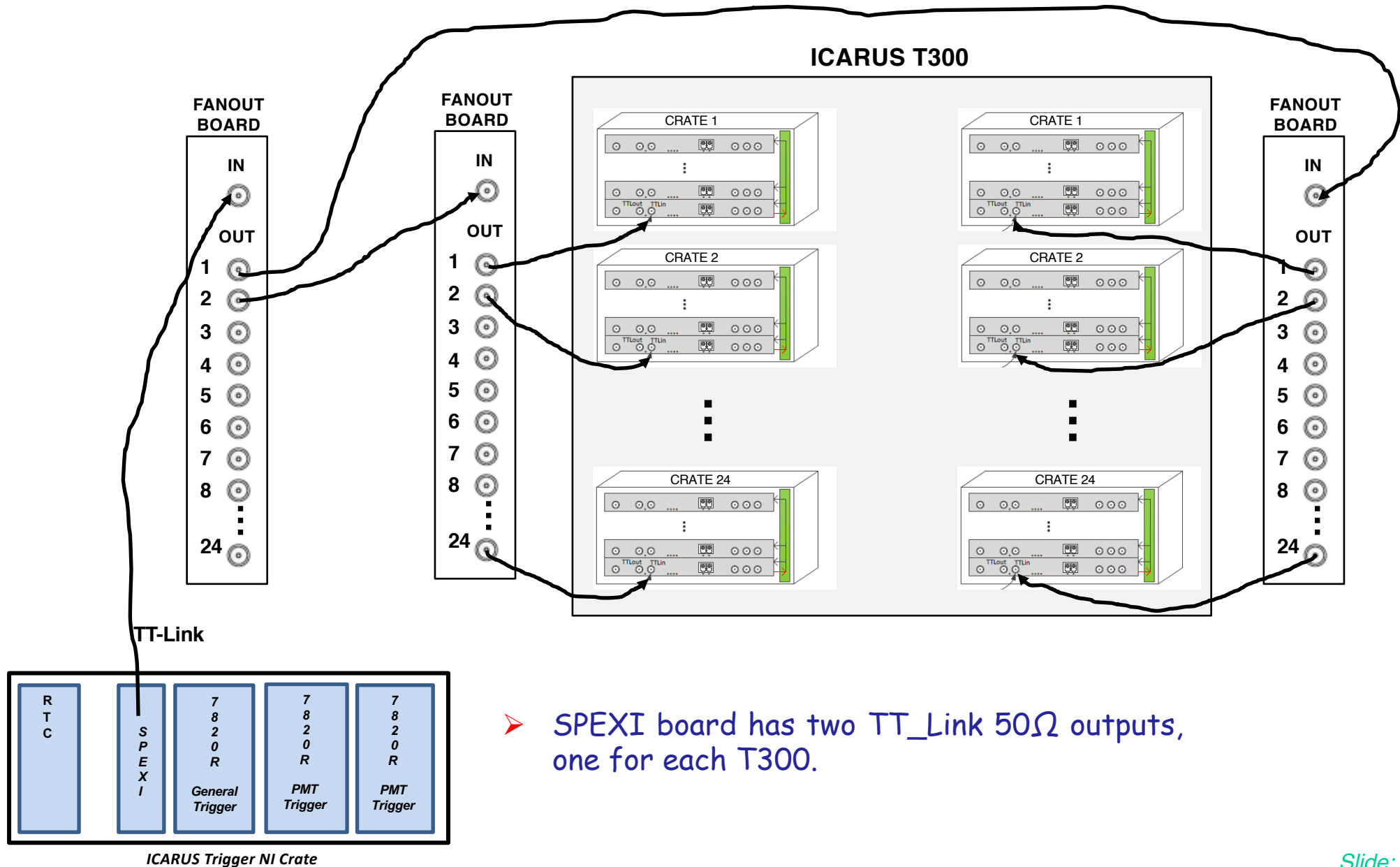
- In the TPC electronics supply contract (670 CAEN A2795 boards) the last production (25%) was expected to be delivered by Feb. 2019 and funded in the 2019 fiscal year.
- INFN Board has accepted Icarus request to anticipate 410k€ in 2018 fiscal year to get the last delivery anticipated by CAEN before the end of 2018.

# TT-Link Signal

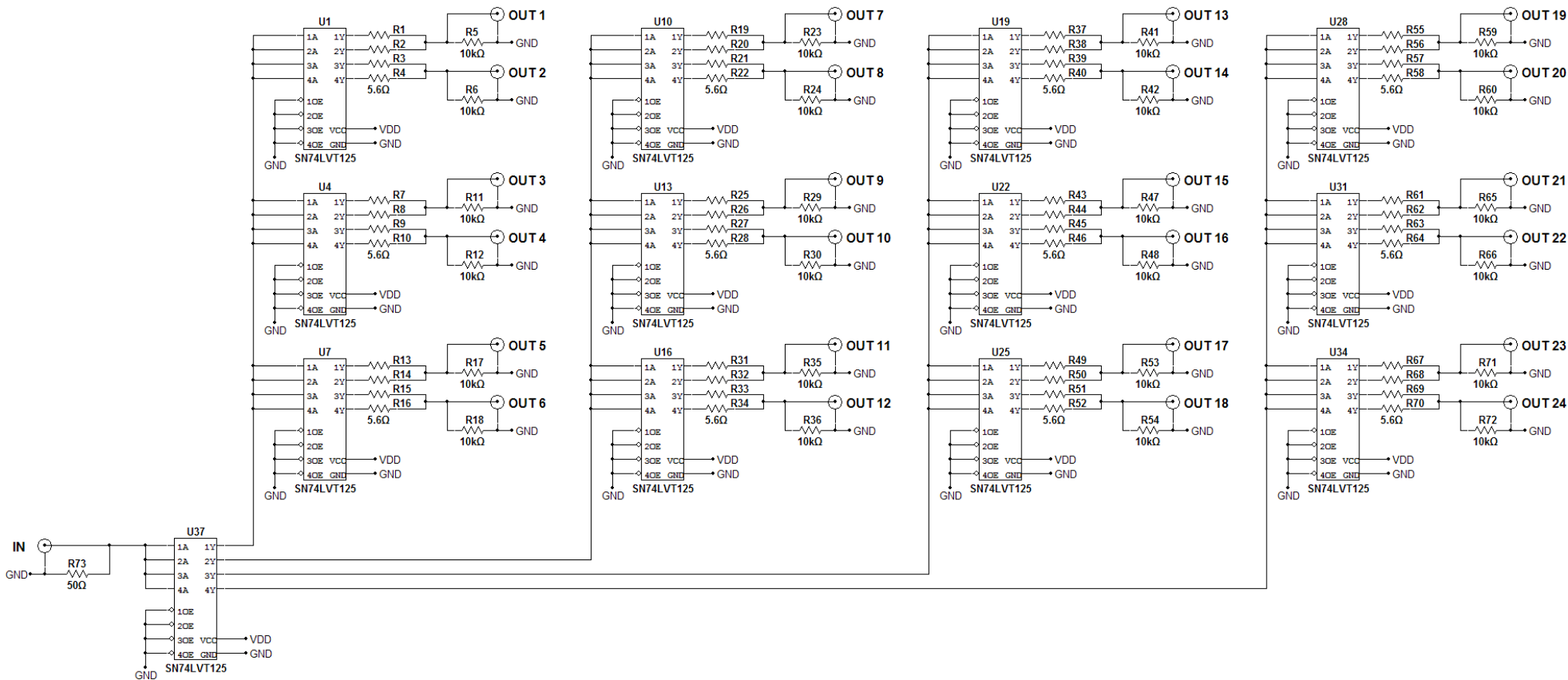
- The TT-Link (Timing and Trigger Link) is used to distribute the sampling clock and a set of real time commands to all the TPC readout electronics boards (A2795).
- The TT-Link is a 1 wire serial bus which sends a 10 MHz clock with a modulated duty cycle
- TT-Link input on the board (A2795) : LEMO connector, TTL standard,  $Z_{in}=50\Omega$ .



# TT-Link Connections



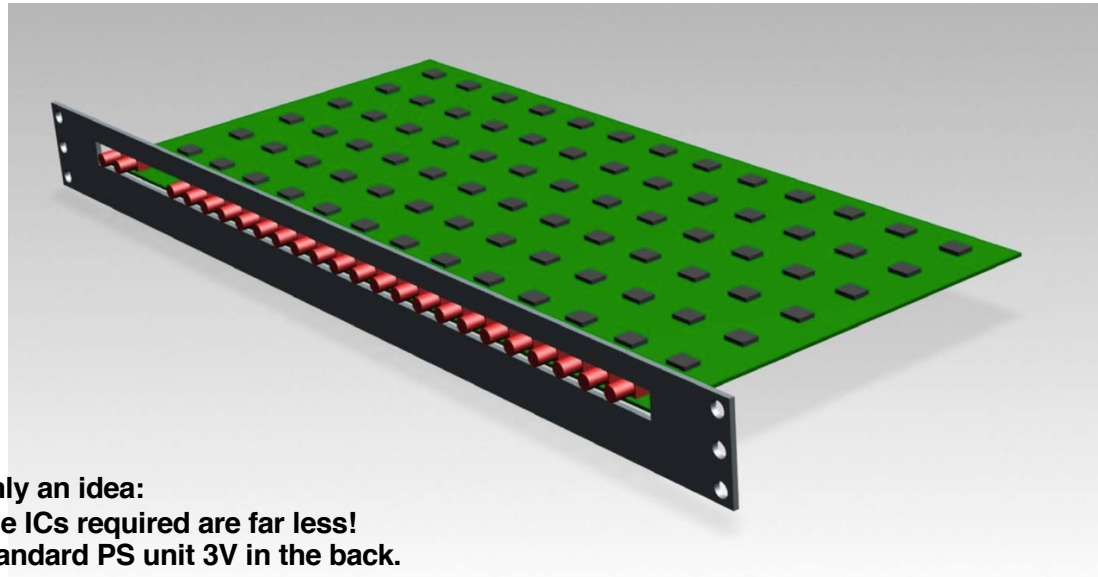
# TT-Link Fan out Board Schematic



- 24 outputs, plus some spares. LEMO connectors PCB style.
- Power supply requirement: 3V, >3A
- Recommend using: RSP-150-3.3 or equivalent



# TT-Link Fan out - Mechanics Proposal



**Only an idea:  
The ICs required are far less!  
Standard PS unit 3V in the back.**

