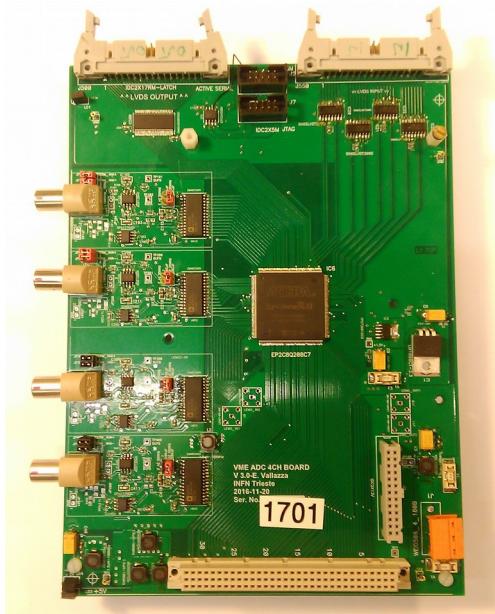


Update proposal for LEMMA silicon detectors DAQ system
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The DAQ system used in August 2017 at the H4 testbeam, while successful in data taking, was extremely cumbersome because of the use of standard 34-wire twisted cables (2 per X-Y silicon detector system). The present proposal describes a possible upgrade with fiber optics connection. The present frontend system uses the ADC board below

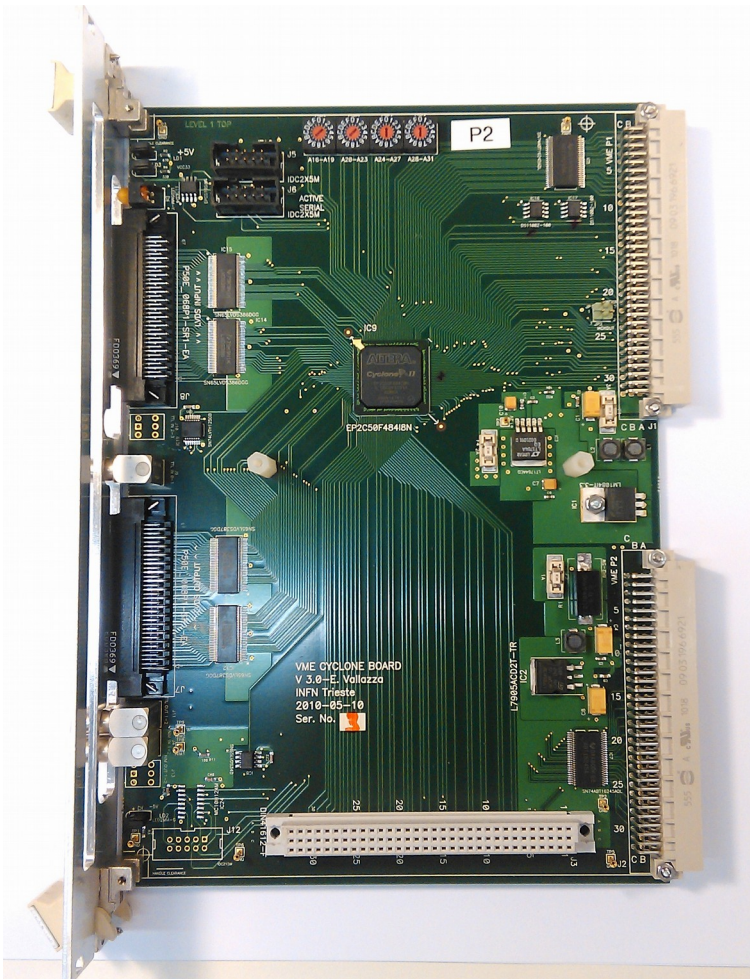


The ADC board is able to read out up to 2 X-Y silicon detector systems (in 2017 we used 1 ADC per detector system). At the moment the two top IDC connectors are used for input and output. All the digital signals from the ADC can also be sent to the DIN connector.

The readout is based on a VME board which has two functions

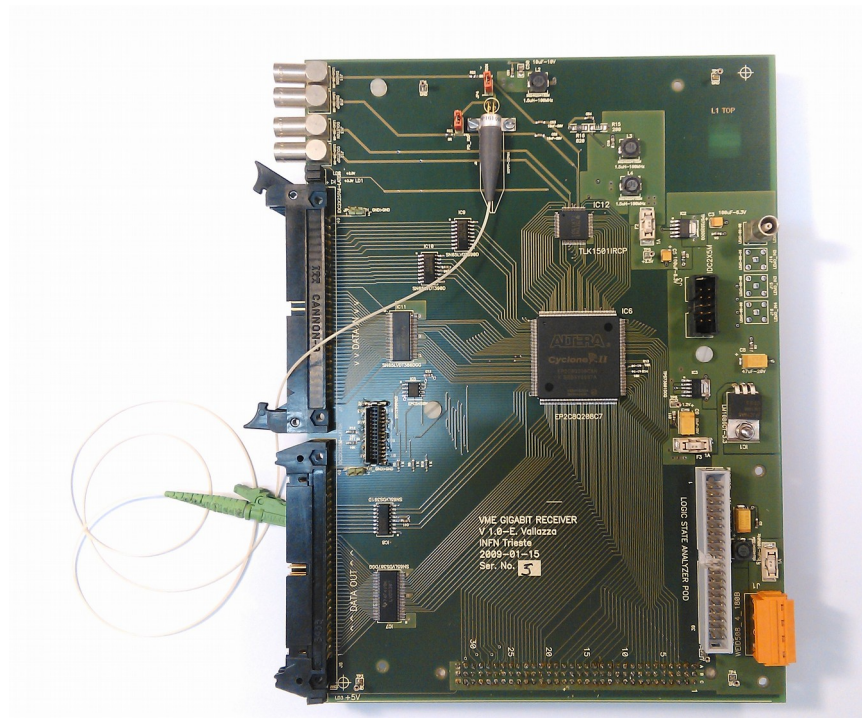
- send the control signals for the readout;
- perform zero suppression and store the data from the silicon detectors during the spill in order to read data between the beam extractions.

A similar board, the VCB shown below



Is equipped with a DIN connector similar to the one on the ADC.

My proposal is to develop a plugin board to allow full duplex operation by means of a fiber optic cable. I have already designed and tested in 2009 a board with some of the functionality, the gigabit receiver shown here



but the communication via the fiber optic cable was asymmetric (only reception). A new board with full-duplex capability could be used on either side of the link. Moreover, modern FPGAs (Altera Cyclone IV and V) provide integrated gigabit links easily interfaced to the fiber optic cables. The board on the VME side would also perform the zero suppression and storage of the data during the spill.