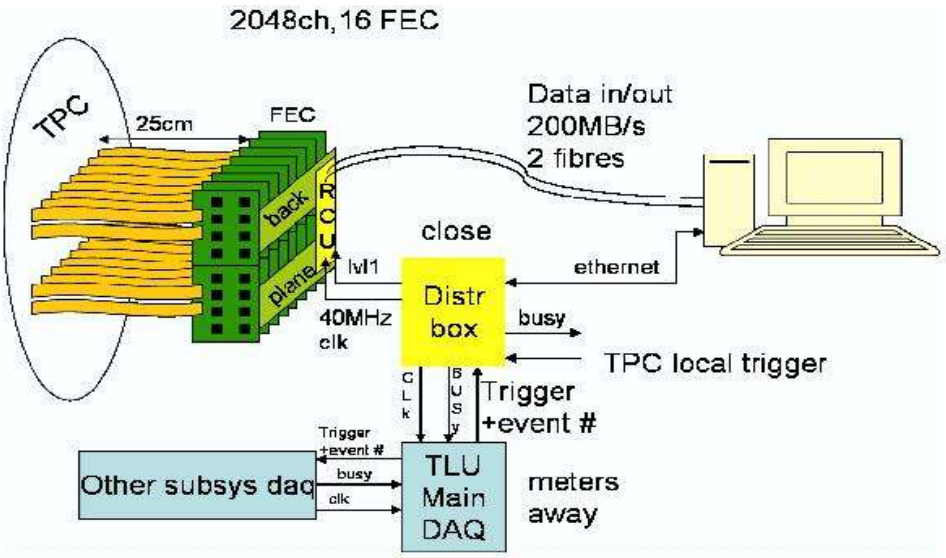
A detector at a future linear electron-positron collider will have a high precision tracking system inside a calorimeter system, and both systems will have a very high granularity. These will be contained in the detector solenoid producing a high magnetic field, ~ 4 Tesla, to reduce the backgrounds at the vertex and to enable very good track momentum resolution ($\delta pt/pt^2 \sim 5 \times 10^{-5}$ /GeV/c). A large Time Projection Chamber (TPC) is a candidate for the central tracker system.

The Linear Collider TPC (LCTPC) Collaboration [1] is currently building a large TPC prototype (60 cm long, with an outer radius of 77 cm), offering some modularity to investigate various gas amplification systems (GEM or MICROMEGAS), pad sizes and geometries as well as different read-out systems.

In this note we present a new read-out system developed for this large prototype, based on the read-out electronics of the ALICE experiment at the LHC [2]. Several modifications which are described in this note have been necessary to adapt it to the expected output signals from the gas amplification systems. These modifications include a new programmable charge amplifier. The schematic layout of the system is shown in Fig. 1.



The new charge sensitive pre-amplifier PCA16, developed by CERN, integrates 16 channels into one chip. It has a programmable peaking time between 30 and 120 ns, as well as a programmable gain in four steps between 12 and 27 mV/fC. The pre-amplifier parameters can be controlled through the Board Controller FPGA located on the Front-End Card (FEC). The output signals of the PCA16 are then digitized by a fast analog-to-

digital converter ALTRO developed by the ALICE experiment with a sampling frequency of 25 [3] or 40 MHz for its modified version.

Since the smallest pad size to be investigated will be ~ 1x5 mm^2, that is much smaller than the effective area per channel occupied by the FEC, the pad-plane will be connected to the read-out electronics through 25 cm long high density kapton cables . The FEC's are placed on a backplane together with the Readout Control Unit (RCU) used to control the readout. The data are sent through an 200MB/s optical link to a 64-bit PCI card located in a PC. The readout software is based on the ALICE system but it has been modified and extended, while the control software is entirely new for this TPC application.

Since the FECs are designed to receive the LHC clock, an additional card, called distribution box, has been developed in order to send the trigger signals and the clock to the FECs. The trigger signals can be received from local triggers when the TPC is operated in a stand-alone mode, or from the central Trigger Logic Unit (TLU) when the TPC is tested with other subdetectors in a common test beam setup.

The large prototype and its data acquisition system will be tested on a large scale (10,000 channels) in a 6 GeV/c electron beam at DESY (Hamburg) in summer 2008. In the presentation we will describe the TPC data acquisition system, enlightening the novelties and the modifications with respect to the ALICE system. We will also report on the performance of the DAQ system.

Acknowledgments :
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