A Data Acquisition System for Small Experiments

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The computer and data acquisition market is changing rapidly: many old PCs are replaced by faster systems and MS−DOS is out of fashion. Consequently, there is the need to replace the old PC−based CAMAC data acquisition systems used for small experiments and de − tector tests. Developing a completely new program is beyond any discussion, standard components should be used instead to minimize man power and programming effort. A new readout and visualization system is pre− sented, combining i) the data acquisition concept de− veloped by ZEL [1], ii) ported to Linux, and iii) the well−known CERN software package PAW [2].

the interface is based on the visual representation of a CAMAC crate, see Fig. 1. When starting the program the computer hardware is scanned for installed CA− MAC interfaces, one can only start a server for existing hardware. After definition of the used converter mod− ules and activation of the ADC or TDC channels, the trigger type (e.g. LAM trigger or triggering via a syn− chronisation module) can be selected. Data output can be chosen to be to file, tape, or Ntuple.

If Ntuple data output is chosen a PAW window is started automatically with access to a shared memory

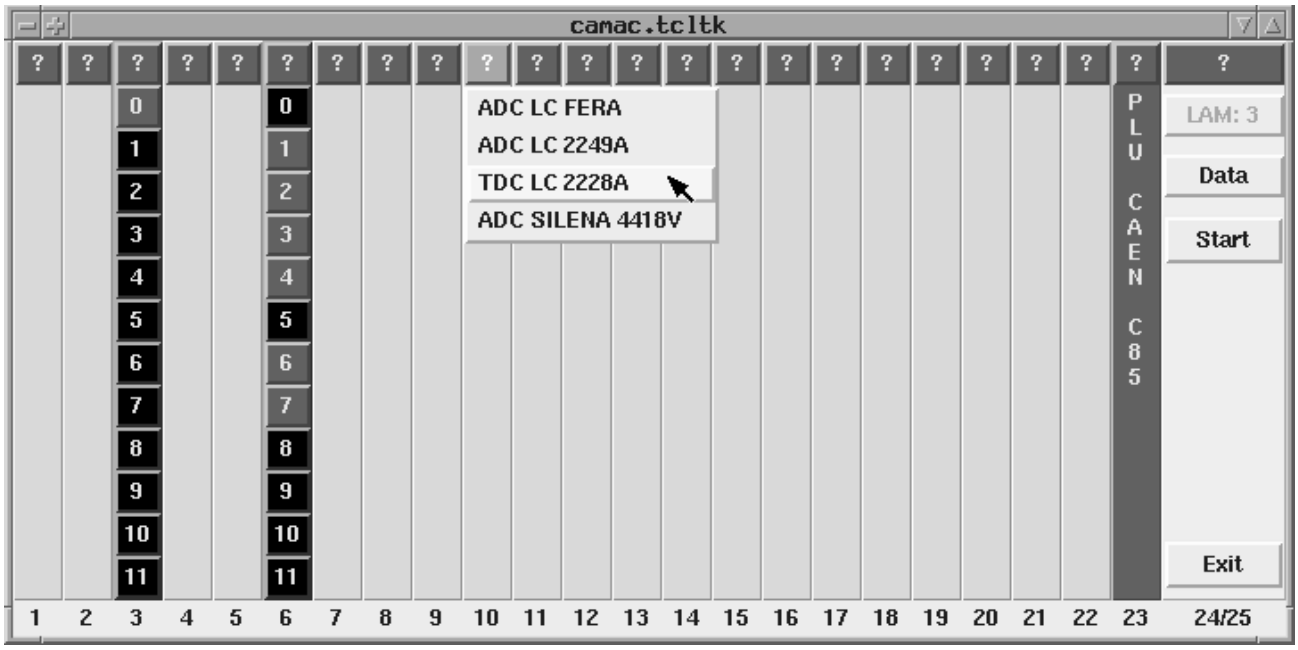

Figure 1: Screenshot of the TclTk window used for data acquisition setup and control

A typical simple data−acquisition system consists of a few CAMAC ADC and/or TDC modules, a CAMAC crate controller, and a PC. After porting the server part of the ZEL software to Linux additional drivers for various CAMAC controllers were re−written resp. adapted. The driver for the DSPT CC−SCSI/A CA− MAC controller (internally a Jorway73a) consists es− sentially of the sjy73a package from Fermilab. The software for the DSPT 6001/6002 CAMAC (for ISA bus) controller was already existing. Only for the PCI− CAMAC controller (developed by ZEL) software port− ing from NetBSD to Linux needed to be done.

For data handling the EMS [3] data format is used, the event clusters are written to disk or tape directly, or are converted into Ntuples used for graphical representa− tion and simple analysis under PAW. A circulating buffer assures that only the newest Ntuples are avail− able for histogram filling.

The graphical user interface is written in TclTk using the normal window shell (wish) extended by EMS commands. The experiment setup is very easy because

section containing the continuously updated events. The user is free to fill histograms or scatterplots and apply cuts to the data for simple analysis.

After stopping the data acquisition, PAW windows are closed and the interface server is terminated, this is done to assure a well defined situation for the next ac− quisition.

The presented system is a good example for the sim− plicity and scalability of the redesigned ZEL data ac− quisition system [4] which will be installed at existing COSY experiments in a larger scale.

References

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[2] CERN program library

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[4] P.Wüstner, PHD thesis, Univ. Bochum 1998

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