Data Acquisition Systems

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Overview

The Data Acquisition group has continued to deploy MIDAS Linux data acquisition systems around the site. More functionality has been added to MIDAS software.

Four Vax Stations were retired from active duty, two being replaced by PCs running Midas (Parity and RMC experiments). Two more Midas systems were added to the detector facility. All VDACS data acquisition systems have been retired.

MIDAS software

This year the continuous development and improvement of the Midas software includes: a) Web based run control flexibility: such as manual trigger button, customized script button, log history button, history plot display button, Slow control page hyper link for variable modification. b) Front-end code: Implementation of "Super Event" structure for dead time and disk space reduction, BOR/EOR event handling improvement, c) extensive Web based Midas documentation, http://midas.triumf.ca/docmidas/index.html d) New application: "webpaw" providing a web based interface to display experiment specific PAW data. This package is actually not part of Midas but has been developed in conjunction with it.

Overall Midas has been quite successful not only within Triumf but also around the world with over a dozen laboratories using it.

NOVA

The NOVA data analysis system continues to evolve to meet the needs of new TRIUMF experiments. Version 2.2 of the system was released in 2000. Enhancements in this release include the possibility of accessing the raw data directly as Floating Point or INTEGER*4 variables (in addition to the default INTEGER*2). The display package has been updated to support log plots, as well as the ability to sum adjacent channels (making it easier to view significant features in spectra with many channels / few counts per channel). Support has been included to access the event time supplied by MIDAS, which is critical for a number of ISAC experiments. The ability to repeat a command at regular intervals has been added, allowing an updating "live time" display to be implemented. A number of minor changes to the system were made to facilitate its use in a Batch environment. NOVA has been fully integrated with the latest (1.8.2) version of MIDAS. Use of NOVA beyond TRIUMF continues to increase. NOVA has now been installed at Oak Ridge, Notre Dame and KVI.

ISAC systems

The ISAC experiments i.e. Life Time (GPS, GP2), TRINAT, LTNO, βNMR have been using the Midas DAQ package successfully as standard data acquisition. Most of the DAQ support group interventions were for small modification of the acquisition software or hardware upgrades. Parasite beam tests or detector tests required attention from the DAQ staff for setup and support. Several new PCs have been deployed for off-line analysis and required some DAQ time for package installation. As a new ISAC experimental area, the TUDA shack required the installation of a DAQ.

βNMR at ISAC

Custom hardware has been designed, implemented and successfully integrated in the βNMR data acquisition system. It consists of a Pulse Programmer card (PPG) and Frequency Synthesizer Control module (FSC) (both in VME and fully programmable).

The simple TD-μSR software developed in 1999 was significantly upgraded integrating the PPG and FSC modules.

βNMR can acquire data in two modes:

βNMR Type 1 : I-μSR Data is acquired in a dead-timeless multichannel scaler and transfered to the host computer every beam cycle. The standard midas data logger is used to save the data in this experiment. Banks of data read from CAMP need to be saved along with the histogram data. A front-end program was written to read data from the CAMP server CPU and send this data into the data stream. The data is also reduced and stored in a format compatible with

βNMR Type 2 : TD-μSR Data is acquired in a dead-timeless multichannel scaler and histogrammed in the front end. Data from each beam cycle is added. The standard data archiver mdarc was upgraded. Support for extra scalers was added. The odb was reorganized to separate mdarc's parameters from those needed by the front-end. Thus mdarc becomes independent of the particular front-end program in use. This was enables mdarc to be used for the future replacement of the μSR experiments in the meson hall.

μSR systems

A project was initiated to replace the μSR experiments currently running under VMS on Vax Stations by a Midas data acquisition system running under Linux on a PC. This system will share many elements developed for the βNMR experiment at ISAC.

The present Run Control Data Base (RCDB) will be replaced by the Midas Online Data Base (ODB), and a user interface is needed that has the look and feel of the existing user interface. A coop student has written a user interface (in Tcl/Tk).

The odb arrangement for MUSR was planned, and a TCL to C interface was produced to enable the TCL code to access the odb.

E614 Slow Controls

The Slow Controls system for Experiment 614 (TWIST) continues to evolve towards its final form. During 2000, it was decided that much of the Slow Controls / Monitoring would be based on a programmable Digital Voltmeter from Hewlett-Packard. A MIDAS driver for this device has been written, and it is currently being used to monitor temperatures and pressures in a test setup. Real time values of Slow Control variables monitored by this device are available from the MIDAS status page, and a time history of these variables is also available from a Tcl window accessible from this page.

RMC and Parity

Both the RMC and the Parity DAQ hardware were upgraded from Vax/VMS host CPUs to Linux PCs. The custom frontend software was rewritten to function in a MIDAS environment with success.