Data Acquisition Systems

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Overview

During 1998, the migration from Vax host-based systems to Pentium host-based systems has accelerated.

The Vax based systems run under VMS with VDACS event by event software or μSR Modas software. VMS and VDACS are frozen at the present versions except for fixes of serious bugs. There are 9 active Vax legacy systems:

- 3 VMS/QBUS/CAMAC legacy systems - ph1dac, ph2dac, m11dac
- 1 VMS/CFI/FASTBUS RMC system - rmcvax
- 2 VMS/QBUS/CAMAC μSR systems - m9bdac, m13dac
- 2 VMS/Ethernet/VME/CAMAC μSR systems - m15dac, m20dac
- 1 test system VMS/Ethernet/VME/CAMAC or QBUS/CAMAC - dasdev

The Pentium based systems run mostly under Linux with MIDAS software. This is the platform where software developments and improvements are active. Efforts on incorporating slow controls to the main data stream are ongoing. There are 6 new Pentium based systems:

- 2 active Linux/Ethernet/VME-VxWorks - Chaos, Trinat
- 3 active LINUX/CAMAC - Tisol, GPS, Dragon test stand
- 1 active Windows NT - LTNO

The VME front-end MVME162 68040 CPU running at 32 MHz has been replaced by a 300MHz PowerPC CPU, MVME 2305. The VxWorks software license has been upgraded to include the PowerPC family. By changing CPU family, there is a factor 10 improvement in clock speed as well as in Ethernet with support for 100BaseT. The cost of memory is also much lower with a PowerPC than with a 68040 CPU. The new front-end systems have 16MB or 32 MB while the older ones had only 4 MB.

MIDAS software

Throughout the year, the Midas system was used by several experiments (CHAOS, Trinat, Tisol, Dragon test stand). Some experiments required new acquisition hardware, which consisted of a PC running a Linux OS with a dedicated CAMAC interface connected directly to the acquisition computer. These new systems phased out the previous acquisition system "VDACS" and users provided us feedback on how Midas behaved. In general the capabilities of Midas exceed what the users are currently requiring which makes future implementation of Midas in more demanding experiments possible. Programming specific to the experiment was implemented with our help and a substantial amount of our time was devoted to support and training of new users. Continuous development and improvement of the Midas system were the main topics of the year. Previous goals were mostly achieved and new features were implemented. The overall status of the Midas system can be summarized as follows: Support for Direct CAMAC access through several manufacturers brands of CAMAC interfaces was implemented. Slow control structure has been cleanup and EPICS device support for NT tested. Solaris OS support was added. A new Midas Run Control interface was developed for Web browser. Revision of YBOS and Midas utility tools was completed. Code management for Midas using the CVS package has been implemented and is accessible through the web. A Triumf Web site for Midas is currently under construction (http://www.triumf.ca/midas) which includes a first round of documentation in URL format and link to other Midas related web pages. The current Midas version released is 1.6.1.

μSR systems

The μSR Data Acquisition package (MODAS running on a VAX/VMS) has been extensively modified to support a new TDC in VME (Highland V680). A customized program developed at TRIUMF was loaded into the microEngine chip to enable data rejection to be performed within the TDC module itself. The TDC is setup and read out by a MVME 162-23 PowerPC module running software under VxWorks. Valid TDC data are histogrammed in an area of memory known as the "histogram memory". The histogram memory is read out periodically and stored by the VAX. Communication between the PowerPC and the μSR Data Acquisition program is by RPC over Ethernet.

One of these new VME systems was installed in M15, and was successfully used to take data during the fall of 1998.

A driver in TCL was written to support a Flux Magnetometer in the CAMP slow controls system for μSR.

Custom Hardware

Andrew Daviel implemented a system to improve the signal/noise of UTC data for the Rare Kaon Decay experiment E787 at BNL. The system consists of a number of complex programmable logic elements implemented in Altera FPGA's and designed to interface with commercial Fastbus TDC units. It was deployed at BNL during the summer of 1998.

After being idle for several years, the RMC DAQ system was required again for a new experiment. The RMC DAQ computer had to be replaced, and other problems with the FASTBUS hardware had to be diagnosed and fixed.

Future Development

In the coming year, development will continue to add features needed at ISAC and integration with Epics control system elements. Special systems for the E614 Fastbus based system and for a segmented μSR detection system will be developed. All μSR systems will see their dependency on the QBUS removed.