C.3. Data Acquisition System, LINAC Computer Control, and JRML Electronics Shop-- *K.D. Carnes*

Data Acquisition. The new VME front-end data acquisition system described in the last progress report has now been fully implemented for all JRML multi-parameter experiments. Our system now consists of five independent data acquisition stations (VME front-end plus computer workstation) and five clustered offline analysis machines. All but three of the workstations are Compaq (formerly DEC) VAXStation 4000/96 color workstations with removable SCSI disks (currently 4 and 9 GB) for data storage and 8mm tape for backup. The remaining three workstations are older DEC machines that, while slower, still provide adequate performance for most experiments and analysis. In addition to the workstations, we have built up a network of 5 high capacity laser printers, one of which produces color output.

The system has been relatively stable for the last three years. Our experimentalists have grown more proficient in using the software, and we have written specialized code for electron spectroscopy and the various forms of two-dimensional position sensitive detectors that exist in the lab. Multi-parameter event-mode data acquisition continues to be vital to a large fraction of our experiments. We have also continued to expand our stable of PC's performing data analysis and display with Microcal's Origin, SIMION trajectory calculations, and general purpose wordprocessing. Vince Needham is handling most of the PC work as well as serving as the JRML webmaster.

LINAC Computer Control. With the data acquisition system performing stably, I have turned my attention to the other major computer system in the laboratory, the LINAC computer control system. Since the beginning of our upgrade, the LINAC has been controlled with a DEC PDP 11/34 running RSX11M+ and using software based on Argonne National Laboratory's ATLAS control software. Needless to say, the PDP is long since obsolete and would be difficult or impossible to repair should it fail. The same is true of the antiquated user interface components, such as the Kinetic Systems touchscreen display. Again following Argonne's lead, I have begun the process of converting the control system to a PC-based system using Vsystem control software from Vista Control Systems, Inc. Vsystem has a highly graphical user interface that should greatly improve system usability. Since all of the control is accomplished with the keyboard and mouse from the PC screen, no auxiliary user controls, such as touchscreens and control knobs, are necessary. As in the past, we will continue to use a variety of CAMAC

modules for the actual hardware control, but the CAMAC crate will now be controlled by a Hytec Ethernet Crate Controller. I have been able to use Argonne's software as a starting point for the auxiliary code that must be written to go with Vsystem, but they have an older version of Vsystem and their code is written in Fortran for VMS machines. I am implementing a new version of Vsystem with code written in C for a fast PC running Windows NT. This has involved a good deal of reprogramming. Fortunately, that process is nearly complete, and we hope to have the system installed later in 2000.

JRML Electronics Shop. In the fall of 1999 JRML lost its long-time electronics technologist, Steve Kelly, after over 13 years of service. Steve left to work for another physics department at Montana State University in Bozeman, MT. Steve's decision to make the move was strongly influenced by the changes in his job description brought about by the aging of JRML electronics equipment. More and more of his time was being spent repairing aging control and data acquisition modules that are beginning to fail with increasing frequency. In addition, many of the repair components are no longer available. It takes a great deal of time to become familiar enough with a module to repair it based solely on a schematic, but due to the cost of commercial repair, our electronics technologist must make the effort more often than not. Steve preferred to spend more time in design and maintenance of in-house modules. As his replacement, we have hired Scott Chainey, a recent graduate from the KSU Electrical Engineering Department. Scott is spending much of his time familiarizing himself with the equipment in the laboratory but has already been called upon to make several repairs. We are also taking advantage of KSU's Electronics Design Laboratory to augment our in-house electronics expertise. They are extremely useful in producing modules that can't be obtained commercially or replacing commercial modules that are expensive or difficult to maintain. In the first category, EDL constructed a Position Sensitive Display module that allows position information to be viewed in real time on an oscilloscope. In the latter category, they have designed and built preamplifiers to replace our German made CATSA preamps, which were very fragile and could not be repaired in house. In both cases, the EDL modules have made a big positive impact on our research operations.