VME Instrumentation Development Program

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CLAS upgrade's predominant choice for both data acquisition and slow controls will be VME systems. To maintain the installed systems and to support the hardware required for the upgrade, new diagnostic and test hardware and software are being developed. This paper presents the proposed projects.

Currently, CLAS uses several crates, read-out controllers, and modules based on the VME standards. At present, new VME TDCs developed by Jefferson Lab and CAEN are being installed. To maintain the large amount of VME-based electronic instrumentation of the CLAS upgrade, test and development stations are being engineered.

The VME hardware test and troubleshooting station (VHTTS) will be used to check individual VME modules', current and new ones, design specification compliance and performance. VHTTS will aid in the troubleshooting of the electronic components of the modules (including VME 64). VHTTS will use external equipment to exercise the unit under test. A combination of LabVIEW, VxWorks, and Java will be used to provide a flexible and intuitive user interface.

The data acquisition and controls test station (DACTS) will aid the development and troubleshooting of new and existing VME-based data acquisition and slow controls systems using CODA and EPICS, respectively. DACTS' focus will be the test and development of system-level integrated VME hardware and software. DACTS will facilitate hardware and software design and development.

Special VME equipment for laboratory tests (SVELT), such as the single board computer (SBC) [1], are being developed, Fig. 1. The SBC project proposes a new solution for a versatile, upgradeable, and modular FPGA-based SBC. This proposed SBC will use a portable, high performance, standards-based real-time executive for which source code is free (open source). This new prototype design can be used in a variety of applications, e.g. VME controllers and embedded controllers. Additionally, VME modules are being designed, including a specialty pulser that provides unique features that are not commercially available or cost prohibitive.

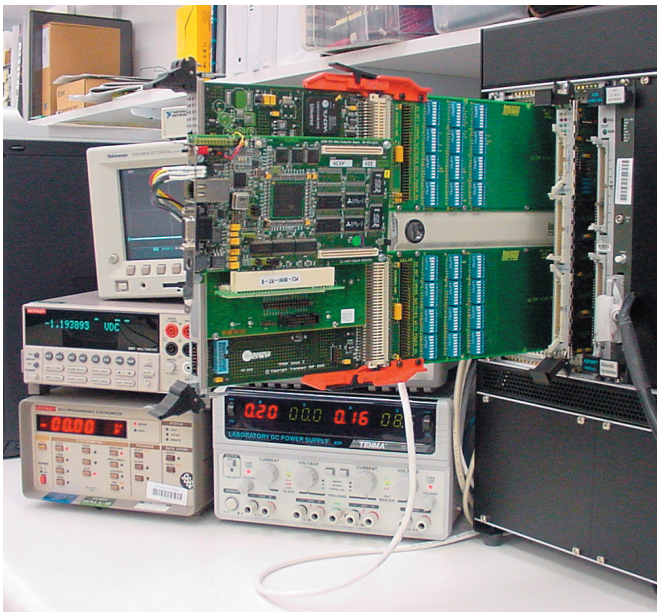

FIG. 1. VME single board computer development stand.

Currently, Epics software for DACTS is being developed. Presently, EPICS host system and target single-board computer running VxWorks and RTEMS is operational. Test applications are being developed for commonly used VME modules including TDCs, ADCs, and scalers.

To summarize, the VME development projects are grouped in three categories, Table I.

Project	Application	Tools
VHTTS	testing and troubleshooting VME modules and software	LabVIEW, VxWorks, Java, and test equipment
DACTS	development of system-level integrated VME hardware and software	EPICS & CODA
SVELT	special and versatile VME hardware for lab applications	CAD/CAM, Xilinx development, test equipment and software

TABLE I. VME projects.

The goal of the program is to have flexible VME hardware, software, development, and test solutions that will meet current needs and upgrade requirements.

[1] Bonneau *et al* A New Type of Single Board Computers for Detectors. CLAS-Note 2004-004.