X-Modal, Data Acquisition Information Sheet:

X-Modal, as of Version III, now includes an embedded data acquisition capability for a limited family of hardware. This module is referred to as the virtual data acquisition (VACQ) module. The same graphic user interface is used for all hardware as well as post-processing of time data that has been previously acquired. Internally, there is a virtual software interface to the hardware that connects to each hardware in order to make the proper hardware driver calls. The user can change hardware without needing to relearn the software or become familiar with a new graphic user interface (GUI). This data acquisition module has been developed by the University of Cincinnati, Structural Dynamics Research Lab (UC-SDRL) in conjunction with a consortia of several companies who are Members of the UC-SDRL Research Software Consortium. Release 3.4 is currently available.

The primary function of this software package is to provide a flexible environment for acquiring time domain data from data acquisition hardware (HP-3565x, HP-143x, VT-143x, Sentinel EX, etc.) directly into a MATLAB® based, programming environment. VACQ is built around a graphical user interface (GUI) in parallel with a command driven interface to provide users with any type of programmatic interaction desired with all operations taking place in MATLAB®. This flexible environment utilizes a unique data management structure as part of the X-Modal Program, in a Microsoft ® windows (WIN-7 or WIN-8, 64 bit) environment programmed in MATLAB® Graphic User Interface (GUI) script. VACQ loads/stores data using Universal File formats (UFF), including the Binary Universal File format (UFF-58b). A new XML based, open data format has been developed and may be added pending UC-SDRL Research Software Consortium support.

Software Control/Certification:

The X-Modal software package, VACQ module, is developed as a MATLAB® MCR executable module (program) and is constantly checked and verified against a controlled data acquiisition environment. Users are expected to conduct there own validation experiments. The Matlab source scripts are no longer available to licensed users unless they are users at the Enterprise License level or possibly Members of the UC-SDRL Research Software Consortium.

Supported Hardware:

VACQ is compatible any software OS (WIN-7®) or WIN-8®)) that contains driver support for a specific set of hardware. The Time Data Thruput (VACQ-TPUT) mode, which does not require hardware, is supported on all versions of X-Modal. VACQ is compatible with the following hardware families:

- ***GP-IP Hardware from Hewlett Packard:** All HP-3565x hardware (known as Paragon and Polygon). This hardware is supported via a USB-GPIB interface module (Contact UC-SDRL for specific I/O compatibility).*
- ***VXI Hardware from Agilent and VTI Instruments:** VXI Mainframe (E1401B, E1421B, E1401T, E8408A, CT400) with VXI-Firewire Interface (E8491B), VXI-MXI Interface (E1489B) or VXI Internet Interface. Support is included for the following modules: VXI 16 Channel Data Acquisition Module (E1432A, VT1436), VXI 8 Channel Data Acquisition Module (E1433-A, VT1435) and VXI Arbitrary Function Generator (E1434A, VT1434A).*
- ***Sentinel-EX Hardware from VTI Instruments:** Currently, the EMX hardware in the Sentinel-EX hardware family is fully supported. The 4 channel module (EMX-4380) is currently fully supported utilizing the Internet interface (EMX-2500) in the PXIe Chassis (CMX09, CMX18). The 16 channel module (EMX-4250) is now supported along with multi-mainframe support. This includes synchronization across all mainframes (required for large channel count); however, large channel count systems have not been available for complete checkout.*
- ***Time Data Thruput (VACQ TPUT):** A time data thruput mode, based upon the Standard Data Format (SDF), is supported for users that acquire data with non-supported hardware. This SDF data file is generated by several software packages, such as DAC Express. The Time Data export modes of X-Modal (UFF and *.mat file formats) are also supported.*

Support for other hardware will always be under consideration. Please contact UC-SDRL for future plans.

Software Requirements:

The VACQ software module requires that the hardware is configured and operational in the user's OS. The X-Modal VACQ module will automatically find and detect supported hardware if the OS has configured hardware and software. Due to potential need for large channel count and/or blocksize configurations, the recommended OS at this time is WIN-7® or WIN-8® (64-bit) with 8 Gb RAM memory (or more).

License Requirements:

The UC-SDRL Research Software license is required and includes access to the VACQ module as part of the X-Modal, Version III,software distribution. Please consult the UC-SDRL Research Software License agreement and documentation for details.

Distribution/Maintenance Fee:

An active UC-SDRL Distribution/Maintenance Fee is required to receive the first distribution, and subsequent updates, of X-Modal. Please consult the UC-SDRL Maintenance/Distribution Fee documentation for details.

Distribution Deliverables and Media:

The VACQ data acquisition module is included as part of the default X-Modal distribution package. Software is generally provided via electronic download over the Internet. Software can be provided on limited forms of other media upon request.

Documentation:

Documentation and on-line help for the VACQ data acquisition module is provided as part of the X-Modal documentation. Specific video tutorials for the VACQ data acquisition module, including a training video with sample data that can be processed via the VACQ TPUT mode of operation, are available on the website.

Training:

Voice annotated video training is available on the UC-SDRL Web Site that includes numerous 10-20 minute video sessions that are designed to assist a user in using X-Modal for the first time. Installation assistance and/or minor questions can be answered via telephone, E-Mail, or FAX. If more detailed installation or training is required, research assistants from the UC-SDRL can be hired as consultants (approximately $500 per day plus expenses) to provide on-site assistance.

Current Capability:

Current capabilities of the X-Modal VACQ data acquisition module are as follows:

- *Complete units (SI, British, etc.) support with channel/transducer documentation capabilities. Excel® based transducer database is provided as well as active embedded transducer calibration including hand-held shaker, drop, and ratio calibration.*
- *Complete digital signal processing functionality including multiple blocksizes, asynchronous, synchronous and cyclic averaging, multiple channel source control, various FRF estimation algorithms, virtual/principle force evaluation for multiple inputs.*
- *Time Data Capture: Time data capture with blocksizes up to the limits of on-board ADC memory is available. Also available is time data streaming up to the limits of available memory, or disc, space, for the number and channels and sampling rates available, subject to the limits of the interface to the data acquisition hardware (Firewire, Internet, USB/GP-IB, etc.)*
- *Multiple Reference, Multiple Input, Multiple Output (MIMO) Power Spectrum*
- *Multiple Input, Multiple Output (MIMO) Frequency Response Functions*
- *Multiple Reference Impact Testing (MRIT) Frequency Response Functions*
- *Multiple Reference Transmissability*
- *Principle Gain (SVD, Principle Component) Evaluation of Data*

Availability:

The VACQ software module is currently available as part of the standard X-Modal, Version III, Release 3.4, software distribution via electronic download, pending signed license agreements and prepayment of the Maintenance/Distribution Fee. Single User Licenses are available via a "click-thru" license agreement via the Internet.

For More Information:

For more information and/or details concerning the X-Modal software package, including the embedded data acquisition module, please contact:

Software Program Coordinator
Structural Dynamics Research Laboratory
University of Cincinnati, P.O. Box 210072
Cincinnati, Ohio 45221-0072 U.S.A.

EMAIL: sdrl-software@uc.edu
WWW Site: http://sdrl.uc.edu