

FULL-FEATURED DATA ACQUISITION SOFTWARE SUITE

EXLab

RELIABLE DATA FIRST TIME EVERY TIME

The photograph on this cover is reproduced with the permission of Rolls-Royce plc, copyright © Rolls-Royce plc 2012



OVERVIEW

FEATURES

- Intuitive, icon-based setup and control
- Spreadsheet-style channel configuration
- Snapshot display with data export
- Independent sampling rates for each instrument
- Real-time online graphical data analysis
- Client / server architecture with multiple displays
- Synchronization of different data sources
- Detect/process events for close-loop control
- Post-acquisition analysis methods and data playback
- Easily create Virtual/Calculated channels based on physical channel data



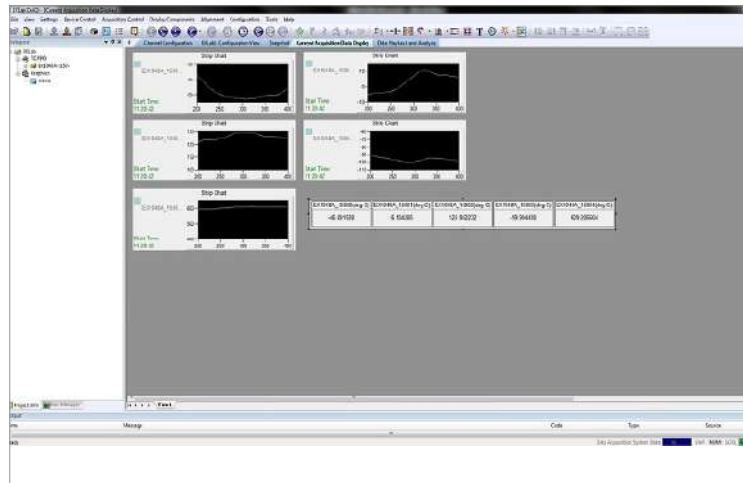
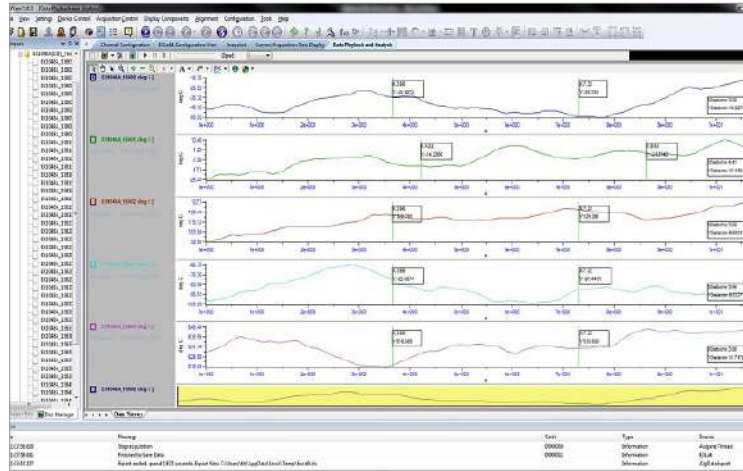
APPLICATIONS

- High Speed Data Acquisition
- General Purpose Data Logging
- HALT / HASS Product Evaluation
- Engine Test Cell Acquisition
- Product Data Evaluation and Analysis
- Process and Plant Monitoring
- Performance and Event Monitoring



Intuitive yet powerful software saves you valuable time, VTI performance hardware gives you confidence in your measurements

EXLab-based systems are a combination of robust, turnkey software and precision instrumentation designed to solve your toughest problems in verifying designs of electro-mechanical products. Combining analog, digital, and counter measurements in a single system reduces integration and startup time. If your measurements include acoustic, vibration, temperature, pressure, strain, voltage, digital states, rpm or other transducer-based parameters — and you're feeling the pressure of time — then an EXLab-based system is the right solution for you.



Why waste time and money developing and validating custom software that is difficult to support?

TIME IS VALUABLE

EXLab reduces the guesswork behind system startup, acquisition and analysis by delivering complete turn-key operation that eliminates time-consuming learning curves and software development delays, ensuring that tests are performed on time with accurate, repeatable results. If VTI data acquisition instruments are powered up and connected to your PC, EXLab will automatically identify those resources for you.

- Eliminate costly application programming
- No need to qualify custom software
- No software debugging
- Simplify training
- Long-term software support

ACCURATE DATA, POWERFUL DISPLAY AND ANALYSIS

EXLab Data Acquisition Software Suite delivers reliable data, first time, every time ensuring critical test data is never compromised. This intuitive icon-based tool simplifies instrument configuration, acquisition and data display without sacrificing functionality or performance.

A wide range of flexible displays, channel groupings, and runtime alarms can be mixed and matched for clearly identifiable data management and analysis, providing a real-time picture of test results and conditions. Extensive post processing tools, including FFT and power spectral density analysis, cursor and marker control, seamless zooming, report capture, and open data export capability enables complete acquisition, control and analysis in one easy to use package.

COMBINED DYNAMIC AND STATIC MEASUREMENTS

Combining high-speed measurements of noise or vibration signals and low-speed measurements of temperature, strain, and more, makes EXLab the workhorse system of its class, providing a corporate-wide software solution regardless of the application. The full range of VTI's sentinelEX series of DSA and mechanical test instruments are supported in EXLab, as well as VTI's legacy VXI VT1413 and VT1432 hardware.

STRUCTURAL STRAIN MEASUREMENTS

Stress and fatigue testing of large structures has special requirements. VTI's solution provides structural test engineers with the performance needed for these large-scale tests. Using Ethernet as its communications interface to the host PC, the EX1629 48-channel, high-performance remote strain gauge measurement unit offers built-in calibration and 24-bit resolution, providing very high data resolution and accuracy. Ethernet control allows for remote operation, which reduces cable lengths. The RJ-45 connector reduces transducer connector costs. Tens to thousands of channels of strain measurement are easily supported by EXLab. Many structural test data acquisition applications require integration with a load system control system. EXLab provides Event Management that allows the user to set up and synchronize the communication between the control system and the EMX series instruments.

PRECISION TEMPERATURE MEASUREMENTS

Today's leading suppliers of power generation and energy delivery products require cutting edge technology and superior performance to meet the world's most demanding energy requirements. R&D facilities depend on the superior measurement accuracy that is delivered by the EX1000A series to improve the efficiency of new designs. The intuitive EXLab interface allows fast setup of high channel count measurement systems to facilitate test readiness. High accuracy temperature measurements can be recorded at up to 1000 samples/sec/channel.

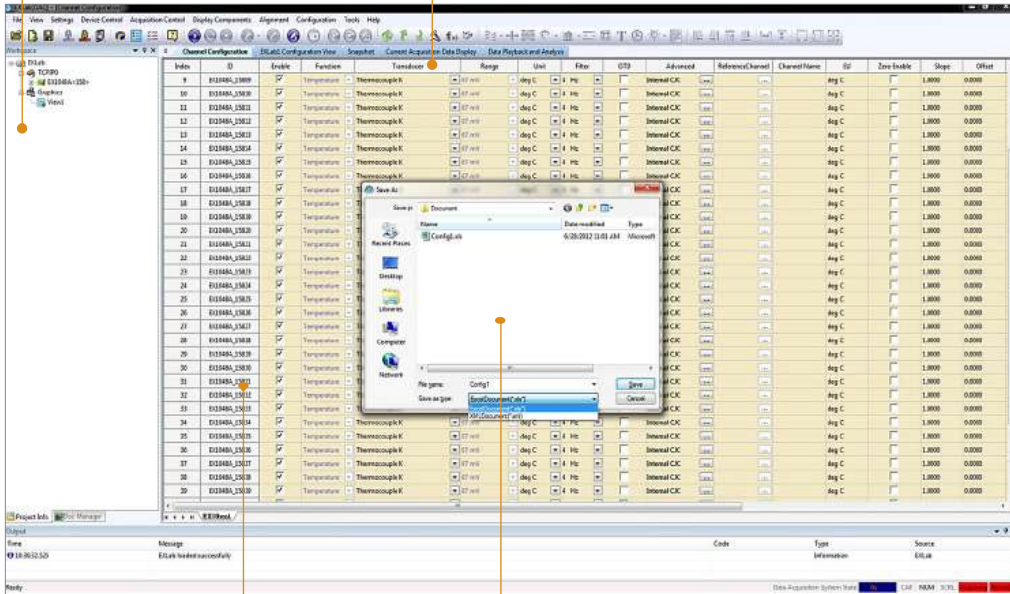
Quick Instrument Configuration

Intelligent instrument configuration greatly simplifies test setup using standard configurations such as typical gain ranges, filter selections, and sample rates. These parameters are pre-loaded greatly reducing configuration guesswork and errors. The convenient instrument simulation utility also saves time by permitting complete test setups to be defined and viewed offline, complete with simulated data for display and logging purposes.

A wide mix of channel types can be easily configured using EXLab. Common measurements, such as temperature, strain, and voltage can be mixed with digital measurements like relay settings, shaft rpm, pulse train rates, or other similar parameters.

Keep things organized with "Project View." The tree view on the left side of the screen image shows the steps and related documents that can be kept with a specific test. This is called the "Project View" of your test

Select transducers from the pull-down menus. For the few transducers not defined, measured voltages can easily be converted to engineering units using a built-in $mx+b$ linearization routine (provided in a separate window).



Modular configuration view with Excel style control – easily copy, paste and edit channels and configurations

Import and export configurations, – Saving time from setting up similar configurations.

Multiple real time display options special

A wide range of flexible displays, channel groupings, and runtime alarms can be mixed and matched for clearly identifiable data management and analysis, providing a real-time picture of test results and conditions.

The screenshot displays a complex software interface with several panels:

- Strip Chart:** Shows two curves on a grid. The y-axis ranges from 0 to 10000, and the x-axis shows time from 1500 to 2100. Labels include CH1(576.5419), CH2(576.5452), and CH3(576.5485).
- Table:** A data table with columns for CH1(deg C), CH2(deg C), CH3(deg C), CH1(uStrain), CH2(uStrain), and CH3(uStrain). It contains numerical values for each channel.
- Meter:** Three analog-style gauges for CH1, CH2, and CH3, each with a needle and a scale.
- Histogram:** Three vertical bar charts for CH1, CH2, and CH3, showing data distribution.
- Alarm Indicators:** Green circular lights for CH1, CH2, and CH3, indicating their status.
- Bottom Panel:** A row of digital displays for CH1, CH2, CH3, CH4, CH5, and CH6, showing values like 00:00:16-16, 00:04:25-95, 00:00:00-00, etc.

Alarms can be configured to display warnings when out of tolerance events occur,

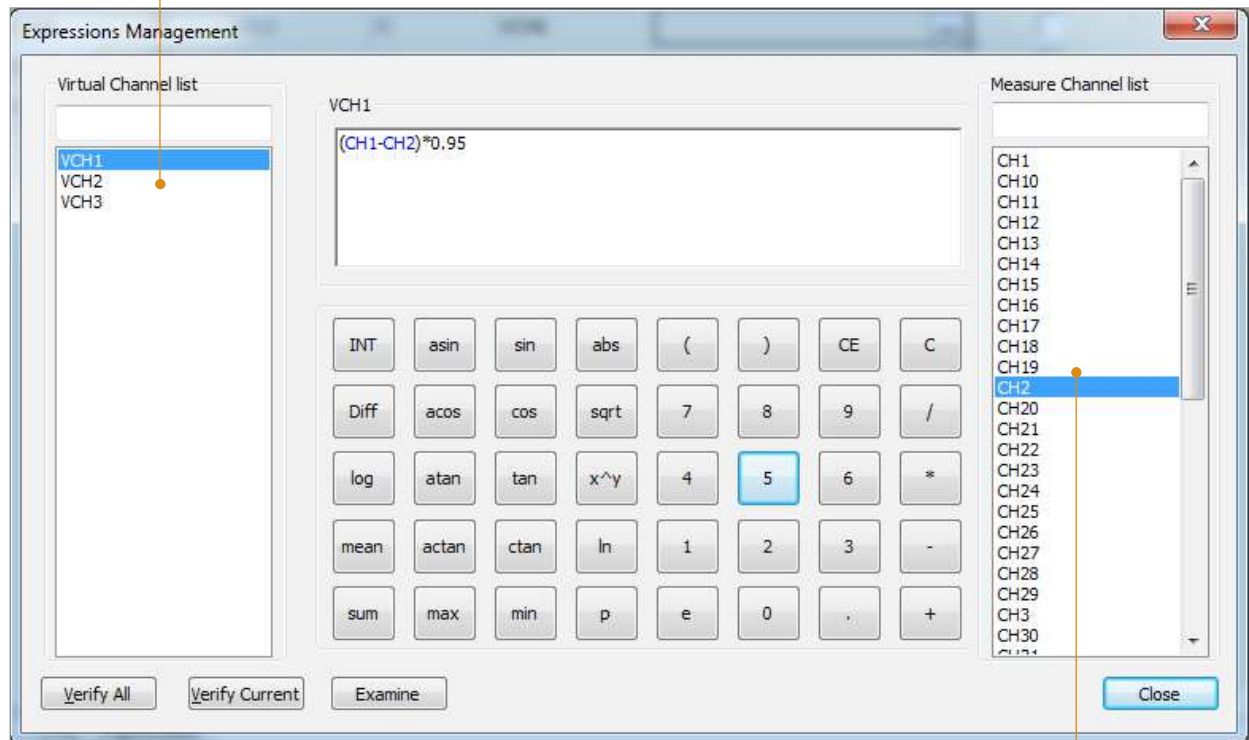
Easily set up multiple real-time displays simply by selecting display type and associating channels with the display.

Displays include strip charts, numeric tachometer, horizontal/vertical bars, digital/tabular, linear, frequency spectrums, XY Plot and distribution graph.

Virtual/calculated channels and special algorithm definitions

Virtual channels can be created by performing math operations on individual channels, or combination of channels. This can be a useful tool in analyzing data and for setting up control mechanisms. EXLab includes standard algorithms, such as those required to set up Rosettes, as well as allowing for users to define custom algorithms.

Calculations are performed real time and resultant channels are treated like other "real" measured channels for display and reporting purposes.



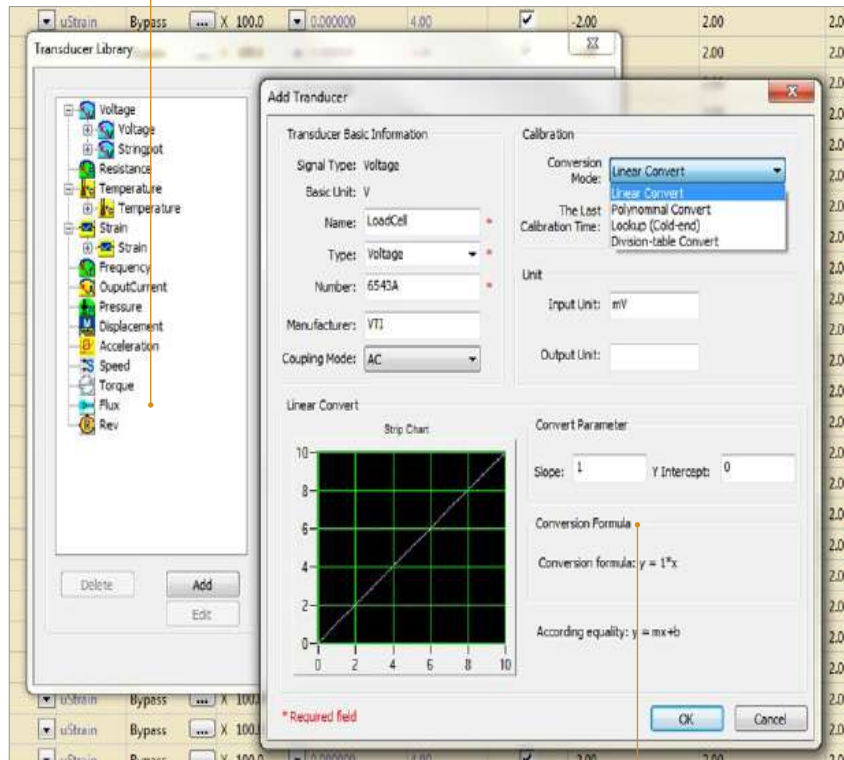
Channels can be created defined using single or multiple real reference channels.

Custom transducers

EXLab contains a Transducer Database Library that manages information on all the supported transducers. This includes information like transducer type, manufacturer part number, measured units, and EU conversion formula.

Users can define transducers that are not already available in the library and add them to the database. The new transducer becomes immediately available for adding to the configuration.

A wide range of transducers are inherently supported in EXLab

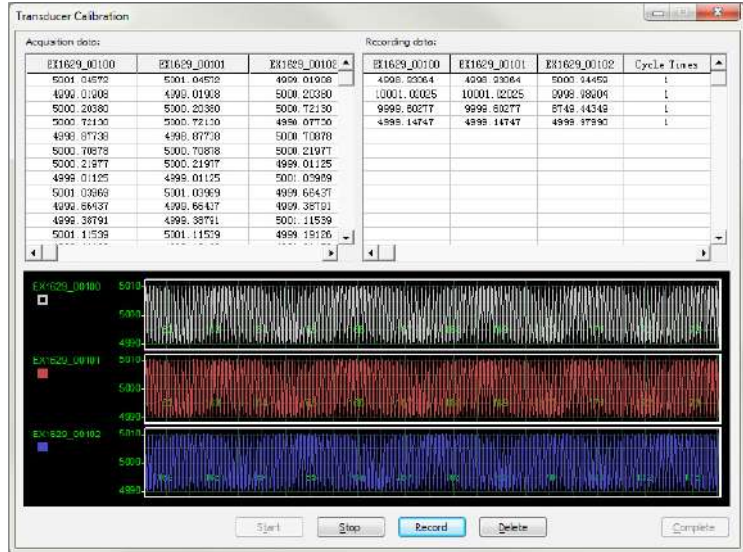


For transducers that are not inherently supported, users can easily define custom transducer type.

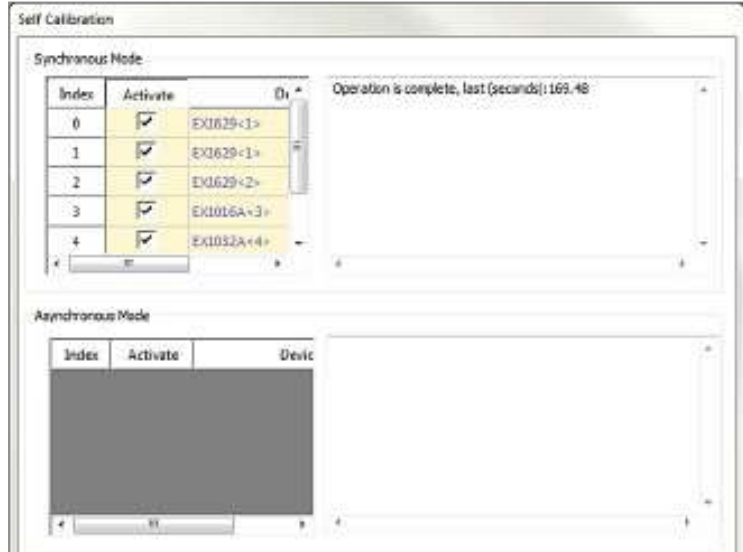
Calibration

SentinelEX series instruments employ sophisticated self-calibration techniques to ensure that the acquired data has the highest degree of accuracy.

EXLab simplifies the calibration process by supporting the calibration of both sensors and instruments using direct instrument control.



SENSOR CALIBRATION WIZARD



INSTRUMENT SELF CALIBRATION WIZARD

Snapshot Display

Snapshot display allows users to view the data at different time intervals during the acquisition process. Snapshot also provides users with the ability to calculate the average value based on a specified amount of data. The user can either snapshot the data manually or set conditions to snapshot the data automatically. For example, a snapshot of load condition data or endpoint capture during fatigue testing can be triggered by events from sentinelEX series digital I/O channels.

ID	Enable	Channel Name	EU	Value 0 @ 2s	Value 1 @ 3s	Value 2 @ 4s	Value 3 @ 5s	Value 4 @ 4s	Value 5 @ 4s	Value 6 @ 5s	Value 7 @ 5s	Value 8 @ 5s	Calculated V
0	EX029_00100	uStrain	2059.2488	1175.3823	-4719.8031	38.4640	38.4636	1175.5840	38.4636	3559.2481	1175.5843		-2083.2452
1	EX029_00101	uStrain	2080.8123	1196.4158	-4099.0088	55.2074	55.2070	1196.4173	55.2070	3360.0824	1196.4178		-2084.7119
2	EX029_00102	uStrain	3400.8155	1217.2402	-4678.2365	85.1303	85.1303	1217.2507	85.1303	3400.8148	1217.2508		-2043.8766
3	EX029_00103	uStrain	3421.7488	1238.0825	-4657.4031	100.9640	100.9636	1238.0840	100.9636	3421.7481	1238.0843		-2023.0452
4	EX029_00104	uStrain	3442.5821	1258.9158	-4636.5686	121.7974	121.7970	1258.9173	121.7970	3442.5814	1258.9176		-2002.2119
5	EX029_00105	uStrain	3463.4155	1279.7481	-4615.7355	142.6387	142.6383	1279.7507	142.6383	3463.4148	1279.7508		-1981.3786
6	EX029_00106	uStrain	3484.2488	1300.5823	-4594.9031	163.4840	163.4836	1300.5840	163.4836	3484.2481	1300.5843		-1960.5452

Data captured in Snapshot will be saved automatically in a desired destination on the host computer.

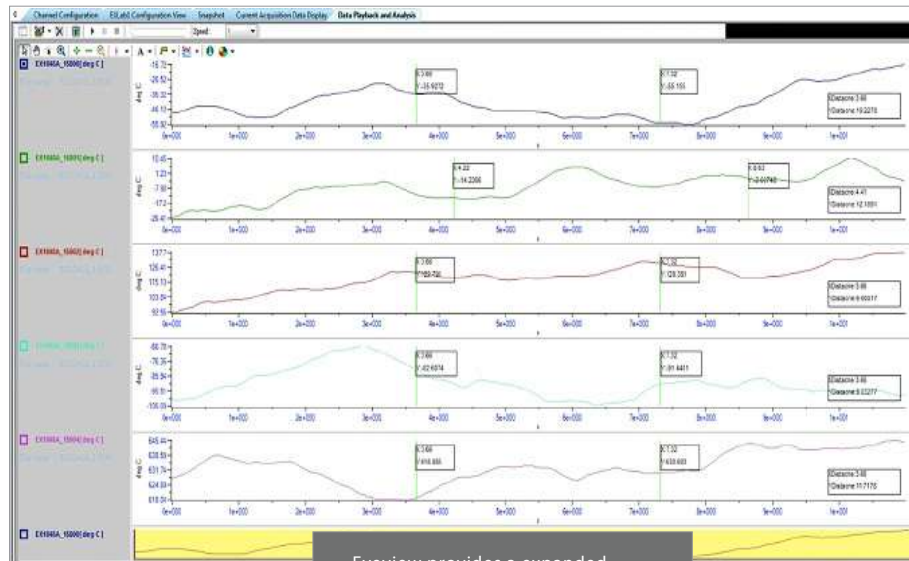
The current version supports an Export function. Just click Export to complete "Save as" for the file.

The Snapshot file displays the time for each group of data Snapshot.

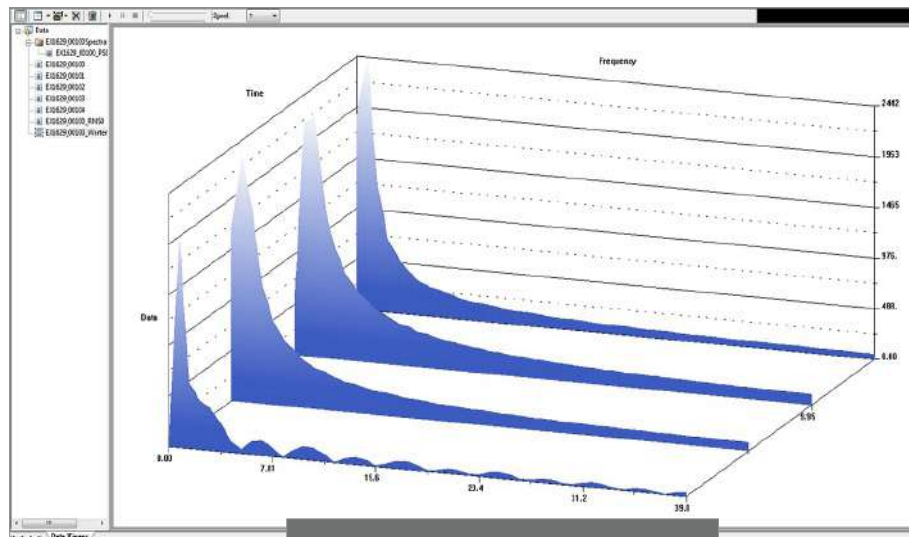
The Block number is automatically incremented by one and can be modified to be a desired number for the user to track the test progress.

Powerful Post Processing, Data Playback/Analysis

With EXLab users have full control of looking at and analyzing data. Data cursors can be used to provide quick access information on a data plot to find out min, max, RMS, and other important values. In addition, EXLab provides an easy way to scan through large time history files using its "Eyeview" to see a compressed view of large time histories along with zoomed in data. Collected data can be analyzed in EXLab using powerful post-processing options. FFTs, math operations, data playback, spectrum analysis, and 3D water falls are some of the supported



Eyeview provides an expanded view of large time histories making it easy to find events



3D Waterfall graph, Spectrum Analysis and Filter Analysis are also supported for post data analysis.

Open Environment Data Storage/Export Options

EXLab allows data to be exported in multiple common file formats like text, binary, CSV, EXLab data files, as well as Matlab and ATI. This gives flexibility to the user to store/post-process the data, and also ensures that the user is not bound to proprietary software in order to access stored data.

The screenshot shows the EXLab software interface. On the left, a 'Workspace' pane displays a folder structure: 'EXLab5' containing a sub-folder 'Structural Test' with several files named 'EX1048A(1)_0000.tdmbin' through 'EX1048A(1)_0004.tdmbin', and a configuration file 'EXLab5.tdmcfg'. The file 'EX1048A(1)_0004.tdmbin' is selected. On the right, a 'Channel Configuration' table is visible, showing columns for 'Index', 'ID', 'Enable', and 'Sample Rate'. The table contains three rows of data.

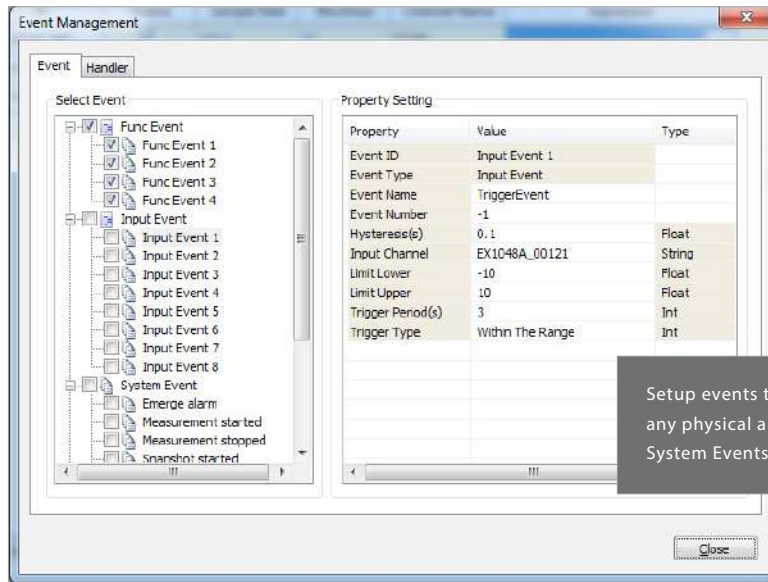
Index	ID	Enable	Sample Rate
0	VCH2_000		
1	VCH2_001		
2	VCH2_002	<input checked="" type="checkbox"/>	100.0

Callout boxes provide additional information:

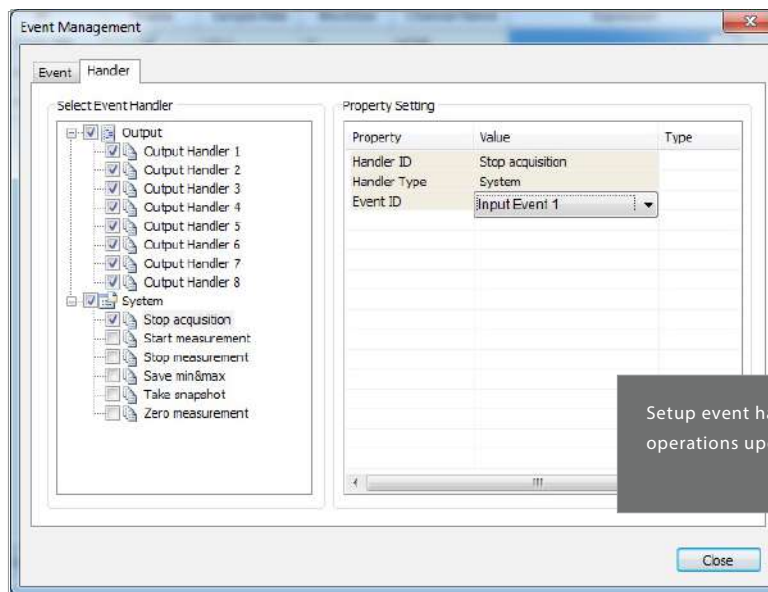
- Loop recording** – Data can be recorded either in one single file or multiple files with the ability for the user to specify duration of each file and the total number of
- Conditional recording** – Data can be recorded based on conditions setup by the user
- Data storage** – Data can be exported to one single CSV file which contain data from all channels or exported to into multiple CSV files each of which contains data from one channel.
- Export options** (shown in a menu):
 - Export to EXLab Format
 - Export to Matlab Format
 - Export to Single File CSV Format
 - Export to Multiple File CSV Format (File per channel)
 - Export to I-Deas ATI Format
- Text/binary export** – Data can also be exported as text files, or binary files

Event Management/Synchronization

EXLab enables the synchronization of data acquisition and control system through a flexible event management system. Event-driven signals can be generated on sentinelEX digital output channels to external devices based on the values of acquired data, a previously set system event or time intervals. Digital input channels can also be set up to read event-driven signals and conditional actions can be initiated based on externally generated signals, such as start/stop recording, or acquire a snapshot of data. EXLab can also apply "AND" or "OR" logic to combine events and create a complex triggering mechanism.



Setup events to detect signals from any physical and DIO channels, System Events and Timer Events.



Setup event handler to do specific operations upon a event happens.

HARDWARE SUPPORT

Model	Lite	Standard	Professional	Enterprise
DYNAMIC DAQ MEASUREMENTS				
EMX Series	•	•	•	•
VXI Dynamic DAQ Series		•	•	•
STATIC DAQ MEASUREMENTS				
EX1629	•	•	•	•
EX1000 Series	•	•	•	•
EX1200 Series	•	•	•	•
VXI Static DAQ Series		•	•	•
THIRD PARTY DEVICE				
PSI/9816	Cons. Fact	Cons. Fact	Cons. Fact	Cons. Fact
OUTPUT				
Alarm Monitoring	•	•	•	•
Alarm Sound	•	•	•	•
Judge Display Control		•	•	•
HARDWARE SUPPORT				
Data Acquisition on Multiple Device	•	•	•	•
Status Data Acquisition and Recrding	•	•	•	•
Cycle/Loop Recording	•	•	•	•
Zero Point	•	•	•	•
Configuration Authorization	•	•	•	•
Calculation Channels		•	•	•
Custom Algorithms		•	•	•
Time Source		•	•	•
EXECUTION CONTROL AND EVENTS				
Event Manager	•	•	•	•
Remote Data Monitoring			•	•
Loop Recording			•	•
VISUALIZTAION AND REPORTING				
Data Playback	•	•	•	•
FFT Analysis		•	•	•
Data Offset Analysis		•	•	•
Data Cutoff		•	•	•
Spectrum Analysis		•	•	•
Data Filter		•	•	•
Calculus		•	•	•
RMS		•	•	•
Snapshot			•	•

Detailed Specifications

USER INTERFACE	<ul style="list-style-type: none"> Intuitive graphical user interface Function driven icons and drop down menus Online help
INSTRUMENT IDENTIFICATION	<ul style="list-style-type: none"> Automatic instrument discovery
INSTRUMENT CONFIGURATION	<ul style="list-style-type: none"> Automatic configuration based on hardware type Off-line simulation mode and programming
INSTRUMENT SIMULATION	<ul style="list-style-type: none"> Fully supported
INSTRUMENT CALIBRATION	<ul style="list-style-type: none"> Cal Zero Auto Cal Auto Tare Self-calibration
MATHEMATICAL FUNCTIONS	<ul style="list-style-type: none"> Arithmetic Exponential Creation / combination of RPN based formulas Operators including +, -, *, /, SIN, COS, TAN, ABS, SQR, ^2, ^3 User definable functions via DLL's Real-time calculation and display, resultant channels treated like other "real" measured channels for display and reporting purposes.
DATA DISPLAY	<ul style="list-style-type: none"> Strip Chart Numeric Tachometer Horizontal / vertical Bar Waterfall Digital / Tabular Linear frequency spectrums XY Plot Distribution Graph Tabular, including configuration settings
CURSORS AND CONTROL	<ul style="list-style-type: none"> Stepless zoom Smart cursor functionality Area Maximum / Minimum Local maximum / minimum Differential markers Data playback mode
DATA CAPTURE	<ul style="list-style-type: none"> Manual Snapshot Automatic Snapshot Manual initiated Triggerbus initiated TTL initiated Event initiated Averaging, Min and Max Data Capture

Detailed Specifications

DATA LOGGING

Independent windowing
 Event messaging / time
 Snapshot export
 Conditional start / stop

DATA EXPORT

ASCII/Text File
 Excel®
 CSV compatible
 Matlab
 ATI

ALARMS/WARNINGS

Independently defined for all channels
 Trigger off actual or calculated channels
 Events entered into log file
 View status for > 100 simultaneous channels

SYSTEM REQUIREMENTS

Intel® DualCore (> 2,4 GHz)
 OS Support:
 Microsoft® Windows XP with Service Pack 2
 Windows 2000 with Service Pack 4
 Windows 7 (32 or 64-bit)
 Note: The Microsoft® Windows (NT or XP) operating system
 Asian languages version is not supported.
 2048 RAM (4096 MB recommended)
 2049 2x200 GB available hard disk memory (mirrored)
 Screen resolution: 1280 x 1024
 32MB dedicated graphics card

HARDWARE SUPPORT

EMX-4350, 4-Ch, 625 kSa/s Smart DSA Digitizer
 EMX-4250, 16 Channel, 204 kSa/s Smart DSA Digitizer
 EMX-4251, 8-Channel, 204.8 kSa/s Smart PXIe DSA Digitizer
 EMX-4380, 625 kSa/s, 4 Ch, 24-bit Smart PXIe DSA
 *Currently works with EMX09 and PMX04. EMX18, EMX-2401 and Cabled PCI-e controller will be supported in future releases

EX1629 Precision Strain/Bridge/Voltage Instrument
 EX1000A Precision Voltage Instrument
 EX1016A Precision Thermocouple/Voltage Instrument
 EX1032A Precision Thermocouple/Voltage Instrument
 EX1048A Precision Thermocouple Instrument
 EX1200-3048 and DMM
 VXI VT141x and VT143x

Ordering Information

72-0335-000

EXLAB-LITE

General purpose, turn-key data acquisition software, support for up to 144 channels, automatic device discovery with intelligent configuration, support for multiple instrument types and configurations, extensive time domain displays and data viewing capabilities, and data logging

72-0336-000

EXLAB-STANDARD

Extends EXLab-Lite capability with 244-channel support, real-time FFT displays, advanced data logging and triggering capabilities, and runtime alarms.

72-0337-000

EXLAB-PROFESSIONAL

Extends EXLab-Standard capability with 348-channel support, post analysis functionality, advanced file management, and multiple client data publishing/display

72-0338-000

EXLAB-ENTERPRISE

Extends EXLab-Professional capability with unlimited channel support, remote monitoring and control, support for up to five (5) remote clients, and optional client support.

RELATED PRODUCTS

EMX-4250

16-Channel, 204.8 kSa/s Smart DSA Digitizer

EMX-4251

8-Channel, 204.8 kSa/s Smart PXIe DSA Digitizer

EMX-4350

4-Channel, 625 kSa/s Smart DSA Digitizer

EMX-4380

625 kSa/s, 4 Ch, 24-bit Smart PXIe DSA

EX1629

48-Channel, 10 kSa/s Strain/Bridge/Voltage Instrument

EX10XXA

48-Channel, 1 kSa/s Precision Temperature/Voltage Instrument

VTI INSTRUMENTS

FULL-FEATURED DATA ACQUISITION SOFTWARE SUITE

EXLab

VTI Instruments Corporation 2031 Main Street
World Headquarters Irvine, CA 92614 USA
Phone: +1.949.955.1894

VTI Instruments Pvt. Ltd. Mallika,
Bangalore Instrument Division 75/76, Millers Road,
Bangalore 560 052, India
Phone: +91.80.4040 7900

VTI Instruments Corporation 5425 Warner Road, Suite 13
Cleveland Instrument Division Valley View, OH 44125 USA
Phone: +1.216.447.8950

VTI Instruments Ltd. 4 The Paddock
United Kingdom Lower Boddington
Northants
NN11 6YF
UK
Phone: +44(0)1295.660008

RELIABLE DATA FIRST TIME EVERY TIME

