FULL-FEATURED DATA ACQUISITION SOFTWARE SUITE

EXLab

RELIABLE DATA   FIRST TIME   EVERY TIME

VTI
Instruments

AMETEK®
ADVANCED MEASUREMENT TECHNOLOGY

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 trans¬ducer-based parameters — and you're feeling the pressure of time — then an EXLab-based system is the right solution for you.
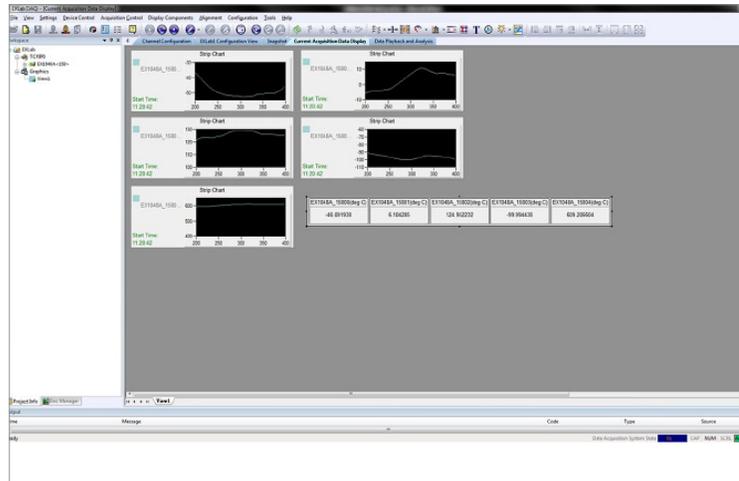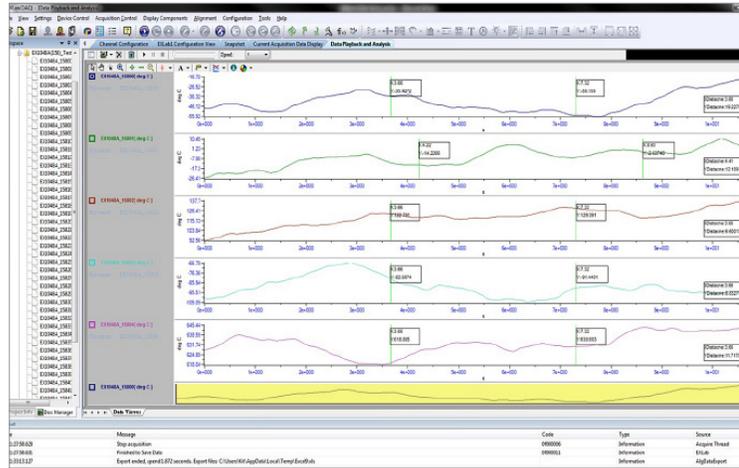
Why waste time and money developing and validating custom software that is difficult to support?

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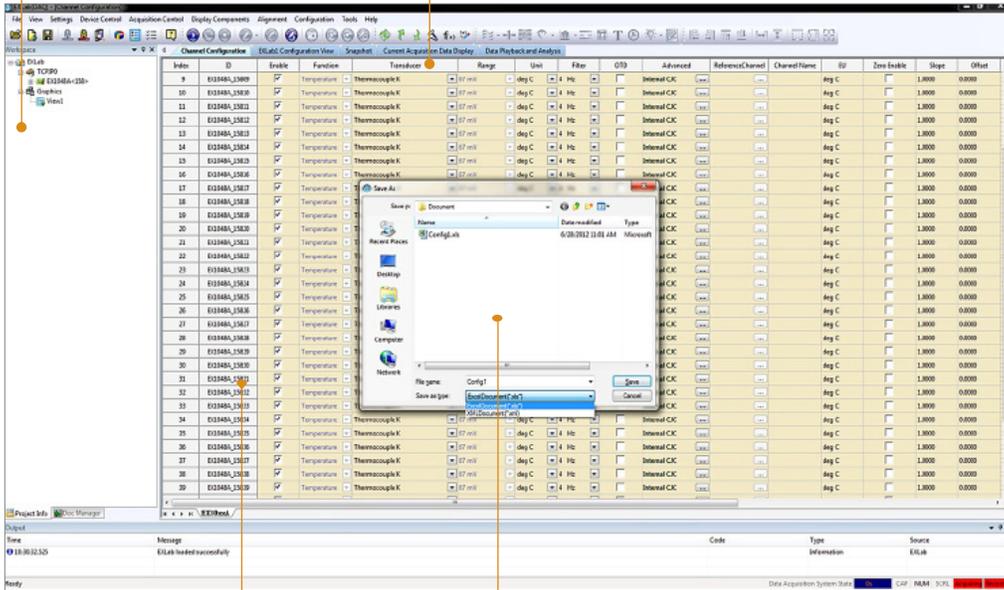
Modular configuration view with Excel style control – easily copy, paste and edit channels and configurations

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.

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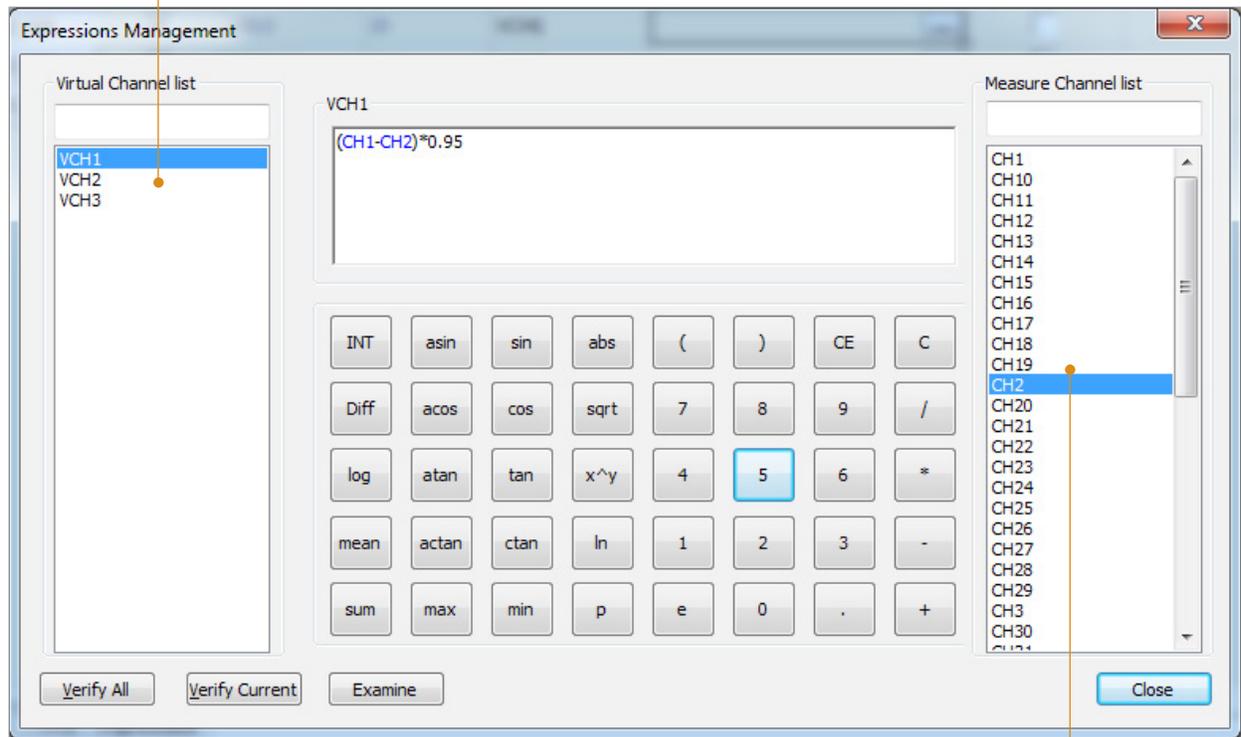
Channels can be created defined using single or multiple real reference channels.

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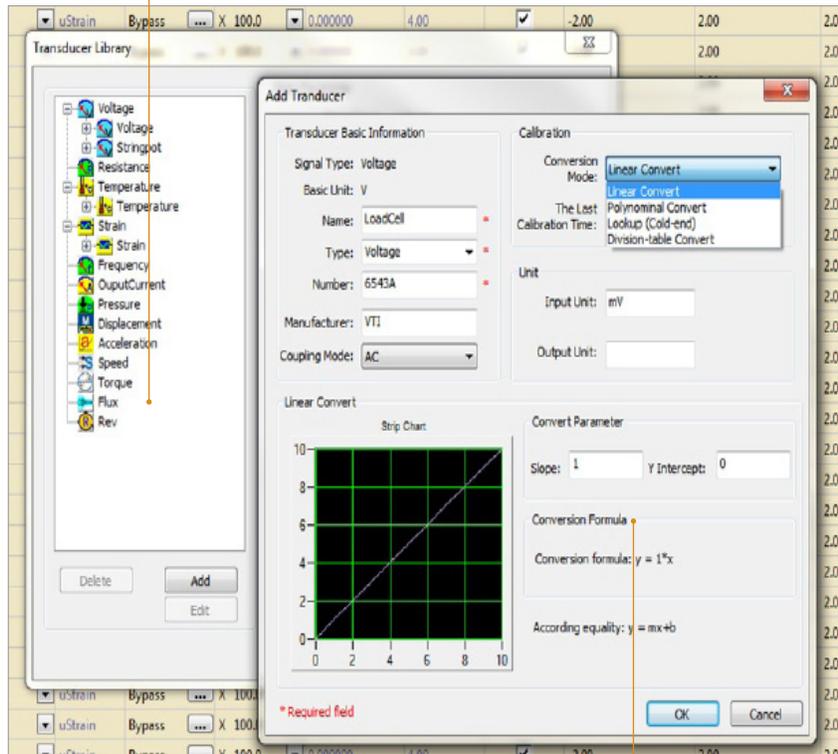
For transducers that are not inherently supported, users can easily define custom transducer type.

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.
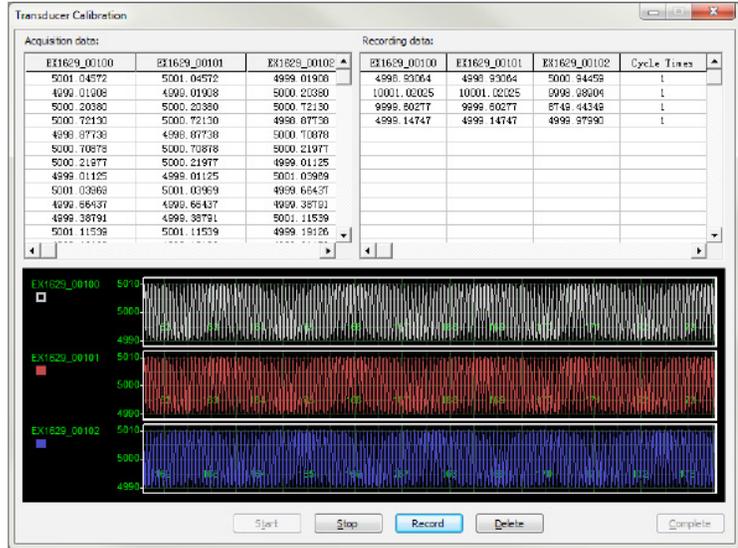
SENSOR CALIBRATION WIZARD
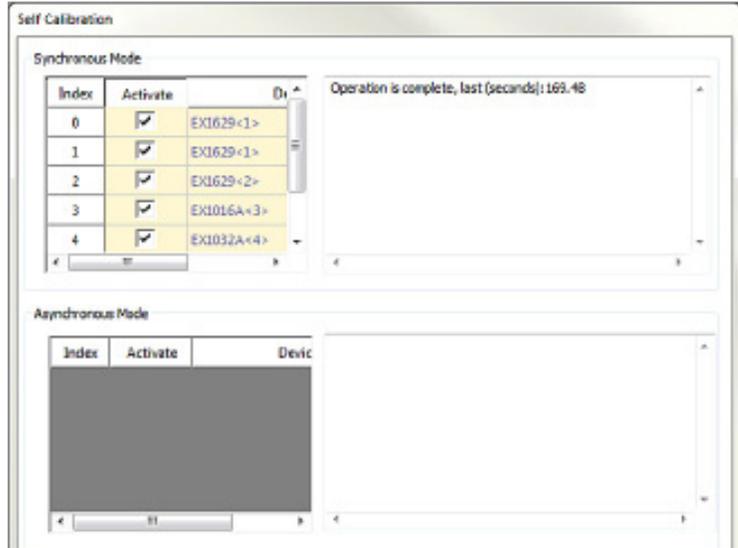
INSTRUMENT SELF CALIBRATION WIZARD

Snapshot Display

Snapshot display allows users to view the data at different time intervals during the acquisition process. Snapsot 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.

dex	ID	Enable	Channel Name	EU	Value 0 @ 2s	Value 1 @ 3s	Value 2 @ 4s	Value 3 @ 9s	Value 4 @ 48s	Value 5 @ 49s	Value 6 @ 56s	Value 7 @ 56s	Value 8 @ 57s	Calculated V
0	EX1629_00100	☑		uStrain	3359.2488	1175.5825	-4719.9031	38.4640	38.4636	1175.5840	38.4636	3359.2481	1175.5843	-2985.5452
1	EX1629_00101	☑		uStrain	3380.8821	1196.4158	-4699.0698	59.2974	59.2970	1196.4173	59.2970	3380.8814	1196.4176	-2964.7119
2	EX1629_00102	☑		uStrain	3400.9155	1217.2492	-4678.2365	80.1307	80.1303	1217.2507	80.1303	3400.9148	1217.2509	-2943.8786
3	EX1629_00103	☑		uStrain	3421.7488	1238.0825	-4657.4031	100.9640	100.9636	1238.0840	100.9636	3421.7481	1238.0843	-2923.0452
4	EX1629_00104	☑		uStrain	3442.5821	1258.9158	-4636.5698	121.7974	121.7970	1258.9173	121.7970	3442.5814	1258.9176	-2902.2119
5	EX1629_00105	☑		uStrain	3463.4155	1279.7492	-4615.7365	142.6307	142.6303	1279.7507	142.6303	3463.4148	1279.7509	-2881.3786
6	EX1629_00106	☑		uStrain	3484.2488	1300.5825	-4594.9031	163.4640	163.4636	1300.5840	163.4636	3484.2481	1300.5843	-2960.5452

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.

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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
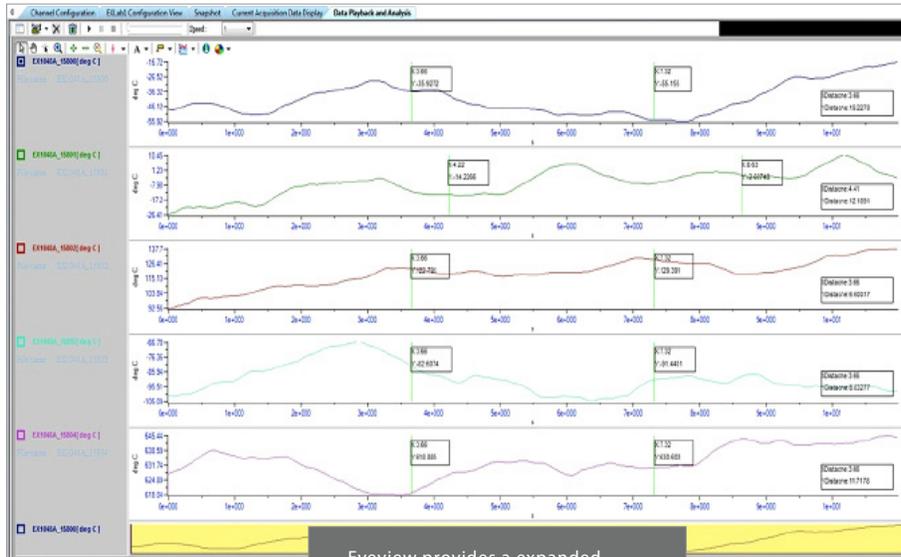
Eyeview provides a expanded view of large time histories making it easy to find events
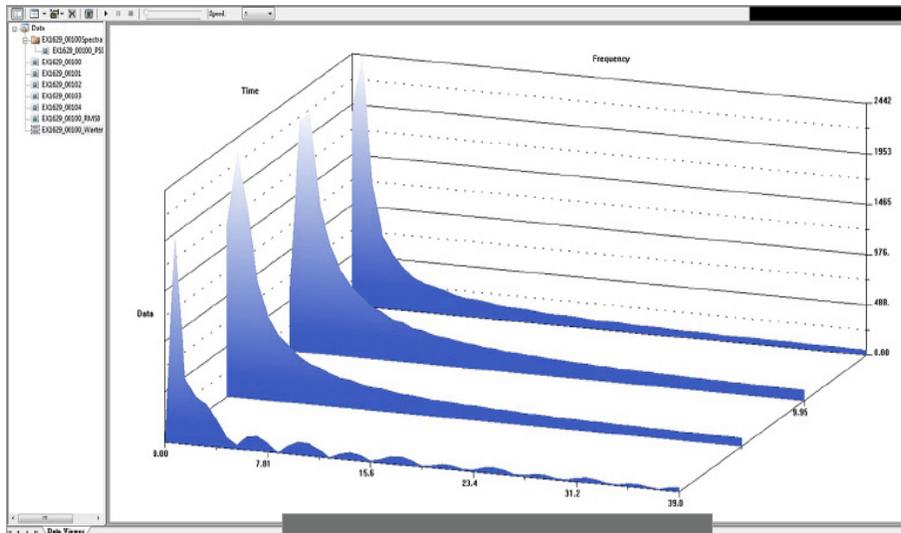
3D Waterfall graph, Spectrum Analysis and Filter Analysis are also supported for post data analysis.

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.

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 can also be exported as text files, or binary files

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.

Workspace

- EXLab5
  - Structural Test
    - EX1048A(1)_0000.tdmbin
    - EX1048A(1)_0001.tdmbin
    - EX1048A(1)_0002.tdmbin
    - EX1048A(1)_0003.tdmbin
    - EX1048A(1)_0004.tdmbin
    - EX1048A(1)_000
    - EX1048A(1)_000
    - EX1048A(1)_000
    - EX1048A(1)_000
  - EXLab5.tdmcfg

Index	ID	Enable	San
0	VCH2_000		
1	VCH2_001		
2	VCH2_002	✓	100.0

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

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.
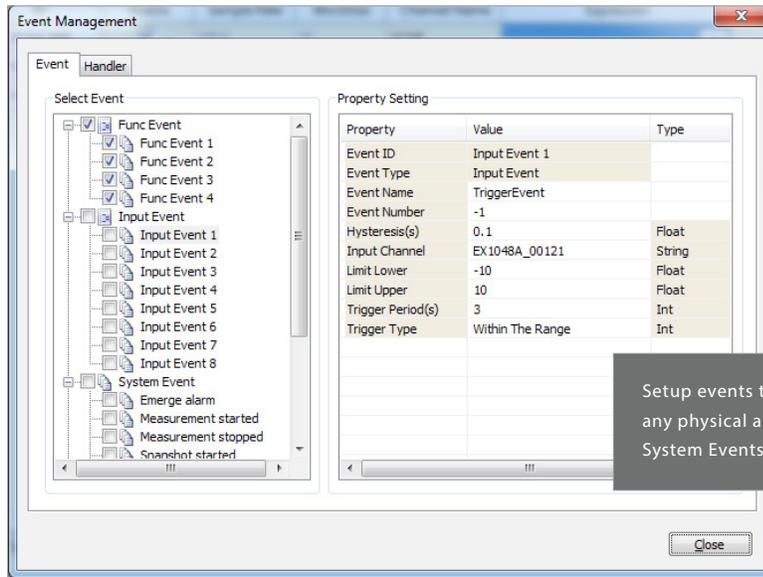
Setup events to detect signals from any physical and DIO channels, System Events and Timer Events.
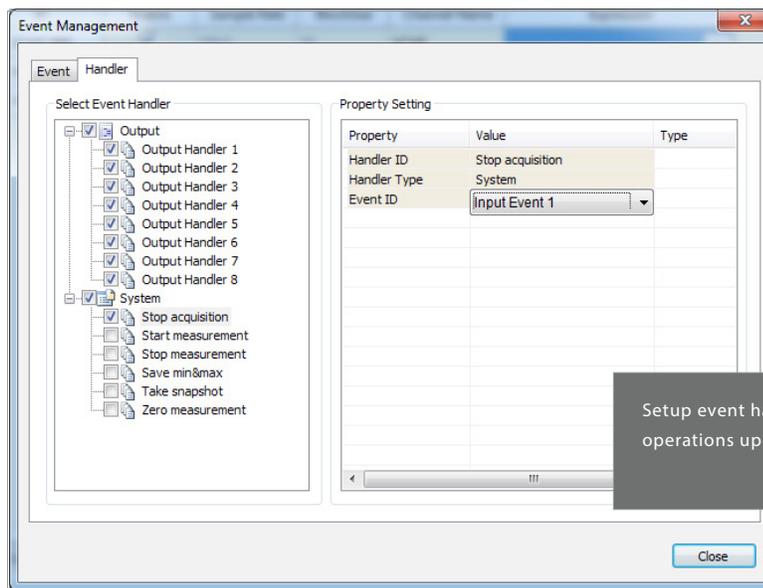
Setup event handler to do specific operations upon a event happens.

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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			•	•

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Detailed Specifications

USER INTERFACE	Intuitive graphical user interface
	Function driven icons and drop down menus
	Online help
INSTRUMENT IDENTIFICATION	Automatic instrument discovery
INSTRUMENT CONFIGURATION	Automatic configuration based on hardware type
	Off-line simulation mode and programming
INSTRUMENT SIMULATION	Fully supported
INSTRUMENT CALIBRATION	Cal Zero
	Auto Cal
	Auto Tare
	Self-calibration
MATHEMATICAL FUNCTIONS	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	Strip Chart
	Numeric
	Tachometer
	Horizontal / vertical Bar
	Waterfall
	Digital / Tabular
	Linear frequency spectrums
	XY Plot
	Distribution Graph
	Tabular, including configuration settings
CURSORS AND CONTROL	Stepless zoom
	Smart cursor functionality
	Area Maximum / Minimum
	Local maximum / minimum
	Differential markers
	Data playback mode
DATA CAPTURE	Manual Snapshot
	Automatic Snapshot
	Manual initiated
	Triggerbus initiated
	TTL initiated
	Event initiated
	Averaging, Min and Max Data Capture

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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

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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

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