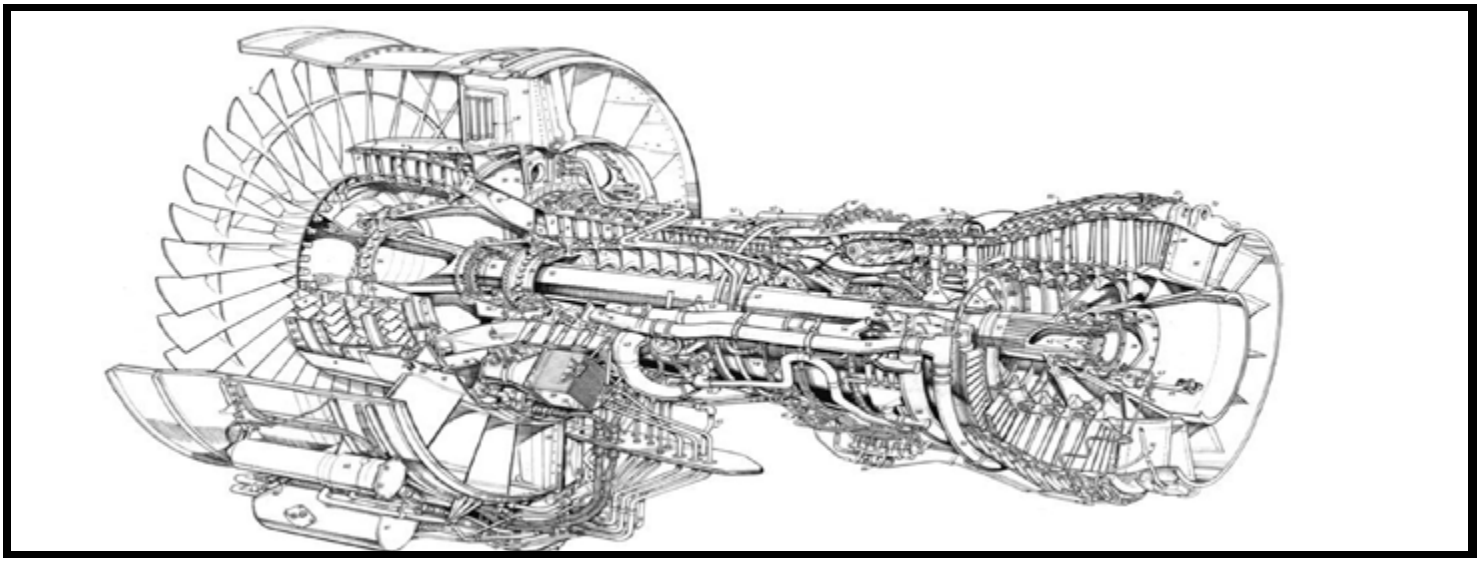


INTEGRATED DATA ACQUISITION AND SIGNAL CONDITIONING SYSTEMS

sentinelEX

RELIABLE DATA FIRST TIME EVERY TIME

VTI Instruments

Interoperability and Flexibility without Compromise

VTI delivers precision instrumentation for the world's most demanding test applications. Our solutions provide reliable data, first time, every time. VTI's mission critical data acquisition solutions are used to monitor and record data that characterizes the physical integrity and performance of aircraft, engines, large structures, and complex electronic systems. Knowing that we serve a wide range of applications, from critical infrastructure to flight safety and troop security, defines our ongoing commitment to product performance and quality.

For over 20 years, we have developed and provided precision integrated data acquisition solutions. Our recently expanded SentinelEX Integrated Data Acquisition family builds upon this with solutions capable of delivering complete corporate-wide coverage spanning a broad range of applications and measurement types.

- Personalized hardware configurability and customization
- Unmatched signal integrity and measurement performance
- Speeds ranging from dynamic, high-speed to steady state
- Applications ranging from several channels to thousands of channels
- Complete application space coverage regardless of the type of measurement or transducer

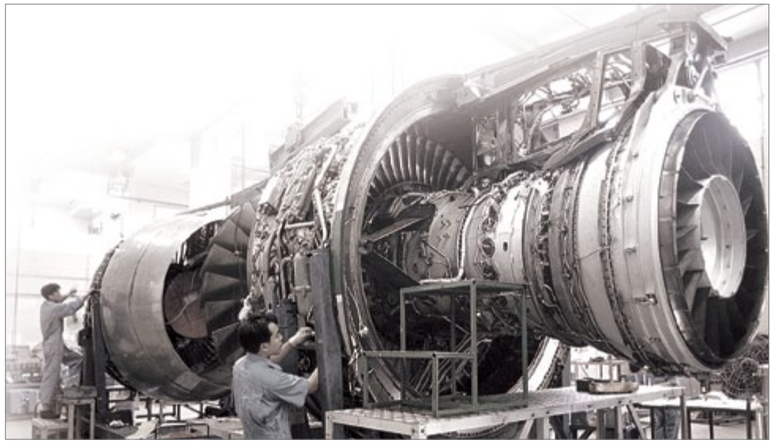
sentinelEX

Platform Independent Solutions

The SentinelEX product family delivers complete application space coverage with solutions designed to meet your challenging, and changing, data acquisition requirements. Solution set interoperability ensures that test system investments are maximized by using hardware that can be tailored to meet unique requirements and by leveraging a common software application programming interface (API).

MEASUREMENT SOLUTIONS

	EMX Series	EX1000A EX1000A-TC	EX1016A EX1032A	EX1048A	EX10SC	EX1266A	EX1629
Voltage	●	●	●		●	●	●
Voltage (> 15 V)	●				●	●	
Thermocouple	●	●	●	●	●	●	
RTD/Thermistor	●				●	●	
Bridge (Strain/Pressure)	●				●		●
Load/Force	●				●		●
Frequency/RPM	●				●	●	
Resistance	●				●	●	
Digital I/O	●	●	●	●		●	●
Analog Output	●					●	
Shock/Vibration/Acceleration	●						
Acoustics	●						
Deterministic Control	●						
Isolation	●				●		
RTD Stimulator						●	
Measurement Speed	Fast	Medium	Medium	Medium	Medium	Slow	Medium



Accurate Data. Precision Performance. Repeatable Results

COMBINE ALL TRANSDUCER TYPES INTO ONE, EASY-TO-USE SYSTEM

ACCURATE, SYNCHRONIZED, DISTRIBUTED SYSTEMS

SCALABLE FROM TEN TO TENS OF THOUSANDS OF CHANNELS

INTEGRATED SIGNAL CONDITIONING AND END-TO-END CALIBRATION GUARANTEES DATA ACCURACY

RELIABLE DATA. FIRST TIME. EVERY TIME.

Qualification and performance testing is rigorous and unforgiving. Retests are expensive in both time and money. More often, they're not even feasible. Test data must be captured correctly the first time. Thus, the reliability of the data acquisition system, the accuracy of the measurements, and integrity of the data must be faultless for each and every test. The risk is too high to compromise on the test instruments.

THAT'S WHY, FOR DECADES, CUSTOMERS WORLDWIDE HAVE RELIED ON VTI

Our customers depend on us to deliver highly accurate data when they are faced with their most critical testing needs. VTI systems deliver the highest performance available in a scalable, open-architecture platform. With powerful software tools that aid the developer in the setup and control of test configurations, errors are minimized. These high-performance systems have been proven to consistently deliver accurate, repeatable data in applications worldwide.

sentinelEX

Open-Architecture Solutions – The Freedom to Choose

For decades, VTI has led and driven industry development activities. This commitment and philosophy ensures that our customers are not locked into the high maintenance costs of proprietary products.

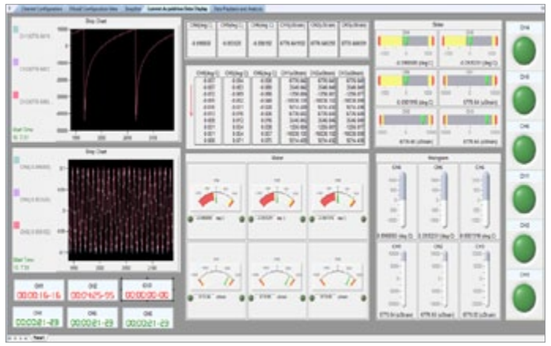
VXI CONSORTIUM	PRESIDENT
LXI CONSORTIUM	CO-FOUNDER, BOARD MEMBER
WESTERN REGION STRAIN GAUGE BOARD	BOARD MEMBER
VITA TECHNICAL COMMITTEE	ACTIVE MEMBER
IVI FOUNDATION	ACTIVE MEMBER
PCI-SIG	ACTIVE MEMBER
PXISA	ACTIVE MEMBER
STRUCTURAL DYNAMICS RESEARCH CONSORTIUM	SPONSOR MEMBER
BSSM	SPONSOR MEMBER
EIS	SPONSOR MEMBER

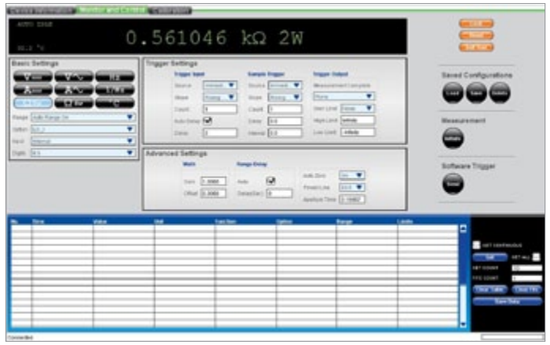
OPEN HARDWARE – MAXIMIZE PERFORMANCE, MINIMIZE RISK

The SentinelEX family leverages the LXI and PXIe standards. LXI (co-founded by VTI) is the largest instrumentation standard for rack mount programmable instruments, whereas PXIe is the new modular card standard based on the PCI Express bus. Combining the power of both of these standards allows the SentinelEX family to scale from a handful to thousands of channels of mixed DAQ and satisfy applications from low-speed temperature to high-speed NVH within one family.

- Distributed data acquisition systems over LAN
- Synchronized measurement data to IEEE 1588 precision time source
- Highly deterministic hardware-based triggering using the LXI Wired Trigger Bus
- Protection against PC bus obsolescence
- Assurance of multi-vendor instrument interoperability

Open-Architecture Solutions – The Freedom to Choose





OPEN SOFTWARE – EXPEDITE SYSTEM READINESS

The most significant investment of any data acquisition project resides in the system software.

VTI's commitment to delivering open-architecture solutions extends to software utilities and tools that reduce development time while allowing the flexibility to choose the application development environment.

- Complete turn-key software solutions
- Transportable front panels that monitor and control instruments from anywhere, on any web-enabled device
- An API that conforms to the industry standard IVI specification
- OS independence with drivers that work seamlessly in Linux and Windows
- Support for many different programming languages (C/C++, C#, LabVIEW™, MATLAB™ /Simulink™, Visual Studio™, Visual Basic™,Python™, etc.)
- Automatic instrument discovery

Reduce- Total Cost of Ownership

MINIMIZE DEVELOPMENT TIME, IMPROVE TEST INTEGRITY

SentinelEX integrates configuration flexibility with precision measurement designs to guarantee accurate results. The use of industry standard interfaces ensure forward-looking and backward compatibility while preserving initial capital investment by minimizing obsolescence.

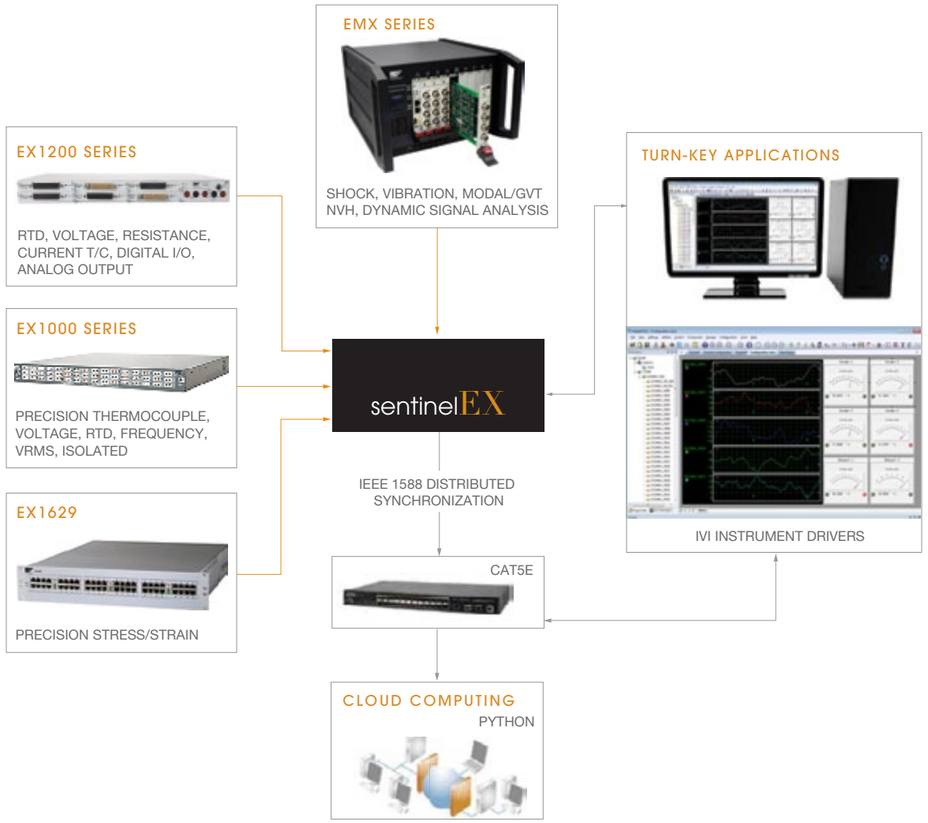
- Integrated solutions eliminate external cabling, simplify field installation and setup, and reduce concerns associated with electrical noise and maintenance
- Powerful, turn-key software speeds setup and eliminates programming time, debugging, and program validation
- Longevity – advanced industry standard designs outlive current test requirements
- Open-architecture platforms enable seamless integration with other devices including PXIe, LXI, and VXIbus
- Speeds ranging from dynamic, high-speed to steady state
- Applications ranging from several channels to thousands

SentinelEX

ONE COMMON PLATFORM FOR ALL YOUR DAQ NEEDS

Unlike proprietary platforms that provide a unique/niche solution for each application, the SentinelEX family delivers one common scalable open-platform for complete application space coverage regardless of the type of measurement or transducer.

SentinelEX allows our customers to optimize their capital investment through product longevity while ensuring unmatched measurement integrity and data reliability.



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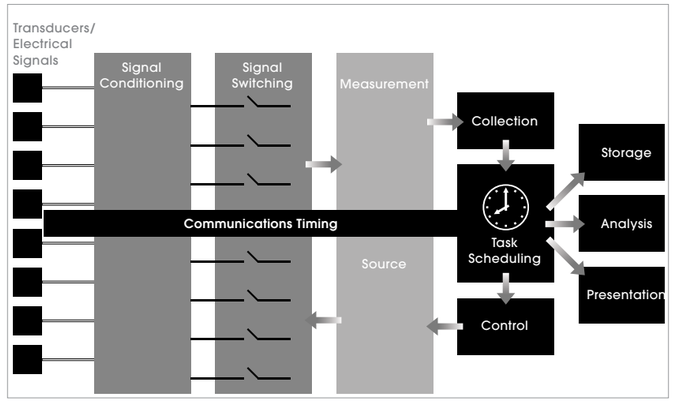
Guaranteed Test Results

INTEGRATED DAQ SOLUTIONS

At VTI, data acquisition is more than just a collection of A/D cards. The SentinelEX family is based on a 30 year integrated product design philosophy that focuses on the measurement from transducer to the desired calibrated result.



PROVEN HARDWARE FOR PRECISION MEASUREMENTS

- End-to-end self-calibration assures repeatable, accurate results
- High-density, scalable instruments e asily handle high channel count applications
- Integrated signal conditioning and excitation optimizes input device performance and accuracy
- Web-based monitor and control
- Easily aggregate multiple instruments to increase throughput
- Advanced independent filtering per channel ensures signal integrity

Unsurpassed Uptime and System Availability

MEASUREMENT CONFIDENCE WITHOUT COMPROMISE

EMBEDDED RUN-TIME SELF-TEST

- Comprehensive self-test capability ensures performance of instrumentation at test time
- Validates gain, offset, and complete measurement path including current excitation sources
- Performed in seconds, in-place and without disconnecting field wiring and transducers

SYSTEM-LEVEL MEASUREMENT CONFIDENCE

- Integrated signal conditioning maximizes measurement integrity and minimizes implementation issues
- Ergonomic sensor connectivity simplifies installation, setup, and maintenance activities
- Instrumentation configurations tailored to meet application needs in the laboratory or widely distributed

EMBEDDED RUN-TIME SELF-CALIBRATION

- Eliminates error contributions due to ambient temperature variations
- Complete measurement path is calibrated utilizing precision voltage reference source
- Performed in seconds, in-place and without disconnecting field wiring and transducers

EMBEDDED FULL NIST-TRACEABLE CALIBRATION

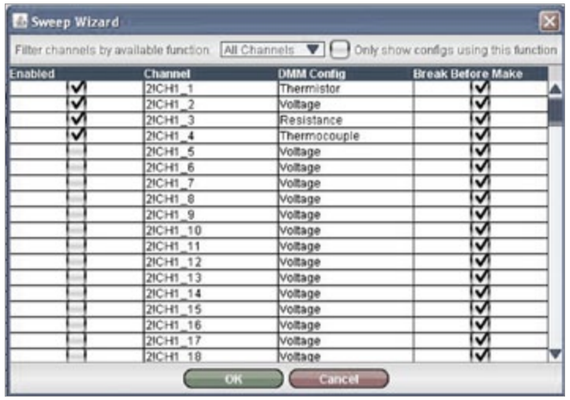
- Complete NIST-traceable calibration utilizing common standards
- Embedded web interface control eliminates programming and validation
- Increases test system availability and reduces need for instrumentation spares

Software Solutions: Complete Turn-Key Packages

INTEGRATED DAQ SOLUTIONS

SentinelEX delivers complete application space coverage with solutions designed to meet challenging, and changing, data acquisition requirements. Industry standard drivers and open application programming interfaces enable the flexibility and freedom of choice to develop custom application programs utilizing commercially available development environments like MATLAB, LabVIEW, .NET, or Python.

While our instruments are compatible with standard programming environments, our turn-key software programs, designed by experienced test engineers, are designed to accelerate test setup and simplify data acquisition, monitoring, and analysis. These programming-free environments feature intuitive GUIs and provide auto instrument discovery and facilitate easy channel configuration. Data display formats are user-selectable for optimum visualization of test parameters. All of this means that you can be acquiring, displaying, and recording data within minutes of connecting your sensors to the acquisition hardware.



	EX-Lab	X-Modal	VTICoda	SO Analyzer *
General Purpose/ High-Speed	●			
Modal/GVT		●		●
Shock Testing				●
Vibration				●
Rotating Machinery/ Order Analysis				●
Acoustics				●
Temperature Monitoring	●		●	
Static Structural	●		●	
Fatigue	●		●	

* SELECT COUNTRIES ONLY

VTI SOFTWARE SOLUTION: APPLICATION COVERAGE

SentinelEX Applications

General Purpose DAQ

SentinelEX is a diverse family of products, offering a broad spectrum of sensor and application coverage. Distributed measurements are linked by the simplicity of Ethernet, precisely synchronized through IEEE 1588, and acquired and displayed with powerful turn-key software applications.

- HIGH-SPEED DATA ACQUISITION
- HALT / HASS PRODUCT EVALUATION
- PRODUCT DATA EVALUATION AND ANALYSIS
- PERFORMANCE AND EVENT MONITORING
- GENERAL PURPOSE DATA LOGGING
- ENGINE TEST CELL ACQUISITION
- PROCESS AND PLANT MONITORING
- TEMP MONITORING /STATIC STRUCTURAL

EX1048A PRECISION TEMPERATURE/VOLTAGE	
EX10SC MODULAR SIGNAL CONDITIONING	
EMX SERIES PRECISION HIGH SPEED DSA	
EX1266A GENERAL PURPOSE DAQ SYSTEM	
EX1629 PRECISION STRAIN/VOLTAGE	

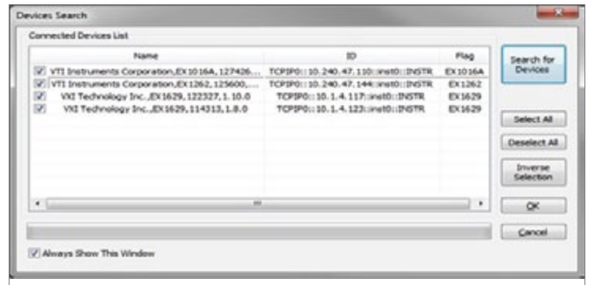
EXLab

Advanced Data Acquisition Software Suite

VTI Instruments 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, data display, and post processing without sacrificing functionality or performance. EXLab supports all SentinelEX hardware solutions.

MINIMAL LEARNING CURVE

EXLab is an intuitive, easy-to-use graphical interface that reduces the guesswork behind system startup, acquisition, and analysis by delivering complete turn-key operation. It eliminates time consuming learning curves and software development delays, ensuring that tests are performed on time with accurate, repeatable results.



- Automatic instrument discovery of VTI data acquisition hardware in EXLab
- Instrument configurations are automatically pre-loaded for the selected devices

AUTOMATIC INSTRUMENT DISCOVERY

If VTI's data acquisition instruments are powered up and connected to your PC, EXLab will automatically identify those resources for you. All installed signal conditioning is also identified so there is no question about which signals you can measure.

EXLab

Advanced Data Acquisition Software Suite

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.

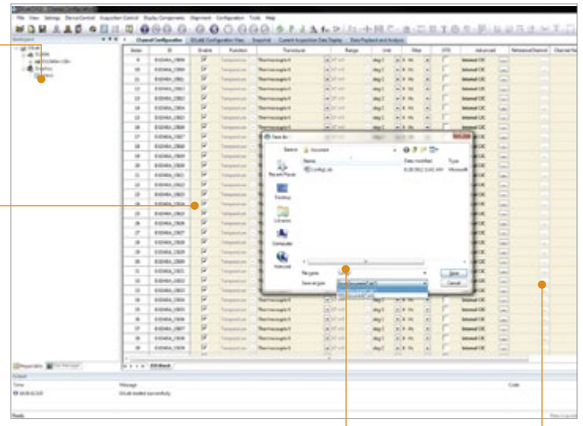
A wide mix of channel types can be easily configured using EXLab. Common measurements, such as temperature, strain, and voltage can be mixed with digital measurements like relay settings, shaft RPM, pulse train rates, or other similar parameters.

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

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

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).

Import and export configurations, – saving time setting up similar configurations.



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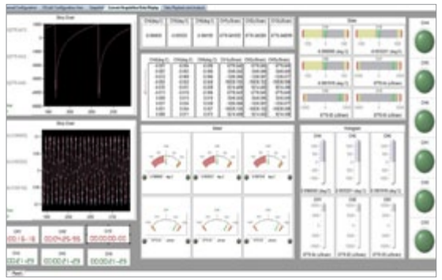
EXLab

Advanced Data Acquisition Software Suite

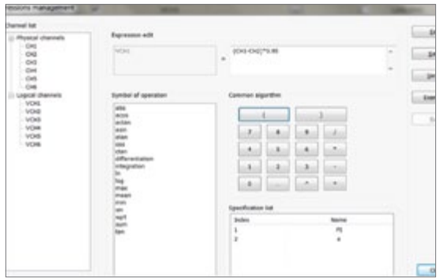
MULTIPLE REAL TIME DISPLAY OPTIONS



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, waterfalls, digital/tabular, linear, frequency spectrums, XY Plot, and image import / overlays.

VIRTUAL/CALCULATED CHANNELS AND SPECIAL ALGORITHM DEFINITIONS



Virtual channels can be created by performing math operations on individual channels or a combination of channels. This can be a useful tool in analyzing data and for setting up control mechanisms. EXLab also allows users to define custom algorithms like Rosettes for strain gages.

- Channels can be defined using single or multiple real reference channels.
- Calculations are performed real time and resultant channels are treated like other "real" measured channels for display and reporting purposes.

EXLab

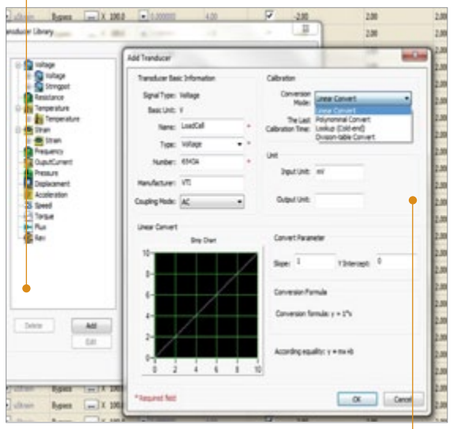
Advanced Data Acquisition Software Suite

CUSTOM TRANSDUCERS AND TEDS SUPPORT

EXLab contains a transducer 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 reference them in the configuration screen.

In addition, EXLab also supports TEDS which allows it to import/export transducer specifications to the transducer library directly through the measurement hardware.

Wide range of transducers are inherently supported in EXLab



For transducers that are not inherently supportedusers can easily define custom transducer type.

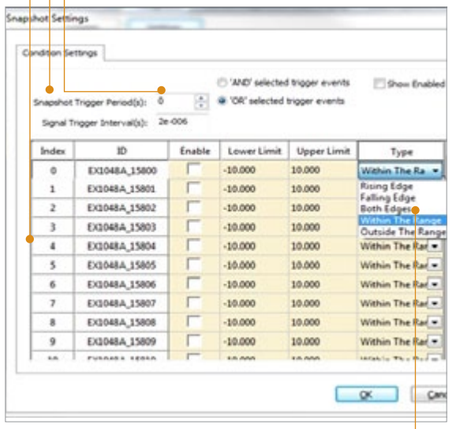
ADVANCED ALARMS, TRIGGERS, AND EVENTS

EXLab offers advanced limit detection functionality which can be used to configure alarms and output triggers based on events. Limits can also be used to initiate data recording and snapshot displays.

Limit detection can be configured on every channel.

Generate out-of-tolerance events based on user-defined limits.

Trigger conditions can be configured across multiple inputs using AND and OR logics.



Configure limits by rising/falling edge upper limit/lower limit.

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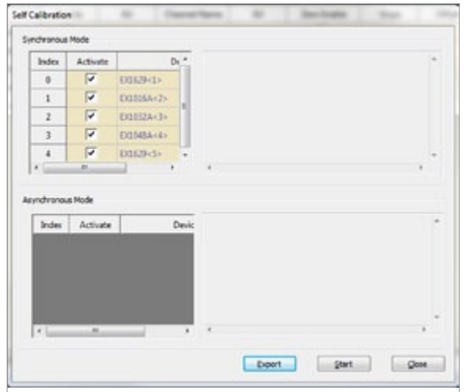
EXLab

Advanced Data Acquisition Software Suite

CALIBRATION

EXLab supports the calibration of both sensors and instruments from within the software.

SENSOR CALIBRATION WIZARD

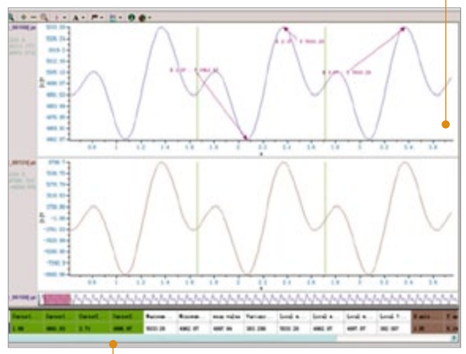


INSTRUMENT SELF-CALIBRATION WIZARD

ADVANCED DATA VIEWING OPTIONS

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.

Data markers provide quick access to important information on plots.



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

EXLab

Advanced Data Acquisition Software Suite

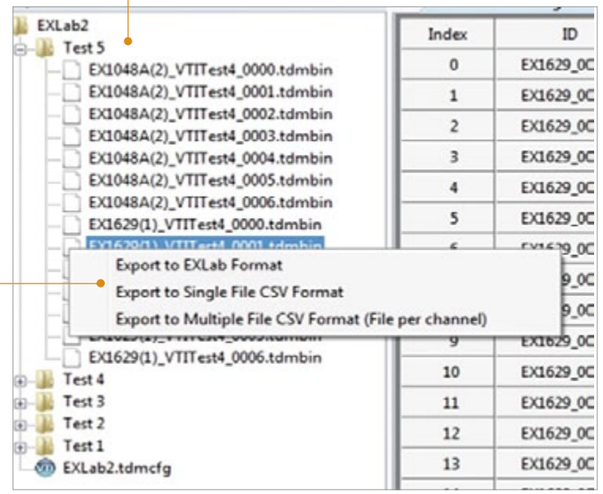
OPEN ENVIRONMENT DATA STORAGE/EXPORT OPTIONS

EXLab allows data to be exported in multiple common file formats like text, binary, Excel, or EXLab data files. 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.

- Conditional recording – data can be recorded based on conditions setup by the user
- Data can also be exported as text files or binary files

Loop Recording – data can be recorded either in one single file or multiple files with the ability that the user can specify duration of each file and the total number of 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.



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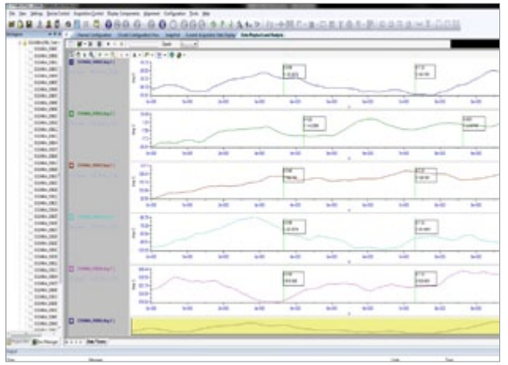
EXLab

Advanced Data Acquisition Software Suite

POWERFUL POST PROCESSING,
DATA PLAYBACK/ANALYSIS OPTIONS

Collected data can be analyzed in EXLab using powerful post-processing options. FFTs, math operations, data playback, spectrum analysis, and 3D waterfalls are some of the supported capabilities.

- Powerful data playback and analysis – allow the user to playback data recorded in the past
- 3D waterfall graph, spectrum analysis, and filter analysis are also supported for post data analysis



SNAPSHOT DISPLAY

Snapshot display allows users to view the data at different time intervals during the acquisition process.
The user can either snapshot the data manually or set conditions to snapshot the data automatically.

Index	ID	Enable	Channel Name	EU	Value 0 @ 28s	Value 1 @ 35s	Value 2 @ 53s	Value 3 @ 60s	Value 4 @ 67s	Value 5 @ 69s	Calculated Value
0	EX1016A_00200	☑		V	-499.9300	-500.0200	-500.1000	-500.0200	-500.0300	-499.9200	-500.1000
1	EX1016A_00201	☑		V	-479.0967	-479.1867	-479.2667	-479.1867	-479.1967	-479.0867	-479.2667
2	EX1016A_00202	☑		V	-458.2633	-458.3533	-458.4333	-458.3533	-458.3633	-458.2533	-458.4333
3	EX1016A_00203	☑		V	-437.4300	-437.5200	-437.6000	-437.5200	-437.5300	-437.4200	-437.6000

ORDERING INFORMATION

MODEL	DESCRIPTION
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
EXLab-Standard	Extends EXLab-Lite capability with 384-channel support, real-time FFT displays, 144 channels, advanced data logging and triggering capabilities, and runtime alarms
EXLab-Professional	Extends EXLab-Standard capability with 1000-channel support, post analysis functionality, advanced file management, and multiple client data publishing/display.
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.

Application Examples

Aircraft Structural Test

THE CHALLENGE

Accurately measure and synchronize over 10,000 channels of strain gage inputs distributed across a commercial airframe.

THE SOLUTION

The 48-channel EX1629 high-performance strain gauge instrument has become the industry's de-facto standard for aircraft structural test, delivering exceptional measurement accuracy in a distributed topology that simplifies setup and configuration. Combined with EXLab or VTICoda and integrated with either Moog or MTS load control systems, the EX1629 becomes a low-risk proven solution for acquiring strain data.

KEY APPLICATION FEATURES INCLUDE

- Independent 24-bit A/D per channel
- Complete end-to-end self-calibration
- Integrated TEDS support
- Precision onboard excitation
- LXI-based Ethernet connectivity trigger bus device synchronization
- EXLab software support with options to tie into leading industry load control systems

SOLUTION SUMMARY	
EX1629	48-channel strain gauge instrument
EX2108	Synchronization trigger bus extender
EXLab	Data acquisition software with integration to load control system

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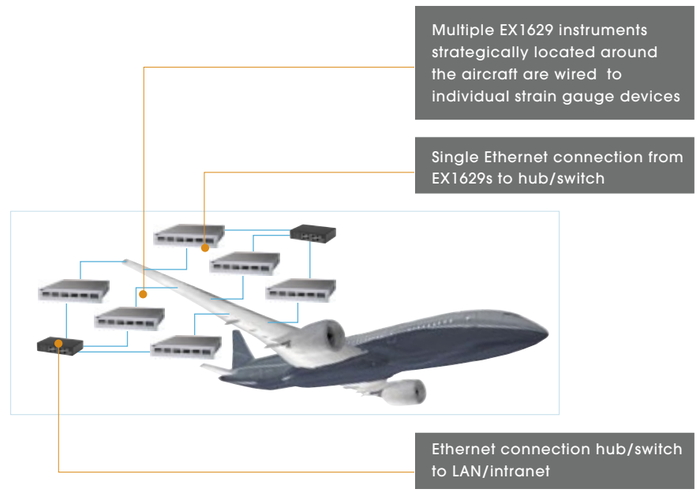
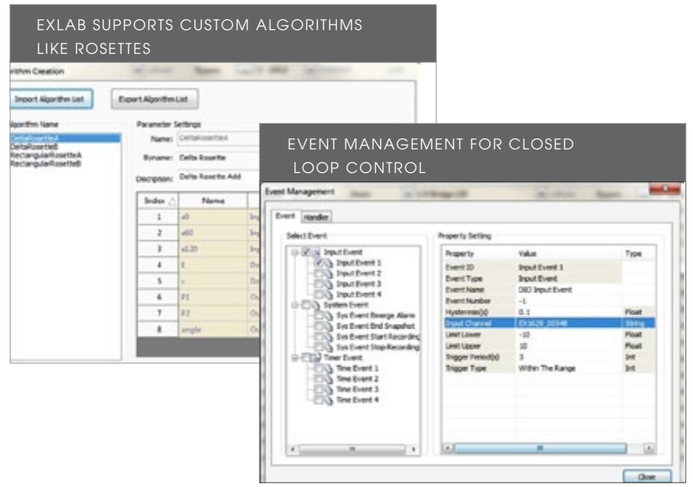
Application Examples

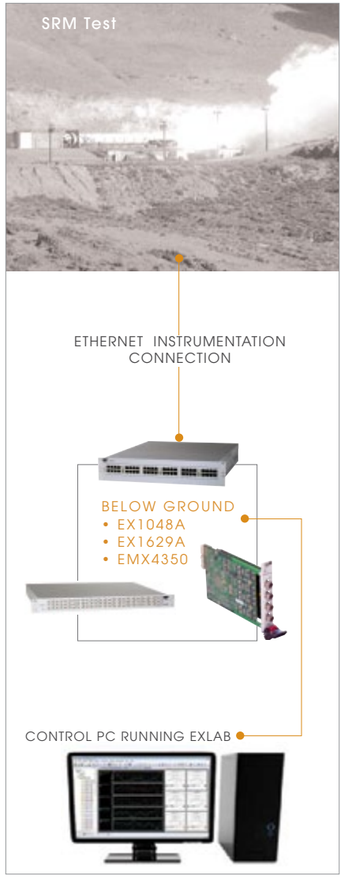
"PERFORMING DISTRIBUTED MEASUREMENTS WITH THOUSANDS OF CHANNELS USING THE EX1629"



EXLAB - PROVEN, FULL-FEATURED SOLUTION FOR LARGE-SCALE STRUCTURAL TEST



Application Examples



Solid Rocket Motor Reliability Testing

THE CHALLENGE

Maintain measurement stability and accuracy in a hostile environment and provide data to a central bunker located 1500 meters from the test cell.

THE SOLUTION

Thermocouple, strain gauge, and high-speed signals are successfully acquired using the EX1048A, EX1629, and EMX4350/EMX4250, respectively. The high-quality instrumentation design of the SentinelEX family, when housed in NEMA enclosures, successfully permits operation under these harsh conditions without sacrificing accuracy or reliability. Utilizing the EXLab client/server capability and SentinelEX's LXI (Ethernet) design, multiple clients can also analyze the data at their desks. The pedigree of VTI's DAQ family and the extensive testing performed in manufacturing production assures customers they achieve reliable data the first time, since repeating the test becomes VERY costly and impractical.

KEY APPLICATION FEATURES INCLUDE

- End-to-end self-calibration
- Open-thermocouple detection
- Simplified connectivity
- Scalability
- EXLab client/server software
- Filtering per channel

SOLUTION SUMMARY	
EX1048A	48-channel thermocouple instrument
EX1000A-TC	48-channel thermocouple/voltage instrument
EX1629	48-channel strain gauge instrument
EMX09	9-slot, high-speed switched serial mainframe with gigabit Ethernet interface
EMX-4350	4-channel, 625 kSa/s dynamic signal analyzer
EMX-4250	16-channel 204 kSa/s dynamic signal analyzer
EXLab	Data acquisition software with client/server support

sentinelEX

Application Examples

Rail Car Load Testing

THE CHALLENGE

Place measurement instrumentation at specific locations within a moving rail car and gather data from sensors.

THE SOLUTION

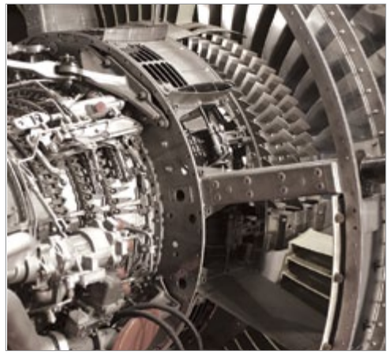
The EX1000A and EX10SC have proven to provide the right combination of voltage and bridge measurement capability. Individual channel definition simplifies transducer placement and field connectivity. DC versions of the instruments are also available that allow for easier power-on capability in these transportable applications.

KEY APPLICATION FEATURES INCLUDE

- Individual channel configurability
- Simple field terminations
- Independent filtering per channel
- Scalability
- EXLab "setup and run" data logging software

SOLUTION SUMMARY	
EX1048A	48-channel thermocouple instrument
EX1000A-TC	48-channel thermocouple/voltage instrument
EX10SC	16-channel signal conditioning unit with mixed transducer support
EXLab	Set up and run data logging software

Application Examples



Small Turbofan Testing

THE CHALLENGE

Accurately measure and synchronize high-level voltages and precision temperatures with a single platform.

THE SOLUTION

The EX1000A-TC and EX1048A high-performance voltage and temperature instruments, provide the flexibility to measure low-level as well as high-level signals in a distributed topology, along with simplified setup and configuration. Temperature measurements with 0.2 °C accuracy, regardless of thermocouple, and voltage measurements with 16-bit resolution and independent signal conditioning per channel, makes these products ideal. Combined with the powerful EXLab software, easy set-up allows calibrated measurement data to be easily exported to test cell software packages or analyzed by remote clients.

DC powered, extended temperature range versions of the instruments are available which allow the instrument to be placed on the pylon, closer to device under test.

KEY APPLICATION FEATURES INCLUDE

- Quick and reliable connections to the sensors
- Adjacent channel noise immunity
- Multiple gain range capability
- Complete end-to-end self-calibration
- LXI-based Ethernet connectivity
- IEEE 1588 bus device synchronization
- DC powered, extended temperature versions allow instruments to be placed on the pylon.

SOLUTION SUMMARY	
EX1000A-TCDC	DC powered, 48-channel thermocouple/ voltage instrument
EX1048A	48-channel thermocouple instrument
EX10SC	16-channel signal conditioning unit with mixed transducer support
EXLab	Data acquisition software

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Application Examples

Critical Temperature Monitoring

THE CHALLENGE

Measure and control temperatures in coolers and freezers used for the storage of high value perishable products. The critical nature of this application requires extremely accurate and stable temperature measurements.

THE SOLUTION

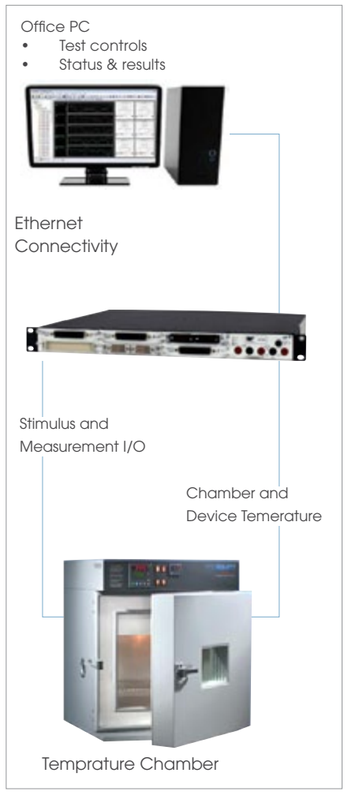
The EX1032A precision thermocouple and voltage instrument provides exceptional measurement accuracy and stability. LXI capabilities include simplified measurement distribution and data synchronization. Coupled with EXLab, lab technicians simply attach the thermocouples and then begin taking readings, displaying data on their client machines, and export the data into Excel spreadsheets for reporting and specialized analysis. Critical alarms also monitor any out of tolerance condition. No need to learn any programming.

KEY APPLICATION FEATURES INCLUDE

- Up to 1,000 Sa/s
- Independent filtering per channel
- Visual open-thermocouple detection
- Stable cold junction compensation (CJC)
- Ethernet connectivity
- LXI for easy client/server applications EXLab for "no-programming required" operation

SOLUTION SUMMARY	
EX1032A	High-precision 32-channel thermocouple,16-channel voltage instrument
EXLab	"Set up and run" data acquisition software

Application Examples



Large Scale Stress Screening

THE CHALLENGE

Generate stimulus signals to the device under test while accurately measuring chamber temperatures and monitoring device response.

THE SOLUTION

The EX1266A provides the ability to generate a variety of outputs to the devices under test. The responses are then measured along with chamber and device temperatures. If an automated test program needs to be written to stimulate/measure the devices under test, then industry standard IVI drivers for either Linux or Windows can be used. Alternatively, EXLab can very quickly generate and measure the required signals and log the data into a central test database.

KEY APPLICATION FEATURES INCLUDE

- Flexible signal routing and stimulus
- Embedded scan list test sequencing
- Wide variety of signal routing alternatives
- Compatible digital I/O and analog output modules
- LXI-based web access and control capabilities
- IVI drivers or EXLab

SOLUTION SUMMARY	
EX1266A	6-slot LXI chassis with integrated 6.5 digit DMM
EX1200-3608	Isolated, 500 kSa/s, 16-bit waveform generator
EX1200-3072	72-channel multiplexer for high-speed scanning measurements
EXLab	"Set up and run" data acquisition software

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Application Examples

Critical Health Monitoring

THE CHALLENGE

Measure run-time electrical and mechanical characteristics of wind turbines in remote locations.

THE SOLUTION

The EX1016A paired with the EX10SC provides the ability to measure numerous transducer inputs on a single platform. Temperature, pressure, RPM, and current are acquired with the necessary isolation. The EX1629 allows the user to measure strain gauges which are then seamlessly integrated into the data stream. All these sentinelEX instruments are automatically discovered within EXLab and a user display seamlessly customized to provide health monitoring and also generate alarms as needed.

KEY APPLICATION FEATURES INCLUDE

- Flexible per-channel input configuration
- Per channel alarm monitoring
- Remote instrument self-calibration
- EX10SC provides high input signal isolation
- Ethernet-based LXI data transmission from remote locations
- EXLab turn-key software

SOLUTION SUMMARY	
EX1016A	High-precision 16-channel thermocouple, 32-channel voltage instrument
EX10SC	16-channel signal conditioning unit with temperature, pressure, RPM, and current signal conditioning modules
EX1629	48-channel strain gage instrument
EXLab	"Set up and run" data acquisition software

SentinelEX Applications

Noise/Vibration/Harshness (NVH)

SENTINELEX'S EMX FAMILY – 4TH GENERATION DSA

The SentinelEX series is VTI Instruments' 4th generation of "smart" dynamic signal analyzers, and builds upon a proud legacy established in the 1980's by continuing to deliver the most trusted solutions to the noise, vibration, and harshness (NVH) marketplace. Part of the largest worldwide installed base of DSA instrumentation, these innovative products are the gold standard for physical measurements, delivering unmatched confidence and performance.

- The ability to distribute the measurements close to the structure
- Simultaneous sampling to eliminate channel/channel phase skew
- The ability to acquire lots of synchronized and time-stamped data
- Turn-key software for data analysis in all domains
- "Transportable" post-processing

DELIVERING UNMATCHED CONFIDENCE AND PERFORMANCE

Measurement performance is elevated to new levels with 625 kSa/s/channel data rates. True differential inputs with superior common mode performance reduce unwanted noise and interference. Industry leading spurious free dynamic range offers exceptional measurement fidelity and IEPE excitation flexibility, fully programmable from 2 mA to 20 mA, maximizes transducer performance and response.

Hardware enhancements also include comprehensive runtime health monitoring and self-calibration without the need to disconnect external transducer cabling, providing uninterrupted system level confidence and peace of mind. Precision distributed measurement synchronization is accomplished utilizing IEEE 1588 (precision time protocol) ensuring that test data is time correlated, whether the instrumentation is centrally located or distributed around the test article.

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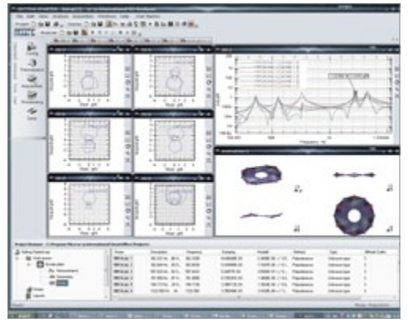
SentinelEX Applications

Noise/Vibration/Harshness (NVH)

"SMART" DSA

The SentinelEX DSA instruments incorporate a RESTful HTTP interface that allows it to deliver advanced data access and storage services throughout the organization using cloud data management services to stream data to remote servers.

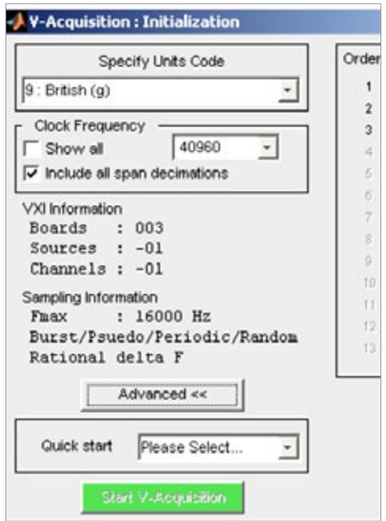
The DSA instruments also support AXI-4 based open-platform FPGA customization which extends traditional hardware performance by combining nearly unlimited user-defined computation, processing, and control possibilities. Industry standard MATLAB®, Simulink®, and other model-based design tools simplify implementation, maximize re-usability, and provide access to hundreds of standard filters and algorithms such as real-time distributed analysis.



OPEN-ARCHITECTURE SOFTWARE SOLUTIONS

All development activities are based on open-architecture design methodologies, resulting in a level of hardware and software independence not available in previous generations of DSA instrumentation. Industry standard drivers and programming interfaces support all major programming environments.

X-Modal III



Automatic discovery and display of specific instrumentation configuration details

X-Modal III is an open source data acquisition and modal analysis software tool featuring intuitive, task-oriented user interfaces, extensive modal parameter estimation algorithms, parallel display capabilities, flexible data management, and channel expandability.

Developed by the Structural Dynamics Research Laboratory (SDRL), one of the leading experts in modal analysis, and sponsored by leading modal analysis groups such as the Boeing Company, Lockheed Martin, Sandia National Labs, CSA Engineering, and VTI Instruments, X-Modal III is used in some of the most complex modal test applications in the world. This advanced software tool is sold and supported by VTI Instruments

OPEN-SOURCE PROGRAMMING ENVIRONMENT

One of the most unique modal test solutions in the market, X-Modal III is based on the MATLAB® programming environment and offers the user the ability to take advantage of leading edge technology for modal testing.

Data can be exported in multiple common file formats like Universal File Format, Excel, MATLAB, QuickTime movie, or JPG. This ensures that the user is not bound to using proprietary software with expensive maintenance fees in order to access stored data.

SIMPLIFIED SET-UP AND USAGE

GUIs with time saving functionality, like easy to use wizards and task oriented user interfaces always with "one-click" away functionality, simplifies data acquisition and parameter estimation. A single software tool designed to provide full modal and impact test capability. No need to switch between data acquisition and analysis, both capabilities in a single solution.

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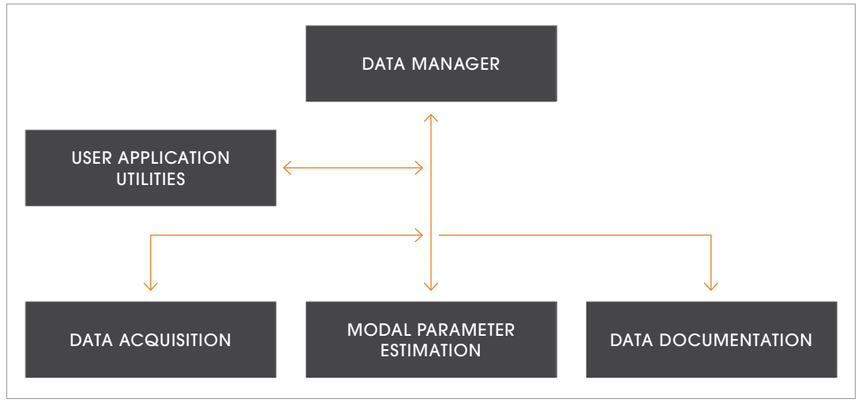
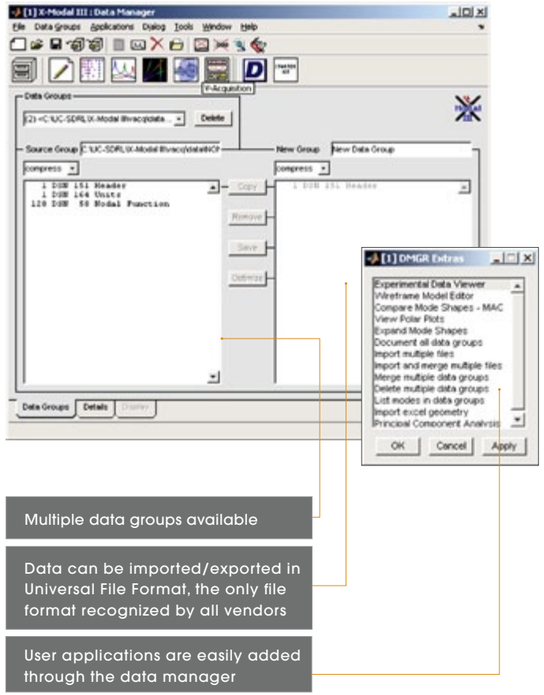
X-Modal III

X-MODAL III ARCHITECTURE

- Autonomous modal parameter estimation procedures
- Multiple parallel live parameter estimation windows
- Task oriented, easy-to-use user interface
- Next operation always "one-click" away
- Simplified "cut & paste" data management
- Simplified units unification tool
- MATLAB-based open-source programming environment



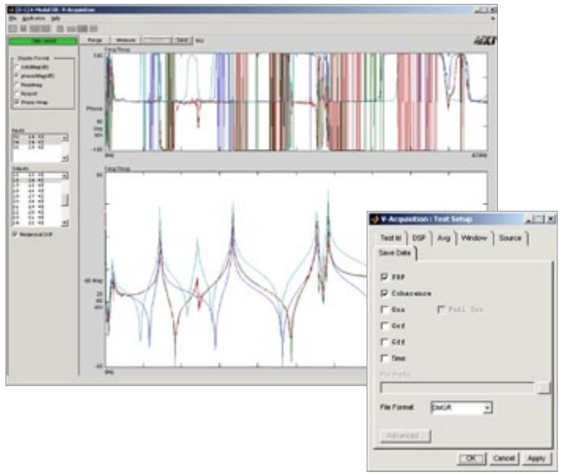
X-Modal III



Multiple data groups available

Data can be imported/exported in Universal File Format, the only file format recognized by all vendors

User applications are easily added through the data manager



DATA MANAGER

X-Modal III data manager provides a central application for managing or combining all data sets. This includes data that's collected by the data acquisition module within X-Modal or data collected from another software like EXLab and imported into X-Modal.

All open standard data formats including CSV, binary, MATLAB file and UFF (Universal File Format) are supported.

DATA ACQUISITION

X-Modal III offers a wide range of capabilities providing virtually every toolset required for performing complex structural tests.

DATA ACQUISITION MODES

- MIMO FRF Estimation
- Multiple Reference Impact Testing (MRIT)
- General Cross Power Spectral Matrix
- Block Time Domain
- Sensor Calibration Modules

DATA SIGNAL PROCESSING

- General Windowing Support
- RMS and Cyclic Averaging
- H1, H2, Hv FRF Algorithms
- Pre and Post Trigger
- Units Support

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X-Modal III

MODAL PARAMETER ESTIMATION (MPE)

X-Modal III supports all commercial MIMO MDOF algorithms plus newer research options (PTD, ERA, RFP, PFD, RFP-Z, PFD-Z, UMPA). Many SDOF methods are also included.

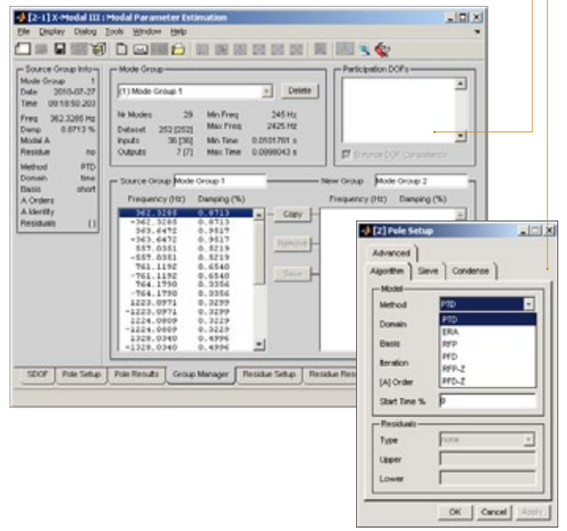
DATA DOCUMENTATION

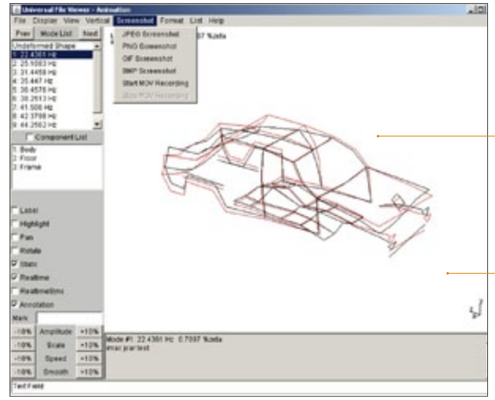
X-Modal III makes it very easy for users to export data for documentation.

- Data plots can be exported in either MATLAB or Excel.
- Animated visualization of mode shapes can be viewed and exported as video or images.
- Data can also be exported as text outputs and tabular lists.

Autonomous modal parameter estimation module

All commercial algorithms readily available





View mode shape animations at different frequencies

Export visualization as a picture or record animation video

SO Analyzer

INTUITIVE OPERATIONS

SO Analyzer has a Microsoft® Windows-like user interface which makes it intuitive and easy-to-use. In addition, step-by-step wizards guide users through setting up of all measurement parameters, simplifying use and minimizing setup errors. SO Analyzer is a full featured DSA package capable of addressing a wide range of applications

APPLICATIONS

- Real-time FFT and time history data acquisition
- Modal analysis (MIMO, ODS, SDOF, MDOF)
- Impact testing
- Rotating machinery data acquisition and analysis
- Acoustic analysis
- Vibration control analysis
- Shock/pyro shock

SO ANALYZER ARCHITECTURE

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SO Analyzer

GENERAL DATA ACQUISITION

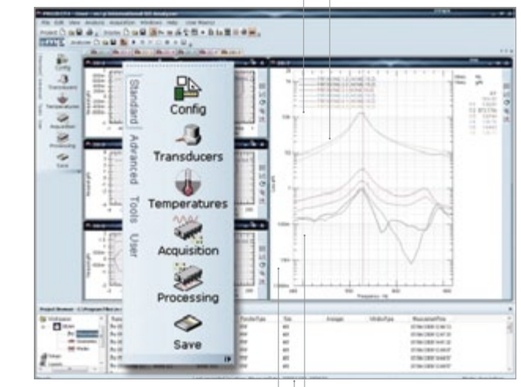
This module acquires multi-channel FFT and time history data while displaying data in real time for general FFT analysis.

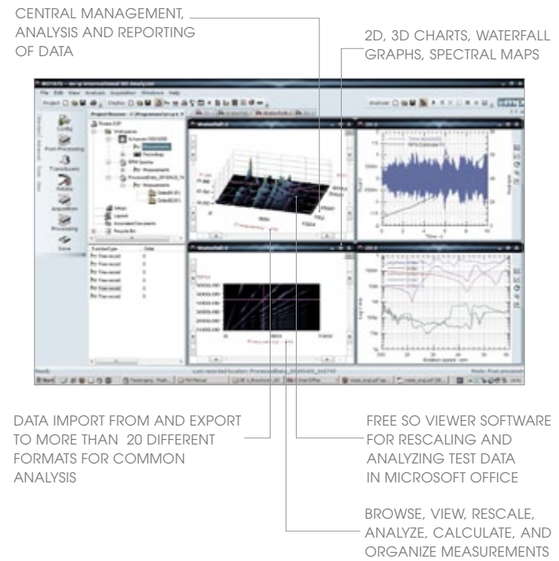
- Frontend control and setup
- Online display and analysis
- Time recording/throughput to disk
- Post-processing

e-REPORTER

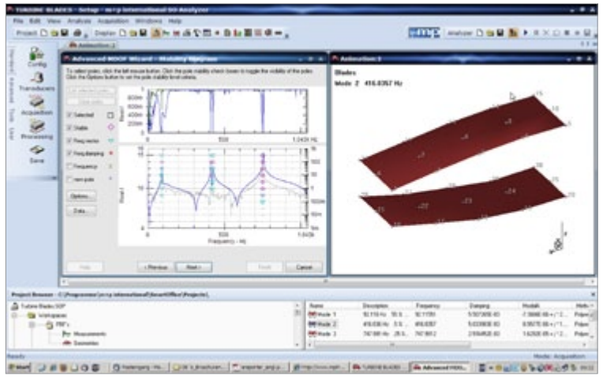
e-Reporter is the powerful data management and reporting tool that provides test engineers comprehensive capabilities for browsing and viewing data. The architecture of SO Analyzer is fully ActiveX compliant allowing users to copy and paste all displays and data into Microsoft Word®, PowerPoint®, or Excel without losing the ability to rescale and analyze the data.

- Front end control and setup
- Data management, import, and export
- Viewing and analysis
- Data reporting
- User programming





SO Analyzer



GENERAL DATA ANALYSIS

The General Data Analysis module is an advanced post-processing package that can analyze data that's acquired through SO Analyzer or imported data from third party software.

- Analysis of data from SO Analyzer or imported from third party software
- Viewing, storing, plotting and printing of test results
- Analysis functions:
  Random (inc. notching/force limiting)
  Sine (inc. notching/force limiting)
  Sine resonance search
  Shock
  Sine on Random
  Random on Random
  Sine on Random on Random

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Application Examples

Modal or Ground Vehicle Testing

THE CHALLENGE

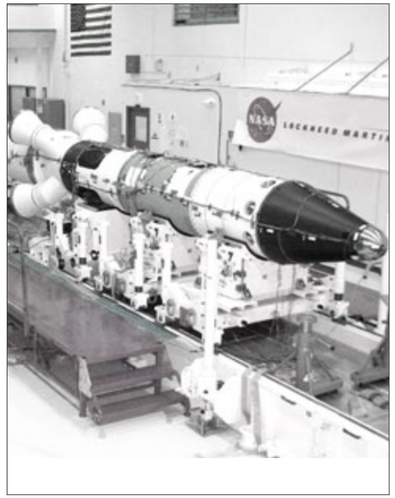
Characterize the dynamic properties of a structure in terms of its modes of vibration. The structure is modeled using finite element analysis and frequency response functions data is gathered. Typical types of measurements would include loads, vibration (accelerometers ICP or charge) and strain.

THE SOLUTION

X-Modal III , coupled with the EMX-4350, EMX-4250 , EMX-1434, and EMX09 provides one of the most unique modal test solutions in the market today. Built on MATLAB™, X-Modal III offers the user the ability to take advantage of cutting edge technology for modal testing. It also provides a solution that gives flexibility and easy to use "wizards" so that the best results are available quickly. SentinelEX provides a measurement solution that offers almost unlimited scalability while providing unmatched performance. LXI with IEEE 1588 allows for measurements to be fully distributed to reduce cable length and ease measurement setup. High-performance signal conditioning provides the highest performance available for uncompromised measurement integrity.

KEY APPLICATION FEATURES INCLUDE

- Software based on MATLAB, providing the capability of almost unlimited signal processing.
- Lowest cost full featured modal application available
- Supports MATLAB scripts for automated test processes
- Flexible data management with multi data groups capability
- Powerful data and animation plotting
- Supports all of the legacy and next generation curve fitters
- Revolutionary parameter estimation wizard makes getting the best results easier than ever before
- Ethernet-based – distributed, scalable hardware supports extremely large channel count configurations.
- Flexible signal conditioning options for IEPE, charge, strain, and voltage



SOLUTION SUMMARY	
EMX-4350	4-channel, 625 kSa/s, smart dynamic signal analyzer
EMX-4250	16-channel, 204.8 kSa/s smart dynamic signal analyzer
EMX-1434	204.8 kSa/s DSA source with 4-channel tach and 4-channel DIO
EMX09	9-slot, high-speed switched serial mainframe with Gigabit Ethernet interface
X-Modal III	Modal analysis software

Application Examples

Rotating Machinery and Order Analysis

THE CHALLENGE

Characterize rotational noise and vibration problems to predict bearing/race failures and improve operational reliability. Data is acquired in the order domain, utilizing precision tachometer inputs and synchronized vibration readings. These example systems are required for applications like turbine/generator testing, drive train analysis, transmission analysis, and windmill testing.

THE SOLUTION

The EMX-4250, EMX-1434, and EMX09 are VTI and the industry's 4th generation DSA, giving the confidence of very high reliability and stability. SO Analyzer provides an easy-to-use turn-key solution making even complicated measurements easy and reliable. Setup and analysis wizards simplify all measurement tasks. Built-in processing in the sentinelEX hardware provides real-time resampling for improved performance for the most demanding order domain problems. The tachometer inputs on the EMX-1434 provide true signal conditioning for a variety of tacho inputs. No need to use external signal conditioning making setup easy.

KEY APPLICATION FEATURES INCLUDE

- Data collection, analysis, and reporting in one package
- Processing of analog and digital tachometer signals
- RPM or time dependent triggering
- Real-time waterfall and computed order tracking
- Tacho Spline fit calculate RPM Vs. time from raw tacho signal
- Fully automated test reporting using the e-Reporter

SOLUTION SUMMARY	
EMX-4350	4-channel, 625 kSa/s, smart dynamic signal analyzer
EMX-4250	16-channel, 204.8 kSa/s, smart dynamic signal analyzer
EMX-1434	204.8 kSa/s DSA source with 4 channel tach and 4 channel DIO
EMX09	9-slot, high-speed switched serial mainframe with gigabit Ethernet interface
SO Analyzer	Data acquisition software

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Application Examples

Acoustics

THE CHALLENGE

Acoustic studies are necessary not only for noise reduction and optimization, but also for reducing vibrations and mechanical wear in complex mechanical structures. Sound intensity and power are measured for vehicle pass by noise measurements, sound quality analysis, and octave analysis for environmental acoustics applications.

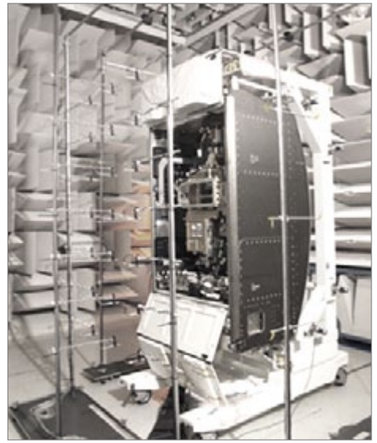
THE SOLUTION

The EMX-4250, EMX-4380, and EMX09 are VTI and the industry's 4th generation DSA, giving the confidence of very high reliability and stability. In these applications, data loss is not an option. SO Analyzer turn-key software provides powerful built-in analysis and allows for acquiring and analyzing data in the time, frequency, or octave domains. The EMX family has integrated signal conditioning, comes with rugged handles, and protection for connectors that allow these systems to become portable as well as full fan control for completely silent measurement capability. Leveraging LXI (Ethernet), systems can also be distributed around the test article or chamber providing synchronized time-tagged data and analysis.

KEY APPLICATION FEATURES INCLUDE

- Data collection, analysis, and reporting in one package
- Scalable from a few to hundreds of channels, all synchronized
- Fully automated test reporting using the e-Reporter
- Close channel/channel phase matched measurement capability
- High data throughput to capture all of the time histories
- LXI and IEEE 1588 allow for distributed measurements to reduce Microphone cable lengths

SOLUTION SUMMARY	
EMX-4250	16-channel, 204.8 kSa/s smart dynamic signal analyzer
EMX09	9-slot, high-speed switched serial mainframe with Gigabit Ethernet interface
SO Analyzer	Data acquisition software



Application Examples

Vibration, Shock, Pyro Shock and Drop Testing – Tests of Physical Impact

THE CHALLENGE

Product endurance and survivability testing due to shipping, vibrating, or dropping for consumer electronics, portable electronics, medical devices, avionics, or ordinance. Often testing can occur either in the lab on a shaker table or out in the field for pyro or ordinance testing.

THE SOLUTION

The EMX-4350/EMX-4380, EMX-1434, and EMX09 are designed to provide unmatched flexibility and performance for critical shock or drop tests. Signal conditioning is designed to work with a wide range of signal input types (IEPE or charge) as well as the flexibility to get the most range out of shock transducers by providing programmable IEPE current from2 mA to 20 mA. The high sample rates of the EMX-4350/EMX-4380 of 625 kSa/s allows users to over sample time histories to provide the widest DSA bandwidth in the industry with full 24-bit dynamic range. The high-speed backplane and Gigabit Ethernet interface along with large built-in FIFO memory on each card assures that customers never miss an event. The high-speed backplane and Gigabit interface provide scalable throughput to support even very large channel configurations. No more missed data. SO Analyzer provides the full flexibility to analyze data in the time domain, frequency domain, or to compute SRS data. Reporting can be automated as well as data integrity checks.

KEY APPLICATION FEATURES INCLUDE

- Data collection, analysis, and reporting in one package
- High speed data recording and throughput
- Extremely high sample rates to 625 kSa/s
- Flexible signal conditioning for IEPE (2 mA - 20 mA) or charge inputs
- Fully automated test reporting using the e-Reporter

SOLUTION SUMMARY	
EMX-4350	4-channel, 625 kSa/s, smart dynamic signal analyzer with IEPE inputs
EMX-4380	4-channel, 625 kSa/s, smart dynamic signal analyzer with charge/IEPE inputs
EMX-4250	16-channel, 204.8 kSa/s smart dynamic signal analyzer
EMX09	9-slot, high-speed switched serial mainframe with Gigabit Ethernet interface
SO Analyzer	Data acquisition software

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SentinelEX Quick Reference Guide

Precision Reconfigurable Modular Instrumentation

DYNAMIC SIGNAL ANALYSIS/NVH

MODEL NAME	DESCRIPTION	SAMPLE RATE	CHANNEL COUNT	RESOLUTION
EMX-4350	4-channel, 625 kSa/s, 24-bit "smart" dynamic signal analyzer with IEPE/voltage input	625 kSa/s	4	24-bit
EMX-4380	4-channel, 625 kSa/s, 24-bit "smart" dynamic signal analyzer with charge type input	625 kSa/s	4	24-bit
EMX-4250 EMX-4250-8	16 (EMX-4250) or 8 (EMX4250-8) channel, 204.8 kSa/s, 24-bit "smart" dynamic signal analyzer	204.8 kSa/s	16 or 8	24-bit
EMX-4016 EMX-4008	16 (EMX-4016) or 8 (EMX4008) channel, breakout box with BNCs for EMX-4250 and EMX-4250-8	N/A	N/A	N/A
EMX-1434	204.8 kSa/s DSA source with integrated 2-channel 64-bit tachometer input and 4 channels DIO	204.8 kSa/s	4	24-bit

INTEGRATED CHASSIS/CONTROLLERS

MODEL NAME	DESCRIPTION	SLOTS	MAX SPEED
EMX09	9-slot (1 hybrid slot) flexible 4U chassis, with integrated Gigabit Ethernet LXI interface, smart panel display for health monitoring and control, IEEE 1588 distributed chassis/instrument synchronization, high-speed switched serial backplane	9	1 GB/s*
EMX18	18-slot (10 hybrid slot) 4U chassis, with integrated Gigabit Ethernet LXI interface, IEEE 1588 distributed chassis/instrument synchronization, high-speed switched serial backplane	18	1 GB/s*

* Up to 8 GB/s can be achieved using optional cable PCIe interface

SentinelEX Quick Reference Guide

General Purpose Data Acquisition

Ideally suited for high channel count temperature and voltage measurements, the EX1000A family of instruments deliver superior measurement accuracy and repeatability across a wide range of applications.

- Complete end-to-end self-calibration ensure reliable data first time, every time.
- Fully integrated independent signal conditioning paths
- Advanced cold-junction compensation (CJC)
- High accuracy ±0.2 °C thermocouple measurements
- High speed 1 kSa/s/ch
- Compact 1U form factor
- DC powered extended temperature versions available for use in harsh environments

PRECISION THERMOCOUPLE AND GENERAL PURPOSE DAQ

MODEL NAME	DESCRIPTION	SAMPLE RATE (Max.)	ACCURACY
EX1000A	48-channel precision voltage instrument	1 kSa/s	0.025% ± 500 µV
EX1000A-TC	48-channel precision thermocouple and voltage instrument	1 kSa/s	0.025% ± 500 µV for voltage ±0.2 °C for thermocouple
EX1016A	16-channel precision thermocouple and 32-channel voltage instrument	1 kSa/s	0.025% ± 500 µV for voltage ±0.2 °C for thermocouple
EX1032A	32-channel precision thermocouple and 16-channel voltage instrument	1 kSa/s	0.025% ± 500 µV for voltage ±0.2 °C for thermocouple
EX1048A	48-channel precision thermocouple instrument	1 kSa/s	±0.2 °C for thermocouple
EX1000A-TCDC	48-channel precision thermocouple and voltage instrument with DC input power	1 kSa/s	0.025% ± 500 µV for voltage ±0.2 °C for thermocouple
EX1000A-DC	48-channel precision voltage instrument with DC input power	1 kSa/s	0.025% ± 500 µV for voltage
EX10SC	Chassis for mounting sixteen 8B signal conditioning modules	N/A	Signal conditioning module dependent

PRECISION STRAIN/BRIDGE/VOLTAGE MEASUREMENT

MODEL NAME	DESCRIPTION	SAMPLE RATE (Max.)	RESOLUTION
EX1629	48-channel precision strain/bridge/ voltage instrument with integrated TEDS, independent bipolar excitation, ±15 V measurement range, extensive software selectable filtering, internal self-test/self-calibration	25 kSa/s	24-bit

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SentinelEX Quick Reference Guide

General Purpose Data Acquisition

Optimized performance and scalability can be found in the EX1200 series precision switch, measure, and I/O instrument. This cost-effective solution is ideal for a wide range of common data acquisition signal types and transducer inputs, combining measurement accuracy with flexible configuration alternatives.

CHASSIS WITH INTEGRATED 6.5 DIGIT DMM

MODEL NAME	DESCRIPTION	SLOTS	SIZE	MAX INPUT CHANNELS
EX1262	2-slot instrument with integrated 6.5 digit DMM, internal 300 V measurement bus, Ethernet interface, built-in webserver and LXI trigger bus	2	Half Rack 1U	192
EX1266A	6-slot instrument with integrated 6.5 digit DMM, internal 300 V measurement bus, Ethernet interface, built-in web server and LXI trigger bus	6	1U	576
EX1268A	16-slot instrument with integrated 6.5 digit DMM, internal 300 V measurement bus, Ethernet interface, built-in web server and LXI trigger bus	16	3U	1,536

MULTIPLEXERS

MODEL NAME	DESCRIPTION	CHANNELS	VOLTAGE/CURRENT CAPACITY	SWITCH POWER	BANDWIDTH
EX1200-3048	48-channel, dual (1x24) 2-wire multiplexer	48	300 V, 2 A	60 W, 125 VA	35 MHz
EX1200-3048S	48-channel, dual (1x24) 2-wire, high speed FET multiplexer	48	250 V, 0.2 A	6 W, 4.2 VA	10 MHz
EX1200-3072	72-channel, dual (1x32) 2-wire, multiplexer	72	300 V, 2A	60 W, 125 VA	40 MHz
EX1200-3096	96-channel, dual (1x48) 2-wire, high density multiplexer	96	100 V, 0.5 A	30 W, 37.5 VA	20 MHz

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General Purpose Data Acquisition

SOURCE/DIO/COUNTER

MODEL NAME	DESCRIPTION
EX1200-1538	8 channels of independent 1 MHz frequency / 32-bit counter inputs, 16 channels of isolated digital I/O, and 2 channels of isolated analog output (DAC) in a single instrument
EX1200-7500	64-channel, time-stamped 8-bit 8-port DIO and relay driver (300 mA sink and up to +60 V) with 2.5 MHz clock rate. Large onboard memory (2 MB) and extensive synchronization and triggering
EX1200-3604	4-channel independent, isolated, 500 kSa/s, 16-bit current (20 mA) and voltage (+20 V) source with extensive triggering capability. Connect in series to achieve up to 80 mA or 160 V output
EX1200-3608	8-channel independent, isolated, 500 kSa/s, 16-bit current (20 mA) and voltage (+20 V) source with extensive triggering capability. Connect in series to achieve up to 160 mA or 160 V output

EVENT DETECTOR

MODEL NAME	DESCRIPTION
EX1200-7416	16-differential channel with up to ±100 V, time-stamped (1 µs) comparator/event detector to detect edges, fault conditions. Can measure voltage and pulse timing

RTD SIMULATOR

MODEL NAME	DESCRIPTION
EX1200-7008	8-channel universal 2-/4-wire RTD simulator. Direct temperature programming with support for a wide range of RTDs

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SentinelEX Quick Reference Guide

EXLab

GENERAL PURPOSE DATA ACQUISITION

MODEL NAME	DESCRIPTION
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
EXLAB-STANDARD	Extends EXLab-Lite capability with 384-channel support, real-time FFT displays, advanced data logging and triggering capabilities, and runtime alarms
EXLAB-PROFESSIONAL	Extends EXLab-Standard capability with 1000-channel support, post analysis functionality, advanced file management, and multiple client data publishing/display
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

VTIcoda

LARGE SCALE STATIC STRUCTURAL TEST

MODEL NAME	DESCRIPTION
VTICODA-EXPRESS	General purpose, turn-key data acquisition software with support for up to 96 channels, single client/server configuration, single instrument, automatic instrument identification, event logging, basic arithmetical operations, time domain displays, and data viewing capabilities
VTICODA-PRO	Extends VTIcoda -Express with support for up to 240 channels plus support for multiple instrument types, full alarm management, running average, circular buffer, calculated stress, and strain
VTICODA-EXPERT	Extends VTIcoda -Pro with support for over 240 channels with support for predicted and real-time stress, predicted alarms, multi-station configuration, FFT display, and advanced mathematical functions

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X-Modal III

MODAL ANALYSIS SOFTWARE

MODEL NAME	DESCRIPTION
X-MODAL III	Comprehensive modal analysis software package supporting unlimited channels, extensive modal parameter estimation algorithms, flexible data management capability, based on MATLAB open programming environment

SO Analyzer *

ACOUSTIC/IMPACT/ROTATIONAL/SHOCK/MODAL

MODEL NAME	DESCRIPTION
VTI DSA PRO SO ANALYZER	Real-time FFT acquisition, analysis and reporting with data import/export, support for up to 16 channels, time history recording, off-line post processing, calculated channels
VTI SOA DSA +16	Extends VTI DSA Pro SO Analyzer capability with additional 16 channel support (up to 240 channels)
VTI SOA ACOUSTIC	Extends VTI DSA Pro SO Analyzer capability with real-time acoustic analyzer (fractional octave filters)
VTI SOA ROTATE	Extends VTI DSA Pro SO Analyzer capability with online and offline rotating machinery analysis with tacho input for order analysis, RPM spectral mapping, etc.
VTI SOA MODAL	Extends VTI DSAPro SO Analyzer capability with guided impact, Geom, ODS, and advanced modal analysis SDOF, MDOF, and MMV
VTI SOA E-REPORTER	Automated reporting, calculator and user programming (Visual Basic)
VTI SOA THROUGHPUT	Extends VTI DSA Pro SO Analyzer capability with time history recording to provide gap-free storage of time domain data
VTI SOA SHOCK	Extends VTI DSAPro SO Analyzer capability with shock response post processing analysis

* AVAILABLE IN SELECT COUNTRIES ONLY

EX1000A Series

Precision Thermocouple and Voltage Instrumentation with Flexible Inputs

FEATURES

- 1000 Sa/s per channel
- LXI connectivity
- LXI trigger bus or IEEE 1588 synchronization provides distributed measurement capability
- Open transducer indicator LED (thermocouples), also available via software query
- Advanced built-in CJC provides one CJC sensor per 4 channels with large copper mass
- High accuracy thermocouple measurements, 0.2 °C typical
- Supports all standard thermocouple types (N, S, T, E, J, K, R, B, custom)
- DC version available for rugged applications
- Galvanic isolation using the EX10SC with 8B modules

General Specifications

VOLTAGE	±10 V , ±20 V, ±40 V, ±60 V
CURRENT	0 to 20 mA
RMS VOLTAGE	0 to 10 V
RTD	
2/3-WIRE RTD (100Ω Pt)	0 °C to +600 °C, -100 °C to +100 °C, 0 °C to +100 °C, 0 °C to +200 °C
STRAIN GAGE/BRIDGE	Full Bridge 3.3 V Excitation or 10 V Excitation
FREQUENCY INPUT	0 Hz to 1 kHz, 0 Hz to 10 kHz, 0 Hz to 100 kHz
THERMOCOUPLE	Type J, K, T
RESISTANCE	0 Ω to 10 kΩ

MODEL NAME	DESCRIPTION
EX1000A	48-channel precision voltage instrument
EX1000A-TC	48-channel precision thermocouple and voltage instrument
EX1016A	16-channel precision thermocouple instrument with 32 channels of precision voltage
EX1032A	32-channel precision thermocouple instrument with 16 channels of precision voltage
EX1048A	48-channel precision thermocouple instrument
EX10SC	16-channel signal conditioning expansion chassis
EX1000A-TCDC	48-channel precision thermocouple and voltage instrument with DC input
EX1000A-DC	48-channel precision thermocouple and voltage instrument with DC input

OVERVIEW

The EX1000A family of precision thermocouple and voltage measurement instruments are among the most accurate and reliable solutions for general purpose and static data acquisition, providing superior measurement accuracy and repeatability for some of the most demanding test applications.

Using the EX10SC signal conditioning modules, a wide range of transducer types, including pressure, strain, temperature, position and voltage, can be combined in this flexible solution.

EX1629

High-Performance Remote Strain Gauge Measurement Instrument

OVERVIEW

The 48-channel EX1629 sets a new standard of performance for stress and fatigue testing. Independent 24-bit A/D converters on each channel, extensive software- selectable filtering, and independent signal conditioning paths provide exceptional accuracy and reliability.

The EX1629 is designed to make it very simple for the user to plugin the transducer and start taking accurate measurements immediately.

FEATURES

- 48 input channels
- Supports ¼ (120 Ω, 350 Ω, user), ½, or full bridge
- Measure voltage inputs with ±150 mV, 1.5 V, or 15 V ranges
- 25 kSa/s per channel (max) per 16 channels, 10 kSa/s on all 48 channels
- 24-bit ADC per channel
- Web-based interface offers easy connection and virtually unlimited scalability
- Built-in bridge excitation per channel (bi-polar) with range of -8 V to +8 V (16 V total)
- Measurement confidence engine allows user to measure excitation current and common mode voltage to troubleshoot bad channels
- Built-in precision 55 kΩ shunt cal resistor for internal or remote shunt capability
- RJ-45 Input connector reduces setup cost and time
- Full TEDs (Transducer Electronic Datasheet – Smart Transducer) support
- 16 channels of DIO
- LXI-compatible wired-trigger bus
- Advanced filtering to eliminate noise
- Trifilar filter per channel
- Analog anti-alias filter per channel
- Digital filtering (user can select Bessel, Butterworth, filter frequency, and order (1-10))

MODEL NAME	DESCRIPTION
EX1629	48-channel high-performance strain instrument

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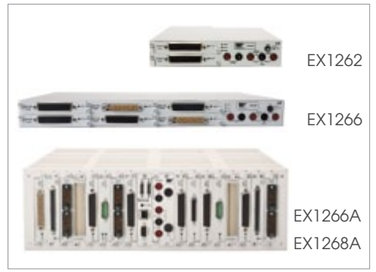
EX1200 Series

Multifunction Scanning Measurement and Switching System



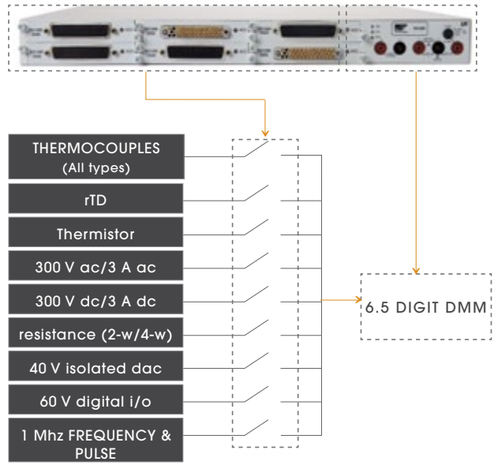
FEATURES

- Modular, scalable architecture in half and full rack 1U, 3U, and 8U versions provides low cost-per-channel across a widerange of channel counts
- Small footprint for switching/scanning applications with up to 576 2-wire channels in 1U
- Optional EXLab "Set Up and Run" software simplifies data acquisition and analysis
- "Built-in" path-level switch configurator, removing the need for expensive PC-based switch configuration tools
- Scan list architecture, tightly synchronized with internal 6.5 digit DMM, increases test throughput
- Measurement support for all thermocouple types, RTDs, and thermistors with built-in cold junction compensation
- Web-based access for monitoring and control of devices, from anywhere in the world, using any web-enabled device
- Analog and digital plug-in modules provide control capability of external devices
- Multiple calibration sets yield more accurate data across temperature range (up to eight per module)
- LXI-based communication interface eliminates platform obsolescence and support cost concerns
- Tightly synchronized measurements in a distributed architecture using IEEE 1588
- Highly deterministic handshaking using the LXI Wired Trigger Bus

OVERVIEW

The EX1200 product family is a modular and scalable series of multifunction switch/measure units that can be configured to address a variety of applications. When installed with the optional 6.5 digit DMM, the EX1200 family can be configured as a cost-effective, high-density, scanning measurement and control instrument capable of acquiring data from thermocouples, RTDs, thermistors, and voltage/current sensors at rates up to 2000 measurements per second.

Plug-in switch/multiplexer modules are used to expand the number of channels that can be scanned in a single system. Additional plug-in modules extend the capabilities of this instrument for data acquisition by adding precision analog and digital outputs for controlling external devices, as well source/tach for measurements on rotating machinery.



EX1262 | 1266A | 1268A

Integrated Multimeters and Mainframes

APPLICATIONS

- General purpose data acquisition
- Temperature monitoring
- Automated/functional test
- White goods testing
- Datalogging
- Cable harness testing
- Battery test

FEATURES

- Integrated modular 6.5 digit DMM
- Scalable solutions, low to high channel count
- High-speed synchronized scanning
- Internal 5-wire analog bus routes input signals directly to DMM
- Highly efficient scan engine eliminates processor overhead
- Frequency/period and temperature
- Up to 2,000 readings per second

PRODUCT DETAIL

MODEL NAME	SLOTS	FOOTPRINT
EX1262	2	½ rack, 1U
EX1266A	6	Full rack, 1U
EX1268A	16	Full rack, 3U

MEASUREMENT CAPABILITY

INPUT

	1p	1n	1µ	1m	1	1k	1M	1G
DC VOLTAGE	10 nV				300 V			
AC VOLTAGE	100 nV				300 V			
DC CURRENT	1 nA				3 A			
AC CURRENT	10 nA				3 A			
2-WIRE RESISTANCE			100 µΩ				100 MΩ	
4-WIRE RESISTANCE			100 µΩ			100 kΩ		
FREQUENCY/PERIOD					3 Hz		1.5 MHz	
FREQUENCY/ENCODING				50 mHz			1 MHz	
DIGITAL					2 V/2.5 MHz	60 V/2.5 MHz		
EDGE DETECTION				100 mV/10 µs		100 V/10 µs		
THERMOCOUPLES	Types J, K, T, E, S, R, B, N							
RTD (2-/4-WIRE)	PT100, D100, F100, PT485, PT3916, Custom							
THERMISTORS	2252 Ω, 5000 Ω, 10000 Ω, Custom							
DIGITAL	300 mA sink/2.5 MHz							

OUTPUT

	1µ	1m	1	1k
DAC (DC VOLTAGE)	300 µV		160 V	
DAC (CURRENT)	2 µA	160 mA		
RTD SIMULATION			4 Ω	10 kΩ

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EX1200 - 1538

Multifunction Frequency Counter/Encoder

FEATURES

- 8 frequency counter channels
- Highly stable 50 MHz, TCXO base clock along with 32-bit counter for frequency measurement
- Counter channel accepts both analog and digital inputs with ±48V differential input range eliminates need for signal conditioning in most applications
- Programmable hysteresis and threshold levels
- 2 isolated DAC channels per card (V/I source)
- Isolated digital I/O

APPLICATIONS

- Single frequency measurement range from 0.05 Hz to 1 MHz
- Tooth wheel RPM measurement
- Measure position and speed from quadrature encoder signal
- Wide range of measurement functions makes this ideal fora wide variety of applications

General Specifications

FREQUENCY/COUNTER INPUTS

NUMBER OF CHANNELS	8 (analog/digital)
SENSITIVITY	±500 mV
INPUT COUPLING	AC/DC
SIGNAL FREQUENCY RANGE	
DC COUPLING MODE	0.05 Hz – 1 MHz
AC COUPLING MODE	3 Hz – 1 MHz
TIME BASE CLOCK STABILITY	±1 ppm
MINIMUM DETECTABLE PULSE	600 ns on analog channel
RPM MEASUREMENT RANGE	3 RPM to 90,000 RPM

DIGITAL INPUT/OUTPUT

NUMBER OF CHANNELS	16
DIO INPUT SIGNAL LEVEL	
LOGICAL HIGH	2.5 V to 60 V
LOGICAL LOW	< 2.5 V
DIO ISOLATION	Channel-to-channel
DIO OUTPUT SIGNALS	Optically isolated solid state switch
OUTPUT SIGNAL COMPATIBILITY	50 mA sink/source, up to 60 V (AC/DC)

DAC OUTPUTS

NUMBER OF CHANNEL	2 channel
OUTPUT TYPE	Constant voltage or constant current
VOLTAGE MODE RANGE	±10 V, up to 20 mA per channel
CURRENT MODE RANGE	±20 mA, drive up to 250 Ω load
OUTPUT RESOLUTION	16-bit
ISOLATION	Channel-to-channel, galvanic

EX1200 - 3048 | 3048S | 3072 | 3096

Voltage/Temperature Input Multiplexers

APPLICATIONS

- Thermal chamber testing
- Battery testing
- High channel count voltage and temperature measurements
- Cable continuity and isolation testing

FEATURES

- Direct routing to EX1200 series DMM through internal analog measurement bus simplifies field wiring
- Support thermocouple, RTD, and thermistor measurements with optional terminal block and built in CJC reference
- On-board scanning greatly reduces overall test execution time
- Discharge relays to bleed out stray charge for sensitive measurements

SPECIFICATIONS	EX1200-3048	EX1200-3048S	EX1200-3072	EX1200-3096
CONFIGURATION	Dual 1 x 24	Dual 1 x 24	Dual 1 x 36	Dual 1 x 48
RELAY TYPE	Electromechanical	Solid state	Electromechanical	Electromechanical
MAXIMUM SWITCHING VOLTAGE	300 VDC/300 VAC	250 V	300 VDC/300 VAC	100 V
MAXIMUM SWITCHING CURRENT	2 A	0.2 A	2 A	0.5 A
MAXIMUM SWITCHING POWER	50 W, 125 VA	6 W, 4.2 VA	60 W, 125 VA	30 W, 37.5 VA
RATED SWITCH OPERATIONS (MECHANICAL)	1×10^8	Unlimited	1×10^8	1×10^7
SETTING TIME	< 3 ms	< 500 µs	< 3 ms	< 3 ms
PATH (ON) RESISTANCE	< 500 mΩ	< 8 Ω	< 500 mΩ	< 500 mΩ

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EX1200-104TB | 160TB | 200TB

Field Termination Blocks with built- in CJC Reference

FEATURES

- Wired cable assemblies with screw terminal connections
- Quick field termination of signal wiring
- Maintenance friendly breakout points for probing connections
- Internal CJC provides a stable reference for thermocouple measurements.

MODEL NAME	DESCRIPTION	COMPATIBLE MODULES
EX1200-104TB	104-pin Terminal Block w/ CJC	EX1200-3048, EX1200-3048S
EX1200-160TB	160-pin Terminal Block w/ CJC	EX1200-3072
EX1200-200TB	200-pin Terminal Block w/ CJC	EX1200-3096
EX1200-TBR	Terminal Block Receiver	All

OVERVIEW

The EX1200 product family is a modular and scalable series of multifunction switch/measure units that can be configured to address a variety of applications. When installed with the optional 6.5 digit DMM, the EX1200 family can be configured as a cost-effective, high-density, scanning measurement and control instrument capable of acquiring data from thermocouples, RTDs, thermistors, and voltage/current sensors at rates up to 2000 measurements per second.

Plug-in switch/multiplexer modules are used to expand the number of channels that can be scanned in a single system. Additional plug-in modules extend the capabilities of this instrument for data acquisition by adding precision analog and digital outputs for controlling external devices, as well source/tach for measurements on rotating machinery.

EX1200 - 3608 | 3604

Voltage/Temperature Input Multiplexers

APPLICATIONS

- Control operations for actuators
- Stimulus source
- Sensor simulation

FEATURES

- Isolated, 16-bit current and voltage source
- Isolated outputs can be combined in series to extend range to 160 V or in parallel to achieve 160 mA
- Sense lines for every channel to compensate for cable loss and ensure highly accurate output
- 500 kSa/s update rate

General Specifications

CHANNELS	8 (EX1200-3608); 4 (EX1200-3604)
RESOLUTION	16-bits monotonic
BANDWIDTH	250 kHz
UPDATE RATE (MAX)	500 kSa/s
MEMORY DEPTH	4 Sa to 2,097,100 Sa
STANDARD WAVEFORMS	Sine, ramp, triangle, square wth independently configurable, initial phase, burst mode, and duty cycle

CURRENT MODE

RANGES	±20 mA, ±10 mA, and ±5 mA
MAXIMUM OUTPUT	160 mA (8 channels in parallel)

VOLTAGE MODE

BIPOLAR	±20 V, ±10 V, ±5 V, ±2 V and ±1 V
UNIPOLAR	40 V
OUTPUT CURRENT	±20 mA
ISOLATION	200 V
MINIMUM RESOLUTION	30.6 µV (1 V range)

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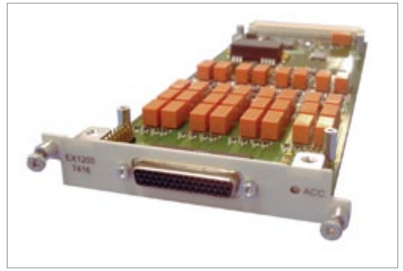


EX1200 - 7416

Comparator/Edge Detector

FEATURES

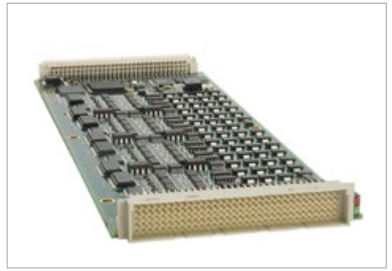
- Constantly monitor input for fault conditions
- Detect edges, out-of-bound conditions, and measure pulse widths
- Can be used as a timestamp module and as a digital I/O
- Inputs can be masked, inverted, and combined to produce interrupts

General Specifications

NUMBER OF CHANNELS	16
INPUT RANGES	±10 V, ±100 V
THRESHOLD RESOLUTION	8-bit
INPUT EDGE TYPE	Differential
INPUT EDGE DETECTION	Normal (rising) or inverted (falling) programmable per channel
TIMESTAMP FORMAT	IEEE 1588
MODES	Normal, paired, pulsed, edge detect, upper/lower bounds, positive/negative polarity
DEBOUNCE TIME	1 µs to 1.6777216 s
TIMESTAMP ACCURACY	500 ns
MATH FUNCTIONS	AND/OR

APPLICATIONS

- Constant monitor
- Alarm /shutdown fault detection



EX1200 - 7500

Digital Input/Output

APPLICATIONS

- External relay control
- Bus emulation
- Digital signal monitoring
- Pattern generation

FEATURES

- 64-channel, 2 MHz digital I/O
- Each channel configurable as input or output
- Selectable output range from 3.3 V to 60 V
- Input data can be timestamped using EX1200 scan engine
- Sink up to 300 mA per channel

General Specifications

NUMBER OF CHANNELS	64
VIN (MAX)	60 V
VIN (HIGH)	> 40 % of Vclamp
VIN (LOW)	<16% Vclamp
INTERNAL VOLTAGE SOURCE	±3.3 V, ±5.0 V, ±12.0 V and ±24 V
DATA INPUT CLOCK SOURCE	Internal clock, front panel input
MODES	Immediate, asynchronous, pattern
GATE (PATTERN MODE)	Programmable active low or high
MEMORY DEPTH	
OUTPUT OR INPUT ENABLED	2 MB
OUTPUT AND INPUT ENABLED	1 MB
MAXIMUM EXTERNAL CLOCK RATE	
PATTERN GENERATION DISABLED	2.5 MHz
PATTERN GENERATION ENABLED	2 MHz

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EX1200 - 7008

Transducer Simulation

FEATURES

- 8-channel 2- or 4-wire RTD simulator
- Solid-state servo mechanism produces fast, monotonic, glitch-free resistance settling
- Synchronize level changes with input measurements
- 300 V isolation

APPLICATIONS

- Simulate platinum/copper/nickel or custom user defined RTD types
- Sensor simulation

General Specifications

NUMBER OF CHANNELS	8
RESOLUTION	0.1 °C
ACCURACY	±0.1 °C
RANGES	4 Ω to 500 Ω, 4 Ω to 5,500 Ω, and 100 Ω to 10 kΩ
CONNECTIONS	2- or 4-wire
SUPPORTED RTD TYPES	
PLATINUM	(Pt100, Pt200, Pt500, Pt1000)
COPPER	(Cu10, Cu100)
NICKEL	(Ni100, Ni120)
TEMPERATURE SCALES	ITS-90
RESISTANCE SETTING TIME	10 ms
EXCITATION INPUT CURRENT (MAX)	±10.5 mA (pulsed/continuous)

EMX Series

Dynamic Signal Analysis/NVH

The EMX series is VTI Instruments latest generation of data acquisition products, building on our legacy as a leading supplier of data acquisition and modular instruments.

HIGH SPEED, DISTRIBUTED DATA ACQUISITION

The EMX09 and EMX18 mainframes include a Gigabit Ethernet interface capable of streaming data at up to 1 Gb/s data from the mainframe. The Ethernet interface contains a high-precision IEEE 1588 source for timestamping data and synchronizing modules and mainframes for true distributed measurement capability.

For higher data transfer speeds, cabled PCIe interfaces can be used to achieve up to 8 Gb/s transfer rates.

SCALE EASILY FROM LOW TO HIGH CHANNEL COUNT SYSTEMS

The modular 9- and 18-slot mainframes allow easy channel expansion by adding additional plugin modules and additional mainframes.

Unlike traditional modular mainframes with the embedded controller approach, where multiple mainframes would each have to run their own application software, a single host approach, using the Ethernet interface, allows application software for multiple mainframes to be run on a single machine. This makes it easy to scale the application software along with the data acquisition hardware.

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EMX Series

SYSTEM MONITORING FOR SIMPLIFIED MAINTENANCE

The EMX09 mainframe has a smart-switch display on the front panel which reports the chassis status/health:

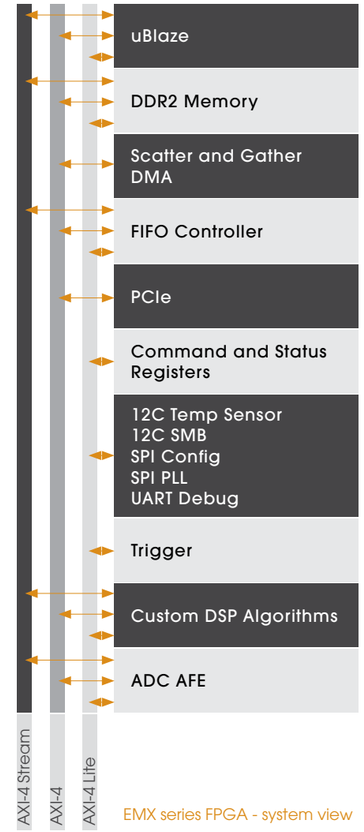
- Temperature monitoring – for detecting and flagging over temperature conditions
- Power monitoring – detects power supply voltage drifts and failures
- IP address – displays the IP address of the chassis for easy connectivity
- Fan speed – allows user to adjust the fan speed

RECONFIGURABLE HARDWARE

Every plug-in module in the EMX series incorporates a user programmable FPGA which extends traditional hardware capabilities by offering a very high-level of flexibility and computational power.

The FPGA implements an AXI (Advance eXtensible Interface) interface where user defined IP blocks can be connected to a virtual data bus without having to make changes to the existing HDL code. Users can configure the "smart" data acquisition hardware, by loading IP blocks on to the FPGA to perform user-defined filtering, signal processing, timing and triggering.

VTI has partnered with Mathworks to provide design tools to simplify algorithm implementation. These tools allow users to define algorithms in MATLAB® and Simulink® and translate it to HDL code, providing an easy to use environment that allows even users with no FPGA experience to develop IP Blocks.



EMX series FPGA - system view

EMX Series

OVERVIEW

HIGH-SPEED CONTROL LOOPS AND INTER-MAINFRAME COMMUNICATIONS

The EMX chassis' high-speed switched serial backplanes implement an advanced switch fabric that allows extremely fast data transfers between plug-in modules in the mainframe. This allows high-speed, deterministic control loops to be set up within the mainframe, for example between a digitizer and a source module.

RUN TIME SELF-CALIBRATION AND HEALTH MONITORING

All EMX plug-in modules incorporate built-in self test and run-time self calibration which provides test system confidence and peace of mind by ensuring that the complete instrumentation measurement path is functional and delivers the most accurate result possible.

TRULY REMOTE CAPABILITIES USING CLOUD SERVICES

The EMX series firmware incorporates a RESTful HTTP protocol which allows instrument control using a standard HTTP interface. In addition to IVI drivers which allow application programming in a wide variety of development environments like Labview, C/C++, C#, Visual Basic and so on, the RESTful HTTP implementation allows the use of popular web programming languages like Java, PHP, Python, Ruby, and Perl.

This expands the capabilities of the device by allowing users to easily develop web applications around the data acquisition system, enabling truly remote capabilities.

In addition, the RESTful HTTP interface transforms the mainframe into a cloud service that can be integrated with other cloud services like cloud databases and cloud computing services. For example, acquired data can be streamed to cloud services like Amazon EC2™ or Microsoft Azure™ where virtually unlimited processing power is available for data processing and analysis, and data can be shared in a secured manner with any web enabled device worldwide.

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EMX09 | EMX18

SentinelEX Mainframes

EMX09

FEATURES

- 9-slot PXI Express chassis with built-in Gigabit Ethernet communications
- 6 PXIe slots, 1 PXIe hybrid slot and 1 PXIe timing slot
- Built-in Gigabit high-speed LXI Interface with IEEE 1588
- High bandwidth PCIe Gen 2 backplane with 2 Gb/s slot bandwidth and 8 Gb/s system bandwidth
- True 4U chassis (units can be stacked on each other)
- Rugged construction with extended temperature range
- Smart switch display for health monitoring and control
- Flexible slot-to-slot direct communication for highly-deterministic operations
- Rack mount, custom front panels, and bolt-down option available

EMX18

FEATURES

- 18-slot PXI Express chassis with built-in Gigabit Ethernet communications
- 6 PXIe slots, 10 hybrid slots and 1 PXIe timing slot
- High bandwidth PCIe Gen 2 backplane with 2 Gb/s slot bandwidth and 4 Gb/s system bandwidth
- True 4U chassis
- Built-in Gigabit high-speed LXI Interface with IEEE 1588
- Built-in temperature health monitoring (LED indicator), accessible via RS-232 connector as well
- Voltage rails can also be monitored and the chassis remotely turned off if a fault condition occurs
- Flexible slot-to-slot direct communication for highly-deterministic operations
- Partitionable switch architecture with non-transparent bridging for true multi-root support
- Rack mount

EMX - 4350

"Smart" Precision Dynamic Signal Analyzers

OVERVIEW

The EMX-4350 smart dynamic signal analyzer incorporates best-in-class analog design methodology to deliver industry leading measurement accuracy. This instrument is ideal for a wide range of applications including noise, vibration, and harshness (NVH), machine condition monitoring, rotational analysis, acoustic test, modal test, as well as general purpose high speed digitization and signal analysis.

FEATURES

- 4-channel IEPE or voltage input
- 625 kSa/s per channel for a bandwidth of 270 kHz
- 24-bit ADC per channel
- Fully differential input
- Programmable input ranges of 100 mV, 1 V, 10 V, 20 V
- Channel-to-channel phase match of ±0.01°
- High dynamic range of 120 dBfs (typical), includes spurs and harmonic distortion
- Programmable IEPE current from 2 mA to 20 mA compensates for long cable runs
- Aggressive anti-alias filters with >110 dB of rejection in the pass band
- Very low DC offset (less than 1 mV)
- TEDs 1451.4 support
- LED channel health indicator per channel
- Built-in self-test and self-calibration for measurement confidence
- 256 MB data FIFO for large transient captures and pre-triggers
- FPGA customization built-in to every EMX-4350 modules for custom signal processing

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EMX - 4380

"Smart" Charge Dynamic Signal Analyzers

FEATURES

- 4-channel IEPE or voltage input or charge input (software selectable)
- 625 kSa/s per channel for a bandwidth of 270 kHz
- 24-bit ADC per channel
- Fully differential input or single-ended, software selectable
- Programmable input ranges of 100 mV, 1 V, 10 V for IEPE or voltage
- Programmable input ranges for charge of 10000 pC, 1000 pC, or 100 pC
- Channel-to-channel phase match of ±0.01°
- High dynamic range of 120 dBfs (typical), includes spurs and harmonic distortion
- Programmable IEPE current of 4.5 mA or 9 mA
- Aggressive anti-alias filters with >110 dB of rejection in the pass band
- Very low DC offset (less than 1 mV)
- TEDs 1451.4 support
- LED channel health indicator per channel
- Built-in self-test and self-calibrationfor measurement confidence
- 256 MB data FIFO for large transient captures and pre-triggers
- FPGA customization built-in to every EMX-4380 modules for custom signal processing

OVERVIEW

The EMX-4380 builds on the performance of the EMX-4350 by adding support for Charge inputs. This gives users a single card solution for virtually any noise and vibration application. By using a single card for either IEPE or Charge inputs, users need only support a single card simplifying configuration control, calibration, and asset management.

No other Dynamic Signal Analyzer card offers this much versatility.

EMX - 4250

"Smart" Dynamic Signal Analyzers

OVERVIEW

The EMX-4250 smart dynamic signal analyzer is designed to provide a higher density, large channel count capability for NVH applications. Leveraging the same world class signal conditioning expertise, the EMX-4250 provides a no compromise solution for almost any NVH application. Designed to be scalable to systems > 1000 channels using Gigabit Ethernet and IEEE 1588 for distributed synchronization. Using the sentinelEX high-speed PXIe backplane allows for very high throughput capability. Break out boxes provide flexible connectivity to interface sensors and signal inputs.

FEATURES

- 16-channel IEPE or voltage input
- 204 kSa/s per channel for a bandwidth of 92.2 kHz
- 24-bit ADC per channel
- Differential or SE input (pseudo differential), software selectable
- Programmable input ranges of 100 mV, 200 mV, 500 mV, 1 V, 2 V, 5 V, 10 V
- Channel-to-channel phase match of ±0.01°
- High dynamic range of 105 dBfs (typical), includes spurs and harmonic distortion
- 4 mA of IEPE current (nominal)
- Aggressive anti-alias filters with >90 dB of rejection in the pass band
- Very low DC offset (less than 1 mV)
- TEDs 1451.4 support
- Built-in self-test and self-calibration for measurement confidence
- 256 MB data FIFO for large transient captures and pre-triggers
- FPGA customization built-in to every EMX-4250 modules for custom signal processing

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EMX - 4008 | 4016

High-Performance Breakout Boxes (BOBs)

FEATURES

- LED Channel Health Indicator

Both the EMX-4008 and EMX-4016 have LED indicators per channel to indicate potential problems with IEPE transducers. RED for open or short circuit, GREEN for IEPE current on. This way you can quickly determine any setup problems .

EMX-4008

EMX-4016

EMX-4016 RACK MOUNTABLE

EMX-4032 RACK MOUNTABLE

MODEL NAME	DESCRIPTION
EMX-4008	8-channel inputs designed for portable use
EMX-4016	16-channel inputs design for rackmount use
EMX-4032	32-channel inputs, designed for rackmount use

OVERVIEW

The EMX-4008 and EMX-4016 provide an easy and quick option for connecting transducers into the EMX-4250. They provide BNC connections which provide a robust connection for most signal types. In addition, the EMX-4008 and EMX-4016 provide both an external trigger connector and an external calibration input connector to facilitate calibration of the EMX-4250. These break out boxes are designed to leverage the 4 mA IEPE current from the EMX-4250.

EMX-1434

"Smart" Dynamic Signal Analyzers

OVERVIEW

The EMX-1434 is a high performance arbitrary source/tach modular PXIe instrument designed especially for sound and vibration applications. It supports various output modes such as sine, burst sine, chirp, Burst-random and continuous random. It also provides two channels of 64-bit tacho inputs each of which has a 16 k-word FIFO as well as 4 channels of digital I/O .

With its capability of providing stimulus to a shaker, loudspeaker and other electrical devices, it works best with our EMX series DSA products, EMX-4250, EMX-4350, and EMX-4380. The combination of the EMX-1434 and the EMX series DSA products is ideal for stimulus/response applications for acoustical, vibration testing, and many other complicated mechanical/electrical testing.

With the most advanced PXIe and LXI architecture, it is capable to stream numerous different waveforms from the host computer to the module, and it supports IEEE 1588 precision synchronization for multiple channels in small applications and even multiple chassis in large systems.

FEATURES

SOURCE

- 4 independent output channels
- Maximum output sample rate 204.8 kSa/s (1 Hz to 93 kHz)
- 24-bit DAC for high-resolution output waveforms
- High fidelity output waveforms with -115 dB SFDR
- Source output safety features eliminate output "bumps"
- Sine, burst sine, pseudo random noise, and band translation
- Arbitrary waveform with loop or continuous output and burst waveform capability
- Signal output capability to 10 V with 25 mA drive current
- Very low residual DC offset to protect shaker inputs

TACHOMETER

- Dual tachometer input
- Maximum frequency range of 1 MHz
- ±25 V and ±250 V input ranges provides signal conditioning for a wide range of tachometer inputs
- AC or DC coupling

DIGITAL I/O

- 4 channels
- Built-in self-test and self-calibration for measurement confidence
- 256 MB data FIFO for large transient captures and pre-triggers
- FPGA customization built-in to every EMX-1434 module for custom signal processing

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CUSTOM INTEGRATION SERVICES

VTI employs an innovative, modular approach to our standard product designs that allows us to quickly make customer-requested modifications that address specific application requirements. These 'custom' products are then documented and supported just like our standard products. This relieves our customers of the burden of managing a custom development project and the associated long-term support issues, while helping them optimize their size and overall cost.

SYSTEM-LEVEL EXPERIENCE

Our application engineering team has years of experience in integrating a wide range of instrumentation products into larger test systems. We work with customers during the project definition phase to help architect solutions that best meet the application requirements. Our expert knowledge of industry standards, such as LXI, VXI, IVI, PXI and VME, at the hardware and software level has helped test developers reduce the time to 'system readiness' in the following applications:

- DATA ACQUISITION
- FUNCTIONAL / AUTOMATED TEST
- SIGNAL SWITCHING AND DISTRIBUTION

It is with this experience that we are able to provide our customers with a world-class selection of automated test and data acquisition solutions.

SERVICE AND SUPPORT

VTI Instruments has a worldwide sales, service, and support infrastructure, along with a staff of applications and technical sales people who have years of experience configuring and specifying test requirements. By utilizing state-of-the-art technology in all phases of product development, VTI Instruments is able to provide a level of worldwide support that is unique in the industry.

VTI is committed to preserving our customers' initial capital investment in our products through a dedicated sustaining engineering program that continuously designs out component obsolescence.
This approach enables us not only to enhance products, but also to considerably extend their life and support cycles. We strive to maintain hardware and software backward compatibility with our installed base whenever possible so as not to impact our customers' existing test program sets.

VTI INSTRUMENTS

INTEGRATED DATA ACQUISITION AND SIGNAL CONDITIONING SYSTEMS

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