



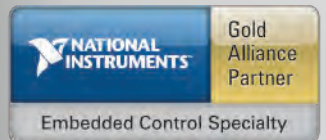
Signal.X
TECHNOLOGIES LLC

DSA 2.9



**Dynamic Signal Analyzer for
Sound, Vibration and more**

**Designed exclusively
for use with
National Instruments
DSA products**



Sound | Vibration | Voltage | Digital | Frequency | Strain | Current | Temperature | Torsion

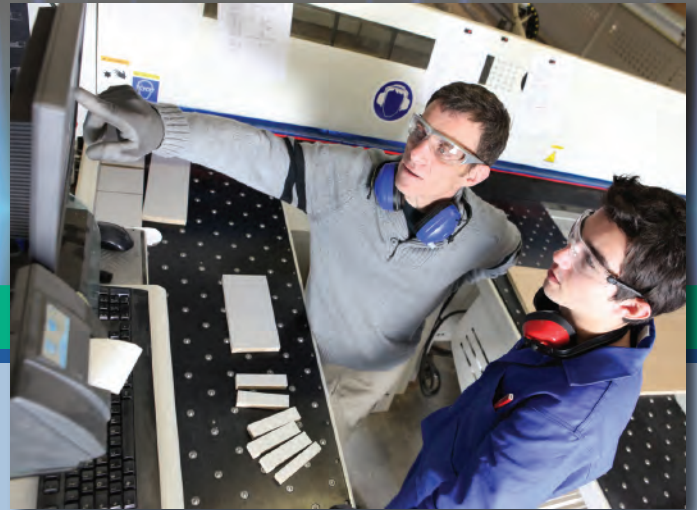
Acquisition. Analysis. Success.

DSA 2.9

DSA 2.9 is an easy-to-use Sound & Vibration measurement and analysis tool designed to access the rich feature set available in the National Instruments Sound & Vibration toolset. In version 2.9, we have greatly enhanced display flexibility while continuing to emphasize agility and speed. Interactive workflow is complemented by a seamless transition between live monitoring, logging to file and interactive data analysis. Our emphasis on productivity means that you will find the essential dynamic analysis capabilities without overly complex setup options. DSA 2.9 is designed to simplify the user experience making it ideal for those who want to get to the data fast with minimal exposure to complex configuration procedures.

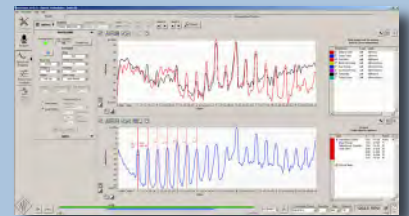
Use DSA 2.9 to:

- Scale a measurement system to fit your needs using National Instruments PXI or CompactDAQ hardware platform.
- Perform most common noise and vibration signal processing tasks such as frequency and order domain spectrum analysis, order extraction, impact testing and time/frequency analysis for impulsive events, harmonics and resonance behaviors.
- Compute advanced functions such as nth octave band spectra, Frequency response, Coherent output power and Zwicker Stationary Loudness.
- Use enhanced cursor function to identify and dynamically track important frequencies of bearings, gears, belts, motors, etc.
- Pre-process acceleration data to velocity and displacement, low-pass and high-pass filter, or perform sample rate conversion.
- Capture data files manually, or utilize a remote digital trigger to achieve a fully autonomous data acquisition capability.
- Mix signal types including high speed sound and vibration signals, generic analog signals, counters for high resolution speed and torsion, and digital event markers.
- Export and import time history files using common formats such as .csv, .wav, .uff58, .hdf, .txt.

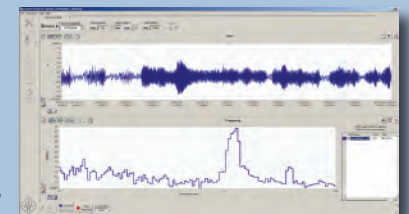


AN ESSENTIAL TOOL FOR BEGINNERS AND PROS ALIKE

Professionals looking for the staples of everyday dynamic analysis will find DSA 2.9 to be an efficient means to gather data, review dynamic behaviors and document their results. For the beginner or casual user, the feature set represents all of the most common capabilities, simplified controls, and lots of display options to make your data look great.



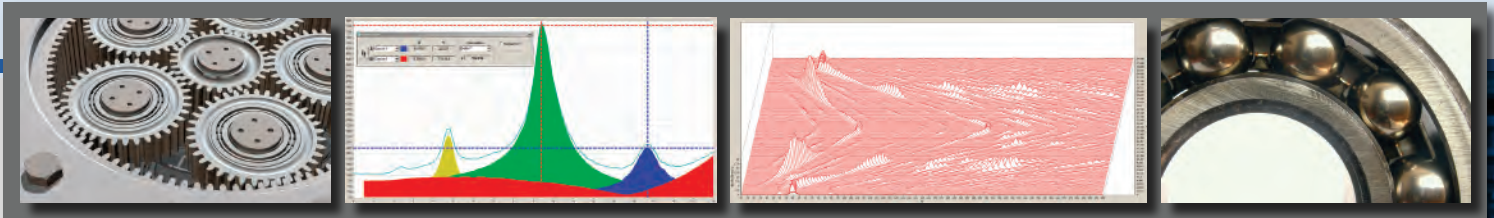
Viewing live data and preparing to record it to a file is the first step in most dynamic analysis projects. In DSA 2.9, you can display time and frequency domain data in real time for any combination of channels in your measurement system. However, the real power of the tool becomes evident when you can immediately interact with a recorded data file using our proprietary file slider control. Working interactively from file means that you can visualize the evolution of data over time, refine your analysis on the fly and evolve your display with flexibility and speed.



EXCEPTIONAL SCALABILITY

Mixed-signal and mixed-rate acquisition is a powerful feature enabled by National Instruments hardware supported by DSA 2.9. In NI CompactDAQ, 4 to 32 channels of synchronized dynamic data can be acquired, or you can mix dynamic signal acquisition with modules for strain, voltage and digital inputs. Digital inputs can be used to start a measurement and mark events. Linking digital inputs to counters in the cDAQ backplane provides for RPM and torsional vibration measurements.

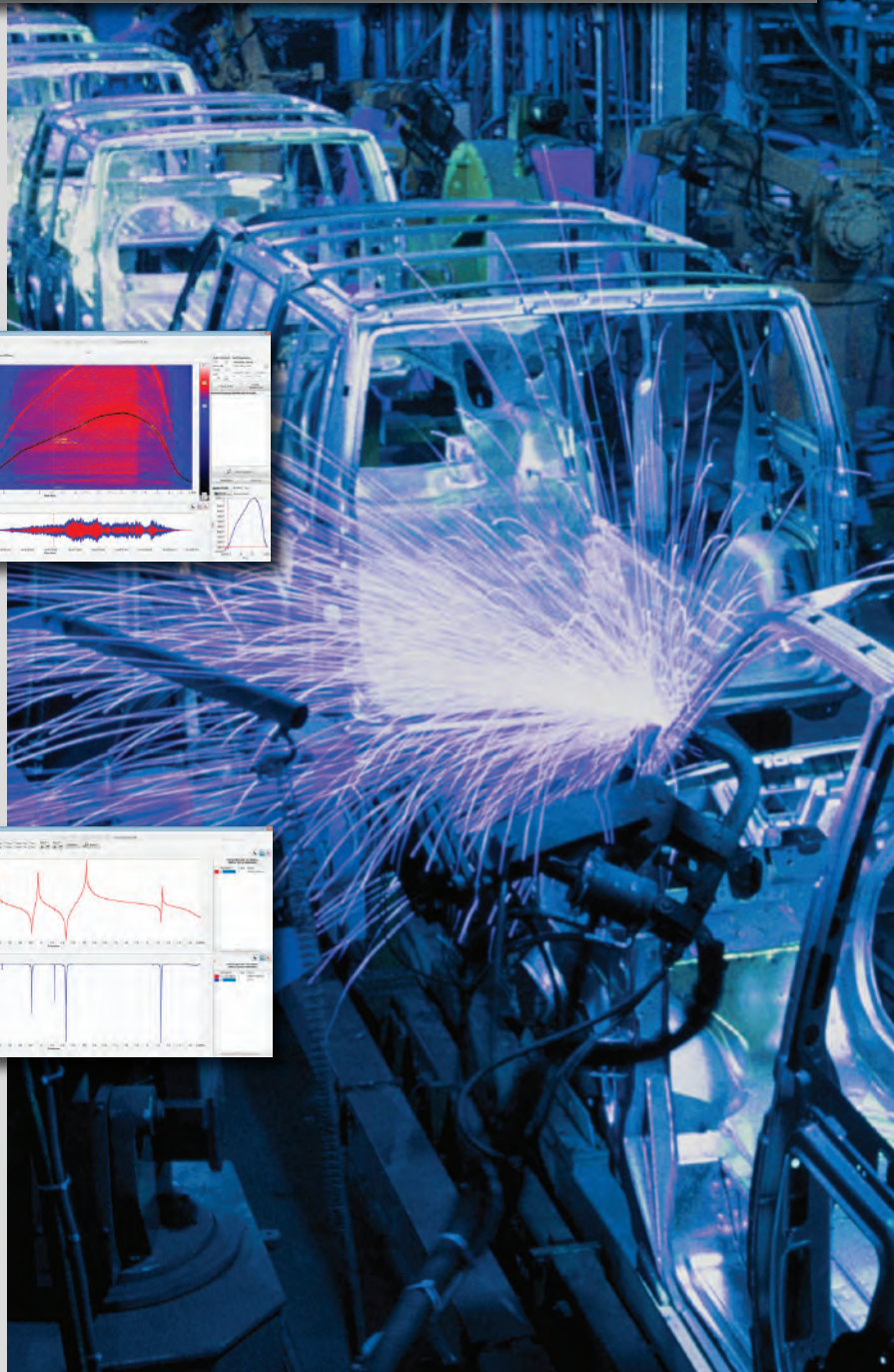
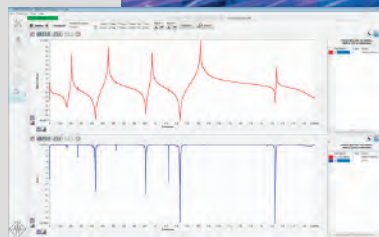
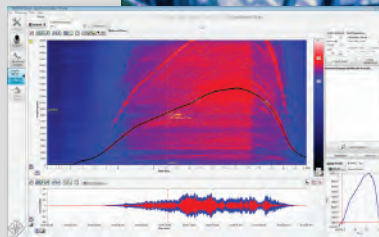
In the powerful NI PXI form factor, you can incorporate a number of 4, 8 or 16 channel high performance DSA cards in your system. Higher sample rates, more dynamic range, adjustable gain and the bandwidth for large channel count make PXI the choice for the most demanding applications.

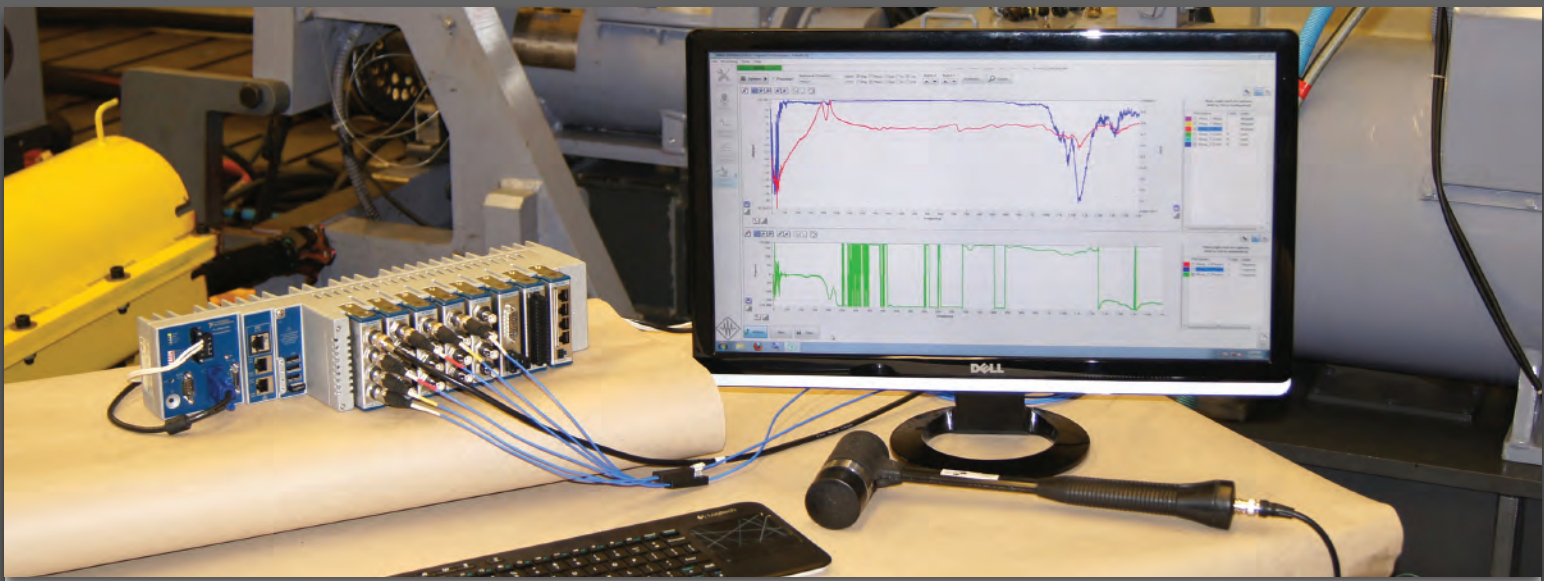


POWERFUL FEATURES—EASY TO USE

DSA 2.9 features point and click order extraction for rotating machinery analysis. The software utilizes the Gabor method to produce an invertible joint time-frequency analysis of dynamic signals. When the signal originates from a rotating machine, DSA 2.9 will allow you to click and drag a mask proportional to speed over the time-frequency graph to select and extract orders. These orders are returned to the original domain at the original sample rate and can even be listened to or subtracted from the original signal. NI's patented Order extraction technique (US 6477472 B2) is a staple of rotating machinery analysis and there is not a faster, simpler or more intuitive means to explore the interplay of sources and path dynamics in a rotating machine.

The impact method for frequency response function identification is a widely used diagnostic tool to identify dynamic properties of structures. In DSA 2.9, a simple impact test capability is provided that is ideal for diagnostic exercises. Frequency response derived from an instrumented hammer strike will reveal dynamic stiffness, resonance frequency and damping. In simple geometries the frequency response can be used to deduce mode shapes. Frequency response function measures with DSA 2.9 can be exported to text files, and universal (uff-58) for import into 3rd party modal analysis applications.





SPECIFICATIONS

Hardware Support

Note: These are recommended National Instruments DSA components supported by DSA 2.9. However, other options exist and you are encouraged to contact us to discuss your specific requirements.

NI CompactDAQ: Chassis

- 9138, 9139, 8-Slot Stand-Alone \ 9171 1-Slot USB \ 9174 4-Slot USB \ 9178 8-Slot USB
- Ethernet or wireless options – Contact Signal.X to discuss your requirement.

NI CompactDAQ: DSA modules

- NI-9234 4-Channel, ± 5 V, 24-Bit IEPE \ 9232 3-Channel, ± 30 V, 24-Bit IEPE
- NI CompactDAQ: digital (provides event marker, measurement trigger, RPM, torsion)
- NI-9401 8-Channel digital input \ 9411 6-Channel digital input

NI CompactDAQ: Strain (not supported for dynamic [spectrum] analysis)

- NI-9237 4-Channel, ± 25 mV/V, 24-Bit Simultaneous Bridge Module

NI CompactDAQ: Voltage (not supported for dynamic [spectrum] analysis)

- NI-9205 32-Ch ± 200 mV to ± 10 V, 16-Bit, Analog Input Module
- NI-9215 4-Channel, 16-Bit, ± 10 V Analog Input Module

NI PXI: Chassis (recommended selections)

- NI PXI-1031, PXIe-1071 3 slots with embedded controller
- NI PXI-1042Q, PXIe-1078 8 slots with embedded controller
- High slot count, PCI or MXI integrated remote controller – Contact Signal.X.

NI PXI: DSA modules

- NI PXI-4462 – 4 Channel, Differential input, 24 bit
- NI PXI-4472 and 4472B – 8 Channel, Single-Ended, 24 bit
- NI PXIe 4492 – 8 Channel, Single-Ended, 24 bit
- NI PXI 4495, 4496, 4498 – 16 Channel, Single-Ended, 24 bit
- NI PXIe 4496, 4497, 4498, 4499 – 16 Channel, Single-Ended, 24 bit

NI PXI: Counter and Digital (provides event marker, measurement trigger, RPM, torsion)

- NI PXI-6602 32 bit 80MHz Counter
- NI PXIe-6612 32 bit 100MHz Counter
- Other options available – Contact Signal.X to discuss your requirement.

NI PXI: Strain (not supported for dynamic [spectrum] analysis)

- NI PXIe-4330 8 Channel, 24-Bit, Bridge Input Module

NI PXI: Voltage (not supported for dynamic [spectrum] analysis)

- NI PXI-6220 16 Single-Ended/8 Differential, 16 bit
- NI PXIe-6341 16 Single-Ended/8 Differential, 16 bit

Stand-Alone NI USB 4431, NI USB-4432 (inputs only are supported)

Measurement and Analysis Capabilities/Real-Time Acquisition

- Display any combination of live signals in the time and/or frequency domain
- Log file to disc manually or with triggered and timed acquisition
- Auto load last acquisition from file for display or cycle for next measurement
- Preferences to allow for manual/auto arming, manual/auto trigger
- RPM acquisition from pulsetrain with dedicated counters or from analog inputs
- Run Notes to record user information in each data file

Spectrum Analysis

- Frequency and order domain power spectrum.
- Frequency response function magnitude, phase, coherence
- Coherent output power magnitude and coherence
- 1/1, 1/3, 1/6, 1/12, 1/24 octave band spectra
- Zwicker Stationary Loudness – ISO 532B standard
- Hanning and flattop windows
- RMS, Peak hold and vector averaging modes
- Linear and exponential weighted averaging
- FFT Blocksize from 256 to 131,072 samples, 128 to 65,536 spectral lines
- Linear, power and Power spectral density, EUpk, EURms and EUPk-Pk units available,
- Linear, log and decibel scaling

Pre-processing Options

- Low-pass and High-pass filter
- Signal and double integration for mks units, plus g's to ips and ips to mils.
- Sample rate conversion: up-sample and down-sample from file to new rates
- A,B,C - weighting for acoustic signals.
- Human body weighting filters: Wh, Wb, Wc, Wd, We, Wj, Wk, Wm, Wf
- For relevant standards compliance: <http://www.ni.com/white-paper/2975/en/>

Impact Testing

- View referenced frequency response magnitude, real, imag, phase, and coherence
- Pre-triggered preview of windowed impact and response time history
- Force/exponential windowing
- Freeform and geometry based naming (component, subcomponent, point, direction)
- 3D waterfall display of acquired frequency response ensemble
- Export to text and off-58 for use in 3rd party modal analysis tools

Rotating Machinery

- Compute the invertible Gabor transform for joint time-frequency analysis
- Order extraction with cursor driven interactive RPM proportional mask
- Mask width defined in orders or frequency
- Angle domain resampling from acquired pulsetrain for order domain display
- Order magnitude overlay accumulator vs time, RPM, revolution
- Export order display direct to text



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Signal.X Technologies LLC is a National Instruments Certified Alliance Partner located in Southeast Michigan. Our team of certified LabVIEW™ developers specializes in applying National Instruments hardware and software to a diverse range of applications in manufacturing test, product development, field data acquisition and NVH. To learn more, visit our website at www.signalxtech.com. We invite you to call us or request a web presentation where we can further discuss your requirements.