# Integrated Vibration Control and Analysis in a Compact Package

The Data Physics Abacus 901 Vibration Controller

The release of the controller software for SignalCalc Test Suite adds affordable, high performance vibration control to the Data Physics 900 Series hardware platform. The SignalCalc Test Suite provides a seamless environment for simultaneous vibration control and signal analysis.

Software Applications:

- Random Vibration Control
- Sine Vibration Control
- Shock Vibration Control
- SRS Shock Vibration Control
- Random & Sine on Random
- Resonance Dwell Control
- Time Replication Control
- General FFT Analysis
- Data Acquisition and Recording
- Structural Analysis
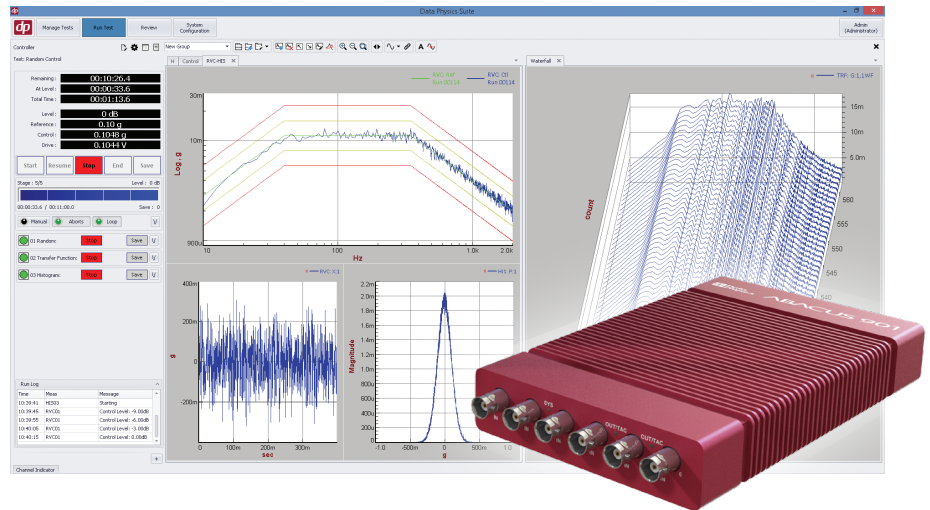
Simplified User Interface

The SignalCalc 900 Series user interface simplifies test setup and run time operations. Enter test profile and the configuration wizard automatically sets up associated control and measurement parameters. Import shaker parameters from a large database of standard models to verify test feasibility. All setup, project, test article, and customer information is saved along with measurement data in a database. Easily search for data from different test runs and test types for analysis and report generation.

Enhanced Signal Analysis Tools

SignalCalc 900 Series includes a complete suite of signal analysis measurements, and has a unique ability to add signal analysis measurements to a vibration control test. For example, narrowband FFT, histogram, and time recording measurements can run simultaneously with the vibration control test. These measurements are configured using independent sample rates, bandwidths, block sizes, etc. Independent analysis and control systems are no longer required, and post processing is a thing of the past.

Signal analysis measurement results are available live during test, and can be included in the same report as the vibration control results.

Custom Plots and Reports

Plots titles, colors, units, and more can be fully customized along with test status overlays. Overlay signals and add cursors, stats, or markers to any plot. Plot templates can be saved and reused across tests. Plots can be displayed on one or more monitors live during test execution, and saved directly to a high quality report upon test completion.

User-Defined Real Time Signal Processing

SignalCalc 900 Series includes the ability to create custom Math Channels by performing mathematical operations on other channels. Math Channels act exactly as input channels, and can be used for control, limiting, or analysis purposes. Math functions include adding/subtracting/multiplying/dividing, integrating/differentiating, filtering, resultant vector calculations, kinematic transformations, and more.

Hardware

The 901 boasts powerful, on-board signal processing and is ideal for closed loop vibration control. The 901 hardware provides up to 5 input channels and one drive channel, and multiple chasses can be connected for larger channel count tests. Features include:

- Standalone processing, eliminating PC issues from causing a test to abort
- 6 channels including two reconfigurable channels (input, output/COLA, tachometer)
- Simultaneous recording of time data and processing of secondary analysis measurements
- AC or Power over Ethernet
- Up to 216 kSamples/s for 80 kHz of alias free bandwidth
- 24 bit analog to digital conversion with up to 144 dB dynamic range
- Dimensions: 7.32 in. x 4.64 in. x 1.40 in. (18.60 cm x 11.78 cm x 3.57 cm)

Specifications

Inputs

- ADC Resolution: 24 bits Sigma Delta
- Sample Resolution (Digital Filtering/Processing): 32 bits floating point
- Maximum Sampling Frequency: 216 kSPS
- Coupling: AC/DC, DIFF/SE, ICP(4 mA), TEDS
- Input Impedance: 1 MOhm + 1 MOhm (DIFF); 1MOhm + 50 Ohm (DIFF)
- Digital Anti-Alias Filter: -100 dB (0 to 40 KHz), -90 dB (40 KHz to 90KHz)
- Analog Anti-Alias: 3 poles
- Dynamic Range: 120 dB to 150 dB
- Input Ranges, FS: 0.1 V, 0.31 V, 1 V, 3.1 V, 10 V, 31 V
- CMMR: 60 dB
- Max Voltage: 80 VMax/1 MOhm; 5 VMax/50 Ohm
- Amplitude Accuracy: +/-2%FS at 1KHz for 15 deg < T< 55 deg
- Frequency Response: -/+ .5% 0 to 40 KHz; -/+1 % 0 to 90 KHz
- Phase Accuracy: 0.5deg at 40 KHz
- THD+N: 90 dB min @ 1 KHz

Software

- Random and Sine/Random on Random frequency: up to 10kHz
- Random and Sine/Random on Random frequency resolution: up to 6400 frequency lines
- Sine and Resonance Dwell sweep frequency up to 10kHz
- Sine and Resonance Dwell measurement types DC, RMS, Peak, Tracking Filter (Fixed or Proportional)
- Shock and SRS sample rate: up to 51kHz
- Shock waveform Types: Half Sine, Rectangular, Triangular (symmetrical or non-symmetrical), Sawtooth (initial or terminal peak), Trapezoid, Wavelet, Double Sine, Sine Burst, Imported File
- Secondary measurement and time data recording sample rate: up to 216kHz
- Sine and Random Notching: Realtime (Sine) and predictive (Sine and Random)
- and more...

- Offset: -/+ 0.1 FS, less than 3 mV
- Crosstalk between inputs: -90 dB
- Crosstalk between inputs: -90 dB; between inputs and outputs: -90 dB
- Frequency Accuracy: 25 ppm

Outputs

- DAC: 24 bits Sigma Delta
- Sampling: up to 216 kSample/s
- Ranges: 1 V, 2 V, 5 V, 10 V; FE: SE
- Output Current: 10 mA

Tachometers

- THD: 90 dB
- Reconstruction filter: 100 dB Stop Band
- Input Ranges: .1V to 31 V Max
- 80 V Max Protected
- FE: AC/DC/DIFF/SE
- Signal Frequency: DC to 500 KHz
- Adjustable: Threshold, Hysteresis, Hold-Off, Pre-Scaler

NOTE: Continued product improvement necessitates that Data Physics reserves the right to modify these specifications without notice.