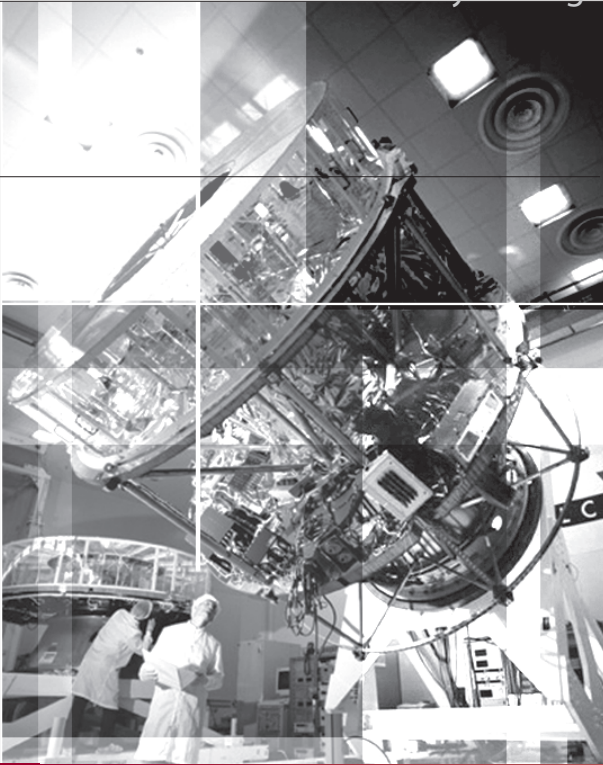**dp** Solutions in Signal Processing

Acclaimed Data Physics Algorithms

SignalStar® Matrix

Multi shaker vibration control
2 to 16 shakers

Single shaker vibration control
40 to 1024 input channels

120 to 150 dB dynamic range

SignalStar
Vibration
Control
System

Matrix

powered by
ABACUS

dp Data Physics *Corporation*

SignalStar®
Vibration Control Systems

Matrix

Redefining the boundaries of vibration control

SignalStar Matrix sets the standard for control performance in multi shaker applications. Matrix provides both multi shaker vibration control and high channel count single shaker vibration control on the DSPcentric ABACUS signal processing platform.
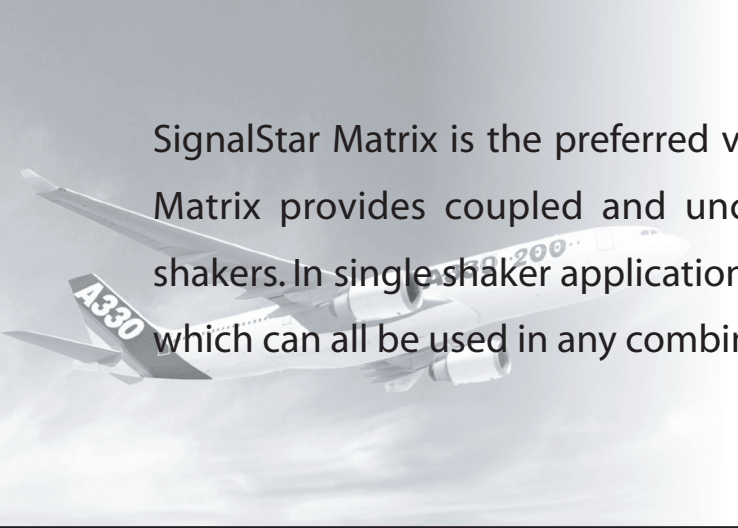
Standard Features

Single Shaker Control Features

- Hardware
  - 40 to 1024 input channels
  - 120 dB dynamic range

- Control Applications
  - Random
  - Sine
  - Sine Resonance Search and Dwell
  - Classical Shock
  - SRS Synthesis
  - Transient Control
  - Mixed Mode (Random on Random, Sine on Random, Random & Sine on Random)
  - Time Data Replication

Multi Shaker Control Features

- Hardware
  - 4 to 1024 input channels
  - 2 to 16 shakers
  - 120 dB dynamic range

- Control Applications
  - Random
  - Sine Classical Shock
  - SRS Synthesis
  - Transient Control
  - Mixed Mode
  - Time Data Replication
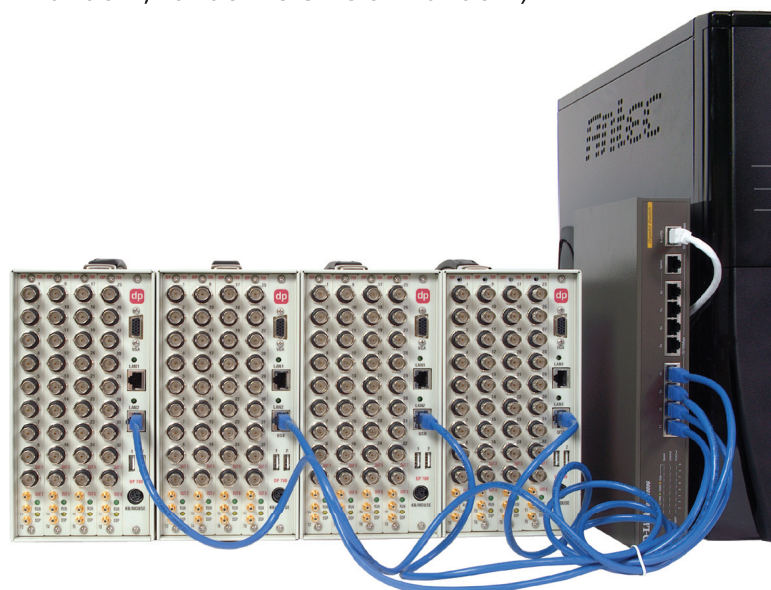
SignalStar Matrix is the preferred vibration controller for high end applications. Matrix provides coupled and uncoupled multi shaker control for up to 16 shakers. In single shaker applications, Matrix supports up to 1024 input channels which can all be used in any combination of control and limit channels.

Modular, Expandable, Digital Signal Processing System

ABACUS networked, distributed DSP architecture provides unlimited expansion possibilities. Multiple 32 channel ABACUS chassis are connected to the host PC through a Gigabit network switch. Synchronization cables between ABACUS chassis ensures excellent phase match between channels in the system.

High quality analog design with 24-bit analog to digital and digital to analog converters provide up to 150 dB dynamic range. ABACUS also provides software selectable single ended and differential inputs to eliminate common mode noise associated with ground loop problems. ICP power for transducers can be selected in the software and also supports TEDS Smart transducers.

The ABACUS distributed digital signal processor hardware architecture is ideal for vibration control applications, where DSP speed is essential for realtime control. A 32-bit floating point digital signal processor on each module supports up to 8 input channels and 2 output channels and ensures sufficient control processing power with additional input channels.

A local throughput disk in each 32 channel ABACUS chassis means that time data can be streamed to disk during control at 107 kHz on all channels, regardless of the number of channels or the number of ABACUS chassis.
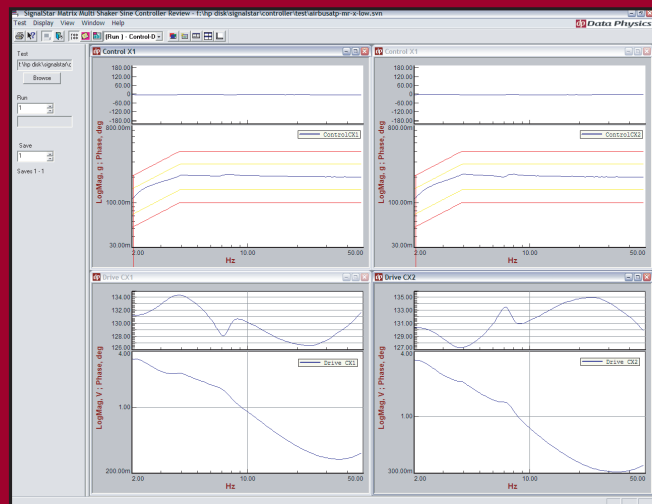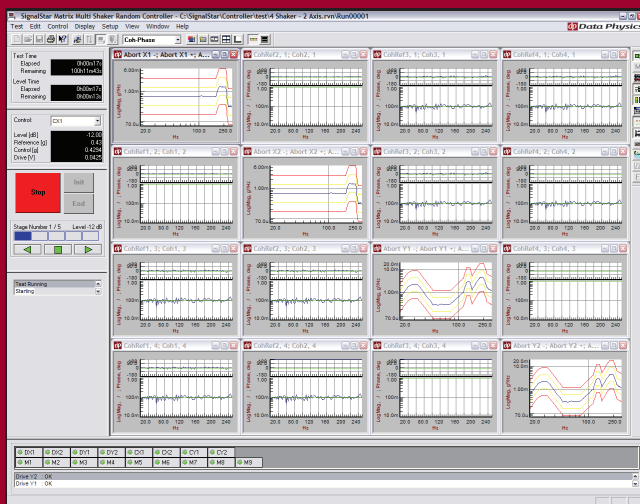
SignalStar **Matrix**

High Channel Count Single Shaker Vibration Control

SignalStar Matrix benefits from more than 25 years of experience that Data Physics has in developing proprietary algorithms for closed loop vibration control. Matrix vibration control software encompasses the complete range of single shaker vibration environments.

Matrix provides single shaker applications features designed for high channel count vibration control. Continuous throughput to disk during control and force limiting make Matrix ideal for satellite qualification testing. Up to 1024 input channels may be used for control and limiting. Each limit channel can have a unique limit profile for alarm, abort and drive limiting.

Control tasks are distributed to the digital signal processors on each ABACUS chassis to ensure optimum control performance, regardless of channel count. Local throughput disks in each ABACUS enable continuous recording to disk for any number of channels or ABACUS chassis.

Acclaimed Data Physics Algorithms

The real vibration environment for a structure is complex with multiple excitation sources. Using SignalStar Matrix, it is now possible to perform more precise and realistic testing than ever before, using multiple shakers to simulate the complex environment.

Matrix addresses the complete range of multi shaker test requirements, from IEEE 344 multi axis seismic testing to 6 DOF time data replication testing. Matrix uses continuous control to adapt to the dynamics of the system under test. Compensating the cross coupled dynamic responses of the multiple inputs simultaneously yields high control accuracy. Matrix offers independent reference definition of each control point with defined phase and coherence between control points.

Multi Shaker Single Axis
Large products, particularly those that are physically long such as space vehicles, may require more complex testing where more than one shaker is used to provide controlled vibration at different points of the structure. This can involve the control of the individual vibration profiles and of the phase relationships between them.

Multi Shaker Multi Axis (Table)
Components and substructures can be tested on specially designed shaker tables with motion in many degrees of freedom. Seismic qualification tests are performed by mounting a test item to a large multi axis shaker table. Automotive subassemblies are often tested on smaller multi axis tables.

Multi Shaker Multi Axis (Direct)
Entire automobiles, aircraft, turbomachinery and other large structures are subjected to the simultaneous excitation of multiple shakers, each directly attached to a point of environmental load input. This provides a realistic simulation of the operational loading under laboratory control. Motion Replication, such as road simulation, is often performed in this configuration.

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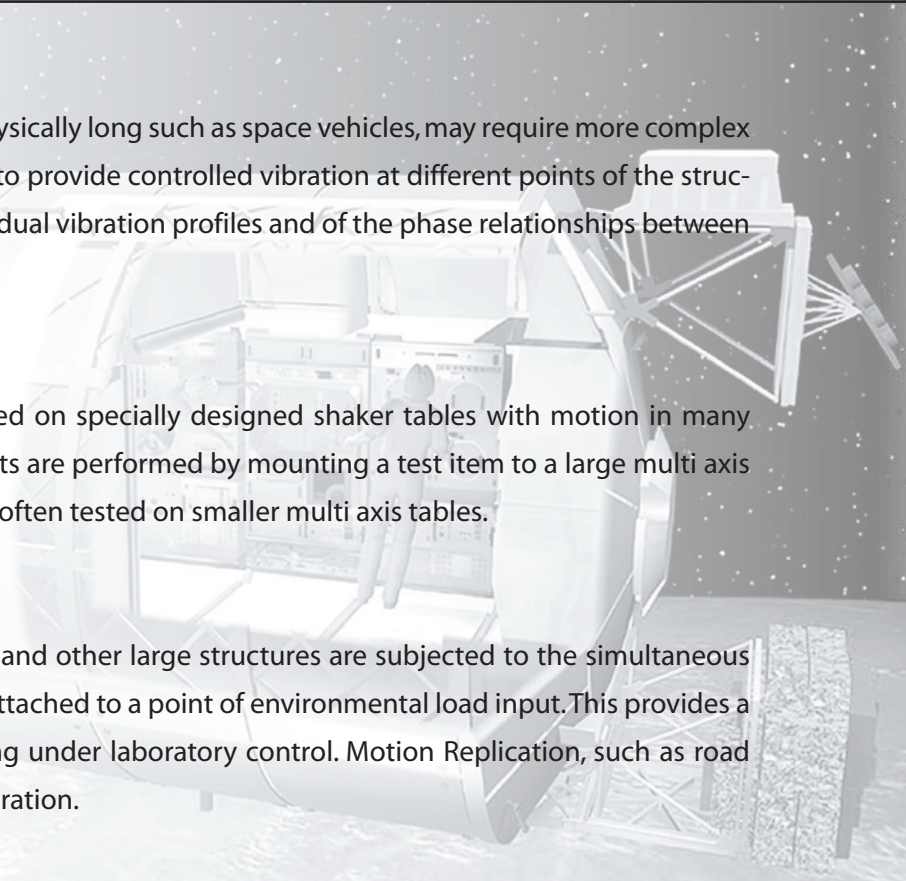
Discover more at www.dataphysics.com

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Data Physics has been supplying high performance test and measurement solutions for over 20 years. With the addition of a full line of electrodynamic shakers to complement its vibration controllers and dynamic signal analyzers, Data Physics is a total solution supplier for noise and vibration applications.

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