Brüel & Kjær

LASER$_{USB}$

Key Benefits

- Full capability for vibration control, data reduction, and signal analysis
- Multi-channel with 2 to 16 channels for multi-point control or analysis
- 24-bit resolution gives wide dynamic range to control highly dynamic structures
- Fast and safe with 100 millisecond loop time
- Amplifier and thermal chamber interfaces for seamless lab integration
- Automatic safety checks to protect your valuable equipment
- USB connectivity makes it as easy to install as adding a mouse or keyboard to your PC
- Kurtosis Parameter Control for non-gaussian random*
- Special Fatigue Monitor protects test article and shaker*

*Valid from Version 8 onwards

LASER$_{USB}$™ VIBRATION CONTROL SYSTEM

The New ERA of USB 2.0 Connectivity

LASER$_{USB}$ brings vibration test into the new era of USB 2.0 connectivity. Combining convenience, performance, flexibility and safety, *LASER$_{USB}$* is the ideal controller for your test lab. It has 24-bit precision with wide control dynamic range, and fast loop times to provide superb control for your most challenging tests. *LASER$_{USB}$* is also a very flexible answer for your test needs with full capability control and analysis software applications for random, swept sine, resonance dwell, classical shock, random and sine on random, shock SRS, and field data replication.

LASER$_{USB}$ delivers what test engineers demand: Convenience, Performance, Flexibility, and Safety

CONVENIENCE

Raising the Standard with USB Connectivity

LASER$_{USB}$ is the only vibration control system that connects to your PC as a true USB 2.0 device. But plug and play is just the beginning of *LASER$_{USB}$* convenience. The vibration control applications are easy to master. Our setup wizard smoothes the learning curve and reduces setup time. Fault-free sensor setup is ensured by the TEDS smart sensor interface while built-in ICP® coupling eliminates the need for separate signal conditioning.

Powerful automation features take the tedium out of repetitive tasks, allowing you to run complex test schedules with a single keystroke. Integrated operation of the vibration controller with the shaker amplifier and many popular thermal chambers saves time and simplifies setup for coordinated environmental testing.

Courtesy NASA/JPL-Caltech

PERFORMANCE

Exceptional Control Capabilities

LASER$_{USB}$ delivers exceptional performance in both R&D and production environments. Distributed DSP processors provide fast loop times for quick test load equalization and enhanced safety. The system features 24-bit resolution with programmable voltage ranges on all inputs and outputs. This design provides the exceptional dynamic range you need for precise control of complex structures or difficult fixtures.

LASER$_{USB}$ comes standard with two inputs, an output, COLA, and digital I/O for remote control. You can easily expand the system to sixteen inputs for multi-point control of complex test structures with limiting and independent channel abort profiles.

FLEXIBILITY

Complete Range of Full-featured Applications

A comprehensive suite of Windows XP/Vista applications for vibration testing and analysis are offered for the *LASER$_{USB}$*. Easy to use, full featured vibration control applications are available to meet the full range of vibration testing from random to field data replication. The flexibility of the *LASER$_{USB}$* does not end there. It can also be readily be configured for signal analysis, modal data acquisition, and shock transient capture and SRS.

LASER$_{USB}$ connects to any PC as a USB peripheral. Multiple DSP processors in the *LASER$_{USB}$* handle the control loop in real-time independent of the PC host.

SAFETY

A Higher Standard for Safety

LASER$_{USB}$ offers enhanced safety and reliability. Over 20 safety checks and interlocks act to ensure the safety of the test article, shaker system, and personnel. In addition, *LASER$_{USB}$* provides unique safety features not available with other controllers. A built-in hardware abort button connects directly to the output hardware circuitry so that you are never at the mercy of the software user interface. Special circuitry on the output protects the shaker from voltage transients due to power failures or accidents such as switching off controller power.

Easy Operation and Automation

Convenience is more than advanced hardware, flexible applications and a fast interface. The true measure of *LASER*$_{USB}$ convenience is the way everything works together to help operators master the system and execute tests efficiently with minimum effort. Combining unmatched on-line capabilities, powerful automation and complete manual control, *LASER*$_{USB}$ reduces errors, effort and frustration.

EASY SETUP

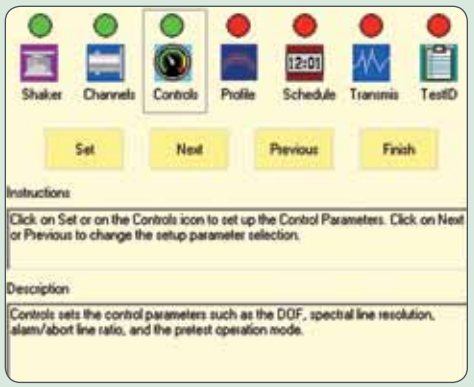
Whether you are an experienced test operator, an occasional user, or even a new user, the *LASER*$_{USB}$ user interface provides the tools and features that you need for successful vibration testing.

Inexperienced or occasional operators can use a simplified user interface for random, swept sine, and classical shock. This interface limits the input required to the very basics with more advanced parameters pre-set by the software.

A setup wizard guides the operator through test setup with step by step instructions and readiness indicators. You can easily save your own defaults and preferences. The system learns your preferences and comes up with the setup parameters and displays in the best configuration for the type of test you choose.

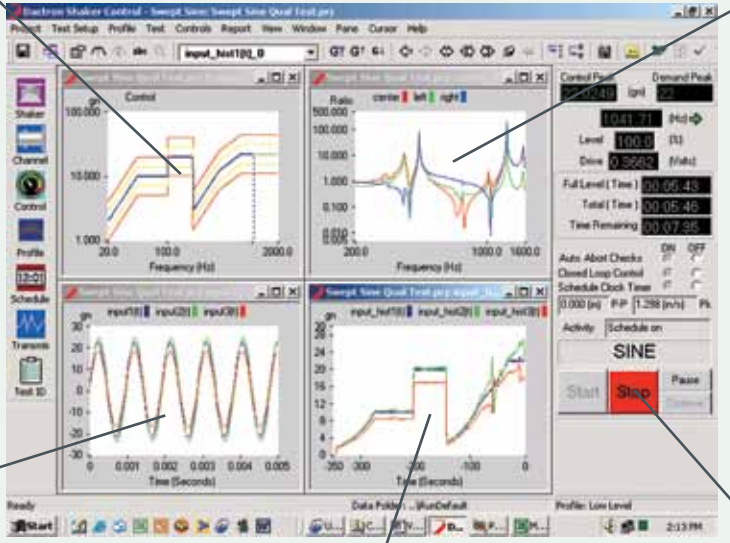
Special Features Ensure Error-free Tests

LASER$_{USB}$ incorporates a number of special features to facilitate error-free measurements. Using TEDS, the channel table automatically reads in the correct calibration values for connected smart sensors. A built-in calibration capability allows pre-test verification of the connected sensors.



The Setup Wizard provides a simple pathway to test setup. After you set each parameter dialog, a ready indicatorturns green so that you can tell at glance the overall statusof the test setup.

Setup icons provide quick accessto the setup dialogs.



Overlay displays withcolor traces make it easyto highlight critical measurements.

Oscilloscope displays allow youto view time histories to examine input signals and troubleshoot problems.

Control Panel toggle buttons and status informationput you in total control at alltimes.

Strip chart displays enhance monitoring by letting you view scrolling histories of signal levels versus time.

Quick, flexible displays and readily accessible toggle buttons and icons for control commands make it easy to supervise and monitortests.

Easy Operation and Automation

AUTOMATION

The Automatic Solution to Changing Test Conditions

The programmable Schedule function executes a sequence of events automatically during a test. An ideal tool for dealing with varying test conditions, it lets you:

- Program a series of low-level steps to ensure a gentle startup for sensitive items.
- Disable and enable aborts at specified levels for reliable starts of low-level tests with high noise levels.
- Use loops and nested loops for level scheduling and cycling.
- Automatically generate test reports at specified events.

Quick Profile Changes

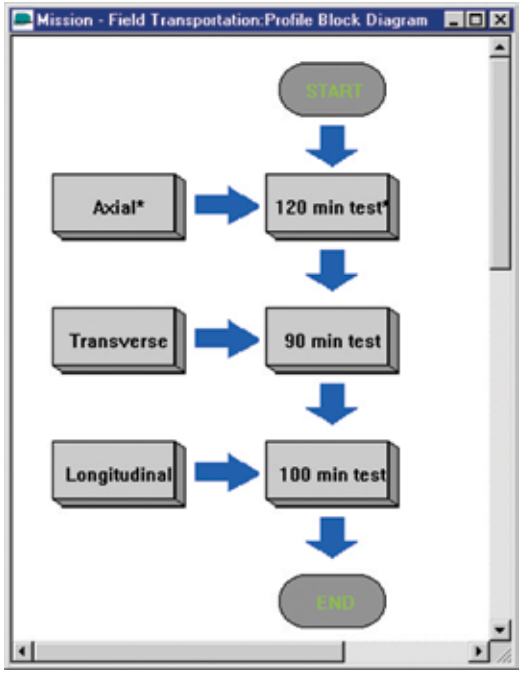
Profile Scheduling simplifies execution of a series of profiles. Simply define a flow diagram of Profile-Schedule blocks for sequential execution. The profile is changed in one loop, eliminating the need to stop and restart the test to change the profile.

Maximize Throughput

Minimize test startup time and maximize production by using a stored drive signal. This feature allows you to bypass the initial equalization process, starting each test immediately at full level. *LASER*$_{USB}$ lets you choose precisely the degree of automation that's right for your test. When required, complex test sequences can be automatically programmed for a test that lasts hours, days, or even weeks.

LAB INTEGRATION

LASER$_{USB}$ can make your lab more efficient and effective by providing capabilities that more tightly integrate and coordinate all of your test equipment. The Amplifier Controller software option allows you to set, switch on/off and monitor LDS SPA-K amplifiers from the same PC used to run the Vibration Control software.



The Profile-Schedule flowchart enables setup and execution of a series of profiles.

The Digital I/O interface of the *LASER*$_{USB}$ extends automation to include synchronization of vibration testing with environmental chamber tests for temperature, humidity or pressure. To further enhance integration of environmental test equipment, use the Thermal Chamber Control Interface option. This option provides seamless connection with the control software of many popular chamber makers. You can set up and control the chamber using *LASER*$_{USB}$ software for fully coordinated operation of all environmental tests.

LASER$_{USB}$ also supports "mission profiling" through its Project Sequence capability. This enables automatic execution of a series of project files in a pre-defined order: for example, a random test followed by a shock test and then a sine test.

Exceptional Performance

ROBUST CONTROL

The robust control capabilities of the *LASER*$_{USB}$ help you to run tests every day, not just when everything is perfect. To handle your most challenging tests, *LASER*$_{USB}$ offers these advanced control features:

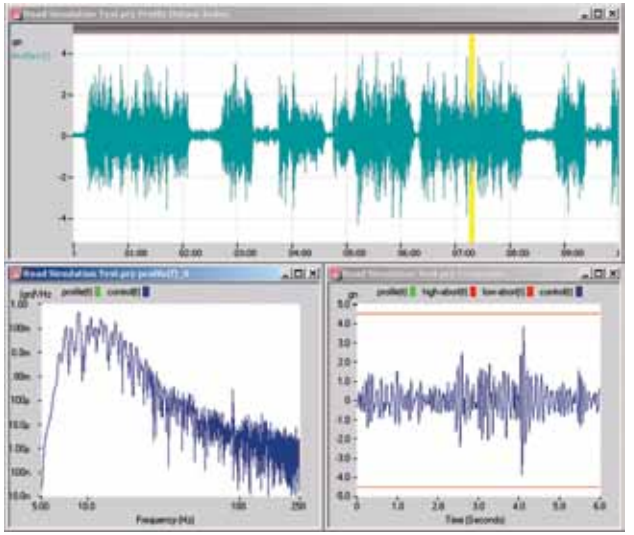
- An unmatched dynamic range - 95 dB for random and 100 dB for sine - helps to control to tight tolerances, even if the fixture is less than ideal.
- A fast loop time - typically under 100 milliseconds for random and 10 milliseconds for sine - provides rapid test load equalization and control response.
- Advanced control algorithms overcome non-linear behavior and provide stable control with both electrodynamic and servo-hydraulic shakers.

ACCURACY ASSURED

Data integrity and test repeatability are crucial for every test. *LASER*$_{USB}$ protects against data aliasing and raises accuracy, giving you total confidence in all test results. Programmable gain amplifiers (PGA) on the inputs enhance data accuracy. Each input channel has both analog and digital filters to guarantee full alias protection. On the output, sharp anti-image filters prevent excitation beyond the test frequency range. Drive signals are very pure, with a total harmonic distortion less than 0.2 %.

16-Input Control

The *LASER*$_{USB}$ System is expandable from 2 to 16 inputs. All inputs sample simultaneously, at rates up to 96 kHz, with any or all of the 16 inputs available for multi-point control. You can optimize control by combining inputs to form a control signal based on the average, weighted average, or maximum values. To prevent excessive vibration on critical components, use multi-point control with independent limit or abort profiles for all inputs.



Informative displays help you to closely monitor test results and track test progress during road simulation tests

Test Flexibility

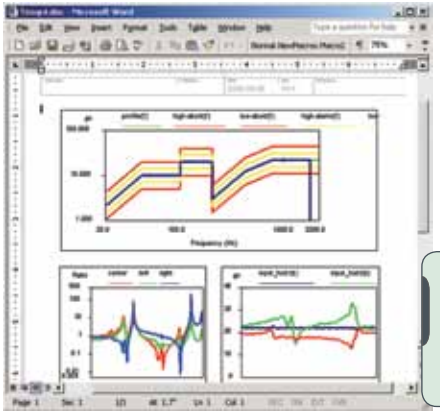
TAILORED TESTING

Whatever your vibration test needs, *LASER*$_{USB}$ has a feature rich software package that is tailored for the specific requirements of the application. Test flexibility also means that you will have the option to control to velocity, displacement or even force sensors in addition to accelerometers. Furthermore, control can be based on either linear or angular acceleration.

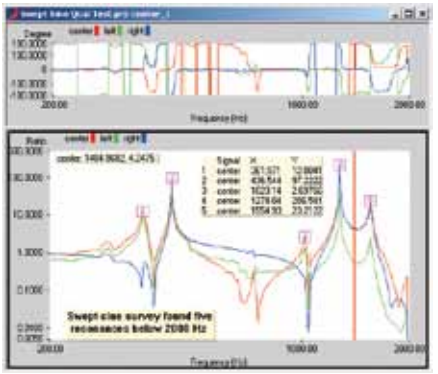
LASER$_{USB}$ offers special test flexibility much as resuming a test after an abort condition. You will even be able to stop a project sequence, switch to a different application and run a test, and then resume the project sequence right where you stopped the test originally.

Bring the Real World into the Lab

You can reproduce the "real world" in the lab by importing field measurements as test profiles. The system lets you analyze field recorded PSDs of transportation vibration or time transients for everything from vehicle crashes to test track runs.



Quick Report eliminates the tedium of cut-and-paste report preparation. A single click on an icon automatically generates a fully formatted and annotated report as an MS Word or PDF document.



Overlay live and stored data on-line; do detailed analysis using cursors and markers; document key observations with annotation

CUSTOMIZABLE

On-line Displays

LASER$_{USB}$ gives you complete flexibility to assess test results online. To better examine structural responses, you can simultaneously view response spectra, for any or all inputs, alongside transmissibility functions with phase information. You can identify data trends using overlays of live data on top of data stored yesterday, or last year.

Cursors and Annotation

To highlight results, you have a full range of cursor, zooming and annotation features. Single or dual cursors, with XY and delta-XY readouts, are always available. You can insert annotations anywhere on a plot as a permanent record of on-the-spot analyses.

Virtual Signals

The Signal Calculator expands your analysis capabilities by allowing you to create virtual signals. All signals are calculated and displayed live during testing. Dynamic data exporting to Excel opens new possibilities by allowing you to process data in a spreadsheet as the test runs.

Customized Reports with Active Data Plots

The job is not finished until the test report arrives. *LASER*$_{USB}$ tools rapidly generate professional, reports, ready for distribution online or on paper. Just click an icon and Quick Report™ automatically creates either Microsoft Word or PDF documents. "Active" data plots allow you to re-scale, zoom, or cursor any data within the Word report. You can also send Word documents with "active" plots to your customers so they can manipulate the data plots on their own.

You have full freedom to create your own customized Word templates and use them for automatic report generation. Your Word templates can graphically define the position, size, and data to use for all plots in the report.

Save and Export Data

Conveniently record test results by using automatic data saves at specified time intervals or in response to test events. Or save data manually whenever you desire. You can easily export data in the best format for passing it on to other analysis packages.

Safety plus Security

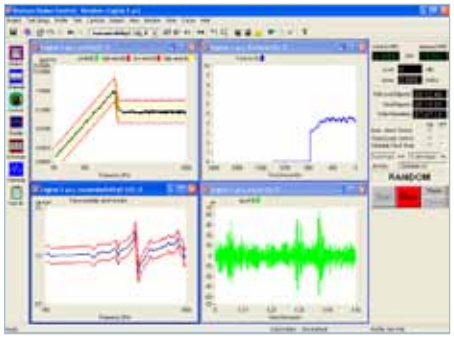
ADVANCED TECHNOLOGIES

Kurtosis Control for Better Real World Simulation

Kurtosis is a statistical parameter that provides a measure of the “peakedness” of a random signal. The capability to specify the kurtosis value provides for better simulation of real world vibration environments for automotive vehicles, military vehicles, or general transportation vibration. Tailoring kurtosis is also important as a means to accelerate fatigue tests.

Fatigue Monitor Protects Test Article & Shaker

Providing an unprecedented level of protection, the Fatigue Monitor detects looseness or fatigue in the product, fixture, or shaker system. To protect the shaker system the Fatigue Monitor constantly checks the measured system inverse transfer function against user specified abort limits.



Kurtosis Parameter Control enables better simulation of real world random signals and reduces fatigue test durations.

Also valuable for protecting expensive or sensitive products, the Fatigue Monitor allows you to use any transmissibility function or channel spectrum as a fatigue detector. Upon fatigue onset the controller stops the test to protect the product from damage or failure.

ENABLING TECHNOLOGIES

Customized Interfaces

NET-Integrator provides ActiveX commands that interface Vibration Control applications to user programs.
This capability makes it possible to develop very simple user interfaces for dedicated test applications or to integrate many instruments and automate complex measurement procedures.

Analyze Data Anywhere

You don't have to be at the controller to display and review data. Analyze Anywhere™ software can reside on any PC.
It does not require any *LASER*$_{USB}$ hardware, yet it offers all the on-line display and report generation features available with a *LASER*$_{USB}$ System.

SAFETY PLUS SECURITY

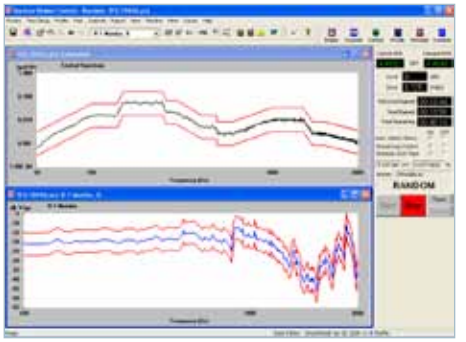
The *LASER*$_{USB}$ System has a comprehensive set of automatic safety checks to protect your equipment and personnel. Before sending a signal to the power amplifier, the system crosschecks profile demands against the shaker limits. A complete loop integrity check precedes test startup. While testing, the system continuously checks alarm and abort tolerances and RMS abort limits.

Page if There is Trouble

Most controllers only provide a screen message in the event of a test abort. For *LASER*$_{USB}$ this is only the start. You can have the system alert you by an audible sound from the PC, or if you are away from the lab, it can even email or page you. Data can also be automatically stored along with the test run log, so that you can thoroughly investigate and document the test conditions at the time of the abort.

Password Security

Password security prevents unauthorized test execution or changes. Privileges to create tests, edit test profiles, run tests, operate on-line controls, or create reports, can be set individually for each operator.



Fatigue Monitoring protects the product and shaker system from damage by using the system inverse transfer function to detect looseness or fatigue and stop the test.

$LASER_{USB}$ – The Solution for Advanced Vibration Control and Analysis

Product Selection Guide

Hardware

LAS-200 **$LASER_{USB}$ Shaker Control System**

Options

LAS-201	One extra Analog Input with voltage, ICP and TEDS input coupling
LAS-203	Remote abort button
LAS-204	$LASER_{USB}$ Rack Mount Kit
LAS-210	$LASER_{USB}$ Channel Expansion Box
ACC-101	Wireless Remote Control Pendant (includes hardware & software)
CAL-100-02	Re-Calibration Software for $LASER_{USB}$

Software

Vibration Control Options

SCO-01P	Random Vibration Control
SCO-01P-01	Sine-on-Random Vibration Control
SCO-01P-02	Random-on-Random Vibration Control
SCO-01P-03	Sine-and-Random-on-Random Vibration Control
SCO-02P	Swept Sine Vibration Control
SCO-02P-01	Resonance Search Track & Dwell Vibration Control
SCO-03P	Premier Classical Shock Transient Control
SCO-03P-01	Transient Time History Control
SCO-03P-02	Shock Response Spectrum Transient Control
SCO-04P	Long Time History (Road Simulation) Control
SCO-05P	Sine Oscillator

General Options

SCO-100-02	Multi-Layer Password Security System
SCO-100-03	High Frequency Control
SCO-100-06	Advanced Graphics Option - Waterfalls and Spectrograms

Other Options

SCO-110	Analyze Anywhere for Shaker Control
SCO-111	Waveform Editor
SCO-113	Thermal Chamber Communication & Control
SCO-114	Amplifier Control Interface
DSA-100-08	Signal Reader (ActiveX commands to read LDS-Dactron binary files)

Networked Enabled Test Options

NET-103-01	NET-Integrator ActiveX Command and Communication Interface
NET-104-01	NET-Integrator Run-time license (per seat license)

Dynamic Signal Analysis Applications

DSA-100	RT Pro (FFT, Transient Capture, Signal Calculator, Modal Data Acquisition, and Waveform Source)
DSA-101	Transient Capture and SRS Analysis

Also available

Offering superior performance at a very affordable price, the $COMET_{USB}$ Vibration Controller is an ideal solution to the everyday demands of your shock and vibration testing. $COMET_{USB}$ provides the flexibility to do random, swept sine, and shock testing on both electrodynamic and hydraulic shakers. Easy to use software together with a Test Setup Wizard make the $COMET_{USB}$ a perfect fit for vibration stress screening and production test applications.

$COMET_{USB}$ Vibration Controller

LDS Test and Measurement Ltd
Jarman Way, Royston
Herts, SG8 5BQ
Phone: +44 (0) 1763 255 255
E-Mail: ukinfo@bksv.com

Bruel & Kjaer North America Inc.
2815-A Colonnades Court
Norcross, Georgia 30071-1588
Phone : +1 770 209 6907
E-Mail: bkinfo@bksv.com

LDS Test and Measurement GmbH
Carl-Zeiss-Ring 11-13
D-85737 Ismaning
Phone: +49 (0) 89 92 33 33 0
E-Mail: infobk.de@bksv.com

Brüel & Kjaer France
46 rue du Champoreux – BP 33
91540 MENNECY Cedex
Phone: +33 (0)1 69 90 71 00
E-Mail: info.fr@bksv.com

LDS Test and Measurement
Room 2912, Jing Guang Centre
Beijing, China 100020
Phone: +86 10 6597 4006
E-Mail: info@bksv.com.cn

Brüel & Kjær Sound & Vibration Measurement A/S
Skodsborgvej 307,
DK-2850 Nærum, Denmark
Phone: +45 4580 0500
Fax: +45 4580 1405

www.lds-group.com www.bksv.com

$LASER_{USB}$ BROCHURE US 2009 09 BG1730-11