

GHI Systems' Products

GHI Introduces Proprietary Products to Meet Demanding User Requirements

GHI Systems, Inc., 916 N. Western Ave
San Pedro, CA 90732 310-548-6544
E-Mail: Sales@ghisys.com
Web Site: www.ghisys.com



© 2000-2006 GHI Systems,
Inc. All Rights Reserved.

The Environmental Shock Simulation Machine -ESSM-



© 2000-2006 GHI Systems,
Inc. All Rights Reserved.



The GHI ESSM Product Drop Machine

Designed to drop your product from a controlled height - onto a specific surface - while controlling the impact orientation!
An impossible task for standard shock machines.

Determine your products' fragility by a valid simulation that duplicates your product's handling environment.

Instrument your product to measure actual shock severity experienced.

Design allows easy access for high speed video.

Base 14"D x 16"W
Seismic mass 120 lbs plus anvil
Shafts SS 1.00" on 8" centers
Bearings Recirculating Ball
Impact Anvil Size. . . 8"W x 6"D
Max Drop Ht 72"
Max Impact Vel . . . 235.8 "/sec
Max UUT Wt 5 lb
Max UUT Size 6" Between Gripping faces*
Min UUT Size 0"
Overall Height 75" Standard, other heights optional

* UUT may be gripped in various orientations.



ESSM ready for a 42" drop of a cell phone onto a steel impact anvil.

See reverse side for options and typical shock.



Options – Related Products

- 4 channel GHI WinCAT instrumentation system for Shock data capture. Available with SRS software.
- GHI Optical Velocimeter for impact velocity verification. Stand alone or built-into software. (Pictured)
- Replacement grippers with pads, 3", 1.5" and 1" diameters.
- Impact anvils produced from user specified materials.
- Electrical safety release switch.
- Replacement brake bumper pads.
- Special accelerometers.
- Special length shafts.

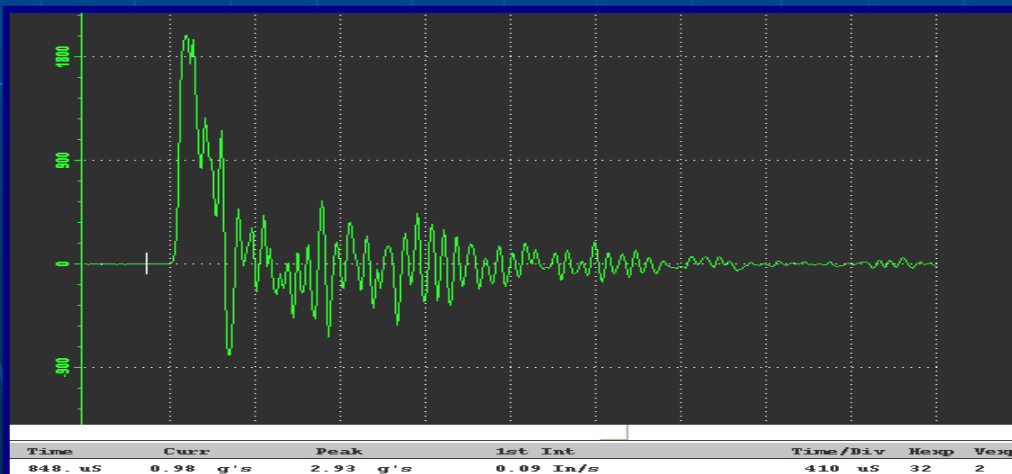


GHI Optical Velocimeter Option



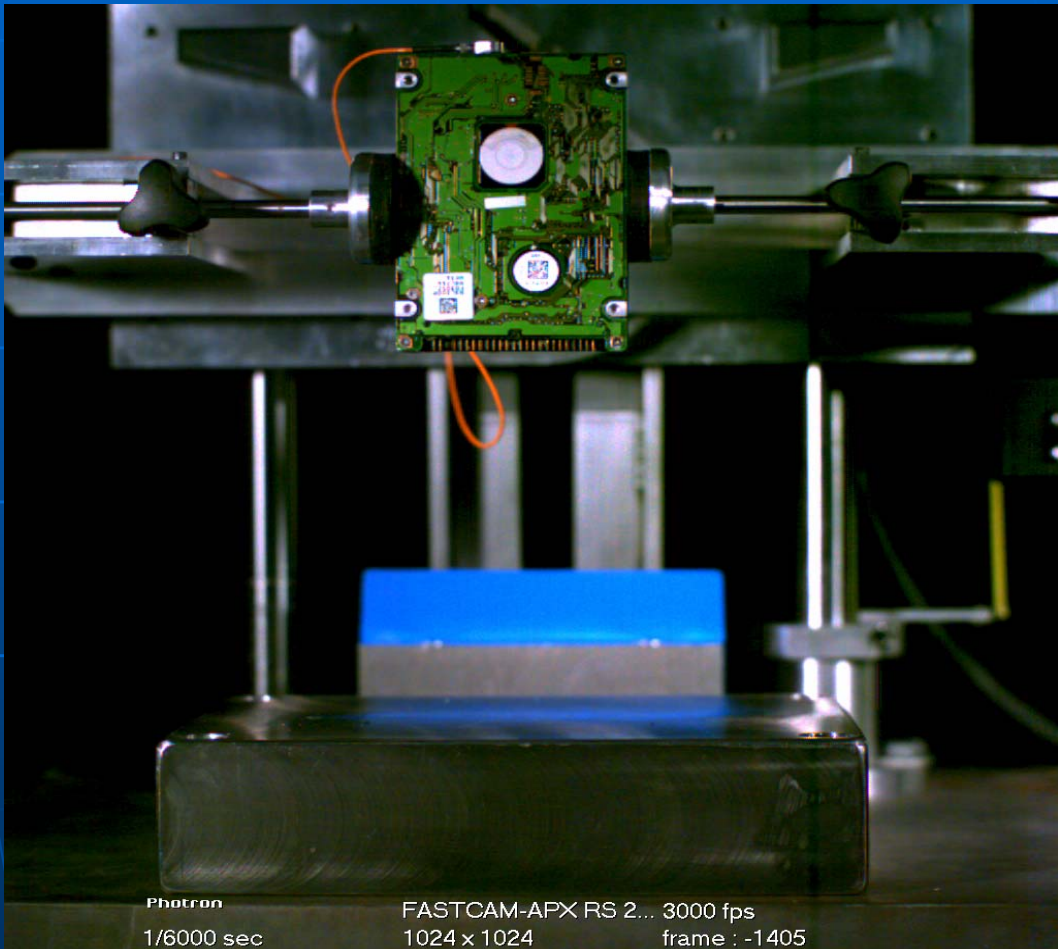
Electrical Safety Release
Foot Switch

Typical Shock Waveform From GHI WinCAT



2 Kg Shock waveform from 2.5" format hard disk drive, 10 inch drop on corner.

ESSM Drop of Instrumented Hard Disk Drive From 25 cm



© 2000-2006 GHI Systems,
Inc. All Rights Reserved.

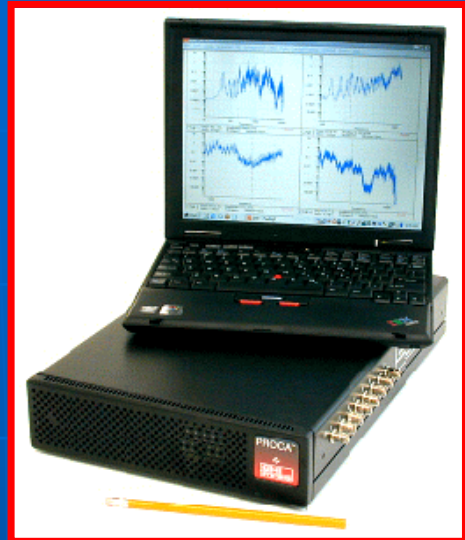
The Portable ProCAT Spectrum Analyzer -For HALT/HASS- Applications



© 2000-2006 GHI Systems,
Inc. All Rights Reserved.



The GHI ProCAT Analyzer



Portable Version, Optional Notebook
Shown.

- Available in both Portable and Desktop Versions.
- 8 channels with Signal Conditioning.
- Tailored for 6DOF Chamber Monitoring. No Un-Needed Baggage.
- Highest Resolutions Available: 0.75 Hz Line width, 12,500 Line FFTs.
1.54 Hz Line width, 12,500 Line PSDs.
See Vibration Details Missed by Others.
- Complete Suite of Analytical Functions: FFTs, Averaged FFTs, PSDs, Transfer Functions w/Coherence, Waterfall Plots, Damage Potential Spectrum (Comparative Fatigue Accumulation vs Time).
- Single and Quad Spectrum Plots with Selectable Frequency Bandwidths, Variable Zoom Expansion, Overlays of New and Historical Data. Provides Machine "Health" Tracking, Proof of Test Duplication, etc.
- Flexible Acquisition Modes: Free Running, Single Capture, Streaming to Hard Disk, Post Recording Recall and Analysis, Streaming While Analyzing.
- Export Time Domain Files or Computed Spectrums in Engineering Units.
- Easiest Analyzer To Use, No Previous Training or Experience Needed.
- Increase Productivity of Your HALT and HASS Programs.



Options - Related Products

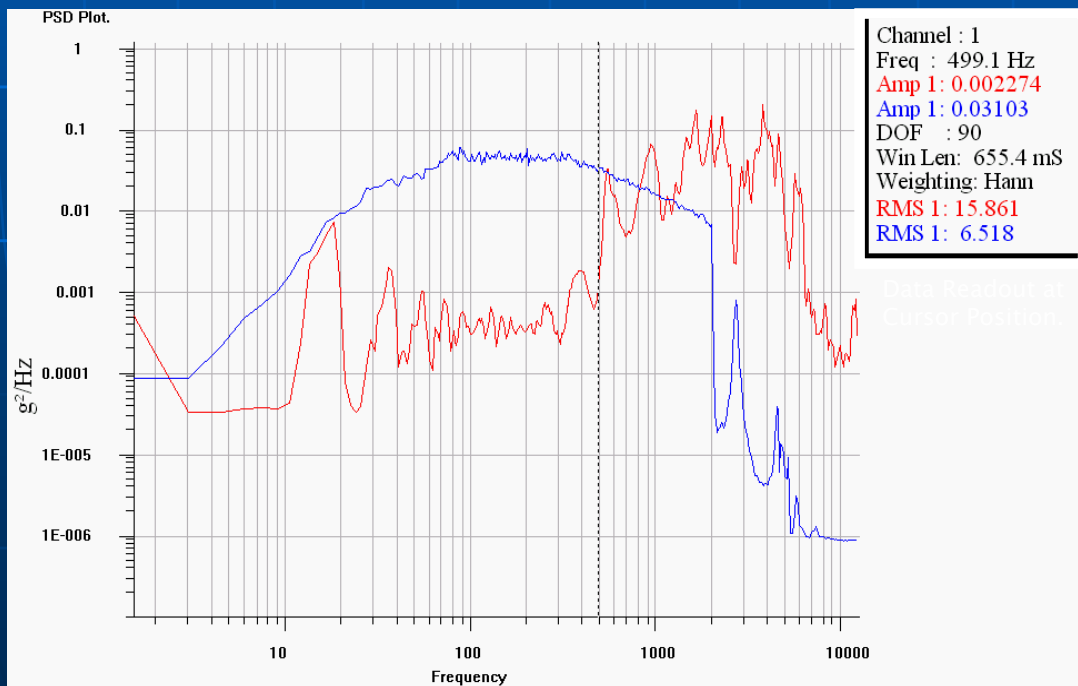
- Desktop Version Includes 1 PCI A/D Card, 1 PCI Signal Conditioning and Anti-Alias Filter Card, ProCAT S/W Auto Loader Disk, BNC Input Box, and Card Interconnection Cable.
- Portable Version Includes PCI Cards As Above, In 110-220 AC or Optional Battery Powered PCI Expansion Box, 8 BNC Inputs, PCI Bridge Card & Cable for Compatible Notebook PC.



PCI Card & Software Set For Desktop PCs.

Typical Overlaid Spectral Plot From GHI ProCAT

Example Shows Electro Dynamic NAVMAT & 6DOF Machine PSDs on Same Grid.

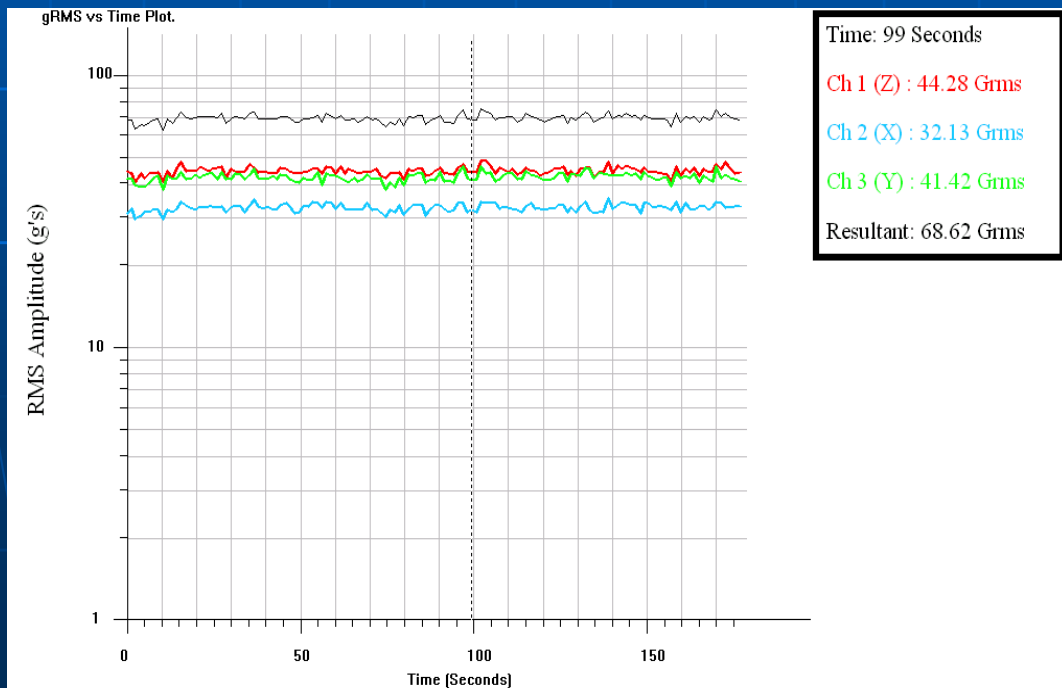




Triax Resultant Grms

The GHI ProCAT has the ability to save and recall long strings of raw data from both single or multiple channel accelerometers. For example: any of eight channels of vibration data can be captured for up to 10 minutes or more. This data can then be recalled and an analysis routine will solve for the resulting magnitude or root of the mean square sum from the triax channels. This plot of Grms vs. Time for each of the three triax input channels plus the resultant can then be used to document true total Grms intensity of the applied stress. This is a truer estimate of total Grms power provided by the three linear degrees of freedom of the 6DOF machine than the single channel reading given by controllers or other analyzers.

Example below shows triax channels and their resultant magnitude from a 6DOF machine. It can be seen that the resultant Grms is much greater than any of the three triaxial directions on the table. This should be taken into consideration during screens, since true Grms is not equal to indicated Grms.

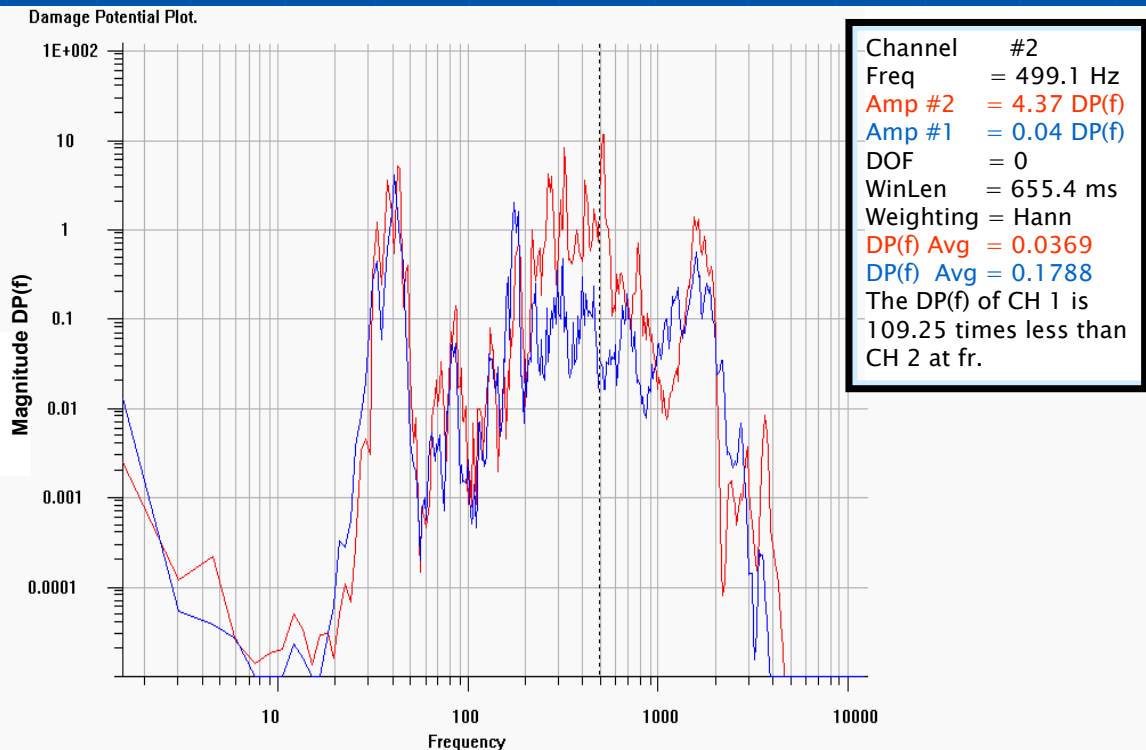




Fatigue Damage Potential

An important feature of the GHI ProCAT is its ability to measure fatigue damage potential. The GHI Damage Potential Spectrum, $DP(f)$, determines the relative fatigue accumulation at various resonance frequencies when a product is subjected to a broadband excitation. It does this by monitoring the power spectral density, PSD, of the excitation and converting this to a velocity spectrum. (Fatigue is related to the velocity of the first bending mode of a resonating member, not to its acceleration.) Once converted, fatigue modifiers are applied to this velocity spectrum. These modifiers are the component's damping ratio ζ , its S/N fatigue rate β , and T, the duration of the excitation.

In the example below, fatigue $DP(f)$ plots from two machines are overlaid. Machine #2 indicates a higher fatigue over the frequencies of 200 Hz to 500 Hz than Machine #1. This overlaps the spectrum of most electronic parts. Machine #1 is lower over these frequencies and can be said to produce less fatigue per time of exposure than Machine #2. The exact relative ratios are read-out via cursor.



The Powerful WinCAT Transient Recording Instrumentation System

Specializes in Shock
Applications
Including MILSPEC
PyroShock &
SRS Analysis



© 2000-2006 GHI Systems,
Inc. All Rights Reserved.

GHI WinCAT System

Portable or Desktop
PC Versions, various
analysis software
options, including SRS



Specify 4, 8, or 16 channels, 4 and 8
channel versions may be integrated with
GHI's powerful ProCAT Spectrum Analyzer
into one unit, desktop or portable version.



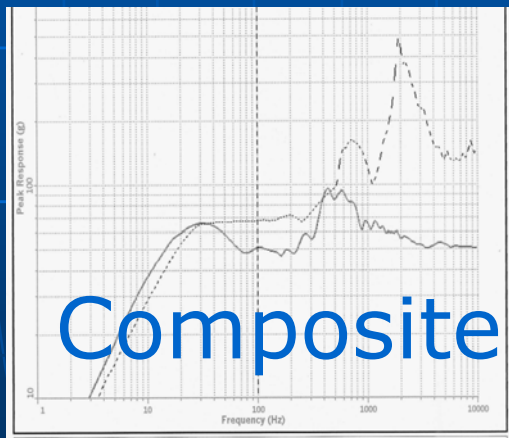
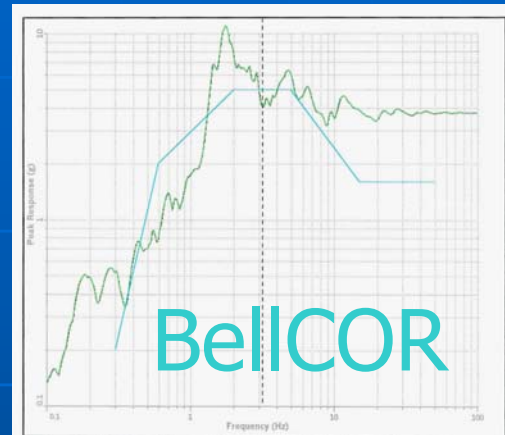
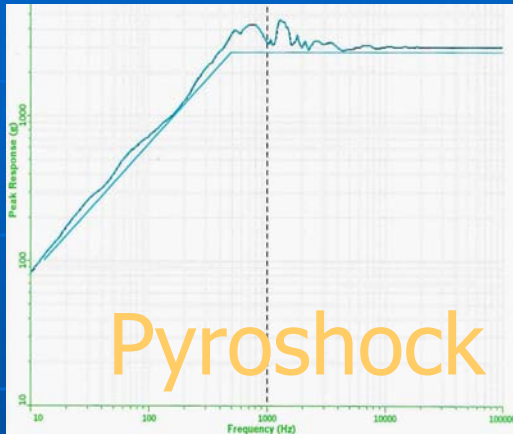
© 2000-2006 GHI Systems,
Inc. All Rights Reserved.

Specifications

- Up to 16 channels
- Sampling rate 1 MHz
- 12 bit resolution = .024% full scale
- 6 user set full scales
- Throughput calibrated to 1.5% max error, w/cert
- Automatic modes for shock
- Digital post filtering w/restore
- Editable Test Reports
- Triax resultant vectors
- Peak, duration, and ΔV readouts
- Optional Analysis Software:
 - Damage Boundary, Mil Spec Tol Bars SRS, Helmet Test, Plus Custom



WinCAT's World Class SRS



Just a few of the supported applications



© 2000-2006 GHI Systems,
Inc. All Rights Reserved.

The Rotary Random
Vibration Machine
–RVM–3–
For Dell Hard Disk
Or Other Test
Requirements
Requiring Precision
Performance



© 2000-2006 GHI Systems,
Inc. All Rights Reserved.



RVM-3 Rotary Random Shaker



RVM-3 Including Dual Actuators
Shown.

- 10-inch magnesium table supports drives in any position. Eliminates test item overhang.
- Rigid solid-granite base reduces machine cross axis.
- Dual 13 lbf actuators work in parallel, under averaged control.
- 10 Hz to 2KHz Random vibration, 10 to 5,000 Hz sine sweep.
- High torque, Low cross-axis
- Optional controller, 2 Input Channels with Averaging.
- **Passes Dell Lab Certification Procedure No. SV0313A03**

Capacity, non-reactive mass 10 lbs (4.5 kg) centered, allows stacked drives to 5" above table.
Actuator Force, 16 lb-f rms random, 26 lb-f peak sine (71 / 116 newtons)
Torque, 130 in-lbs peak
Frequency Ranges, Random 10 - 2,000 Hz,
Table Displacement, 8.5° p-p (0.75" p-p tangential) max with furnished stinger.
Table/Shaker Assembly Weight, 180 lbs (82 kg).
Table/Shaker Baseplate Size, 20.0" w x 18.0" d x 7.0" h (508 mm x 457 mm x 178 mm).
Table Size, 10" diameter (254 mm), 1" thick (25.4 mm), Material: magnesium.
Mounting Holes, M6 with threaded steel inserts, rectangular pattern, 25 mm centers.
Electrical Requirements, 1,000 VA @ 120/240 VAC, single phase, 50/60 Hz



Options – Related Products

The RVM-3 from GHI Systems is used to create very-controllable torsional vibration for testing equipment such as hand-held devices, hard disk drives, sensors, and MEMS. The optional easy-to-use programmable controller software provides the user complete flexibility over defining the test parameters, characterizing the response of the test item, and generating detailed output reports. The results are very repeatable between different test items.

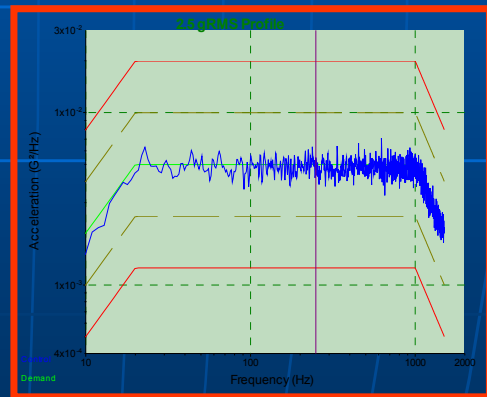
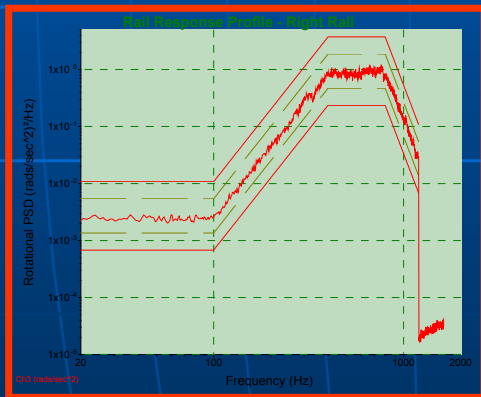
The RVM-3 was developed to support the **DELL Lab Certification No. SV0313, Rev. A03** for Rotational Random Vibration Tests for a full range of hard disk drive formats, including 3.5" and 2.5".

The RVM-3 is a unique solution for rotary vibration requirements. It employs two parallel actuators working in series and driven from one power amplifier. It also uses a solid granite block baseplate to provide the needed machine rigidity to enhance pass/fail margins of test protocols.

Example of typical test profiles are shown below.

Typical Vibration Spectral Plots

Left Example Shows Plot of Dell Profile "Q". Right Example Shows Plot of Proposed 2.5 Grms Profile.



The system may be ordered with or without an optional full-featured controller that provides 4 analog input control channels. Two of which can be used for averaged control.

GHI System' installed base of shock and vibration machines for testing disk drives exceeds all other vendors combined.

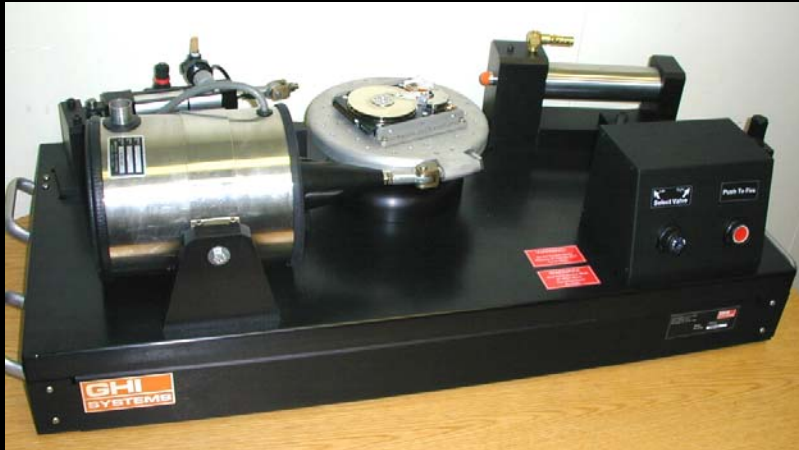
© 2000-2006 GHI Systems, Inc. All Rights Reserved.

The Rotary Shock Machine
–RSM 3–
For HD Latch
Verification
Or Other
Rotary Shock Requirements



© 2000-2006 GHI Systems,
Inc. All Rights Reserved.

RSM-3 For HD Latch Verification



Includes GHI's WinCAT transient recording instrumentation system



© 2000-2006 GHI Systems,
Inc. All Rights Reserved.

Reduced Mass/Inertia Table For RSM-3 Produces 500 KRad Shocks



For Microdrives



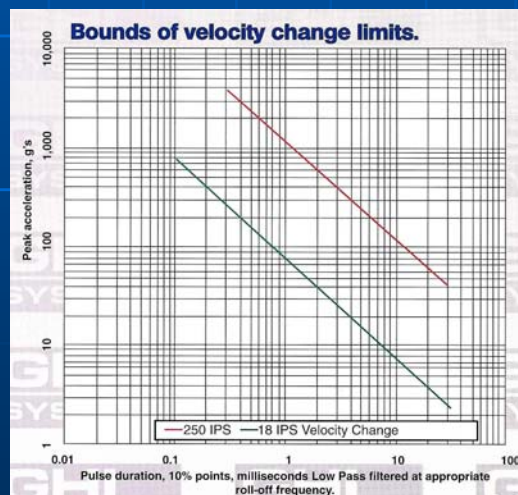
© 2000-2006 GHI Systems,
Inc. All Rights Reserved.

Portable Linear
Shock Machine
-LSM-100-
For MEMs
and Other
Miniaturized Device
Shock Testing



© 2000-2006 GHI Systems,
Inc. All Rights Reserved.

LSM-100 Horizontal Shock Machine



Includes GHI's WinCAT transient recording instrumentation system



© 2000-2006 GHI Systems, Inc. All Rights Reserved.