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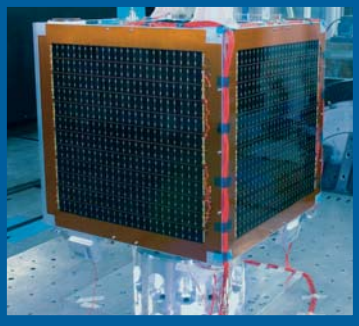
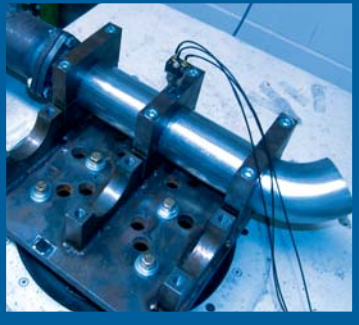
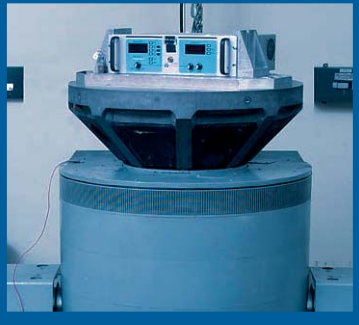
VibControl

Vibration Control and Signal Analysis







VibControl

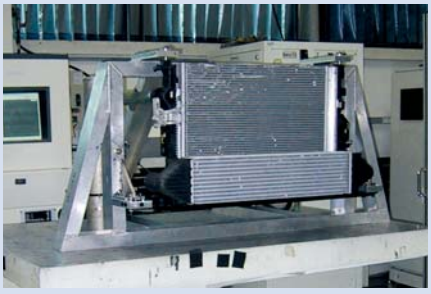
Our VibControl products for advanced vibration testing and signal analysis from 4 to hundreds of input channels are used by many of the leading environmental test laboratories throughout the world. Endusers appreciate the intuitive operation, the extensive analysis and reporting functions, the numerous upgrade possibilities and, of course, the excellent stability and high quality level of the systems.

Vibration control at Fujitsu Siemens Computers, Augsburg/Germany

Future-Proof Software and Hardware

We protect your investment in the long term – this is part of our product philosophy. Thanks to the modular design of hardware and software, VibControl can be configured and expanded to other vibration tasks and higher channel counts at any time. Software upgrades are possible for all test modes, special post-processing functions, automatic test sequencing, etc.

m+p international regularly adds enhancements to its VibControl software; these updates result primarily from the close cooperation with our customers and their valuable feedback. All our systems are based on state-of-the-art, high-precision measurement hardware made by well-known test and measurement manufacturers ensuring long-term support and system longevity. And if you want to replace the measurement front-end you have used for many years with the latest hardware technology? No problem, we will equip your VibControl system with the desired measurement hardware without making changes to your familiar user interface. With the VibPilot, we offer a compact multi-channel instrument for both professional vibration testing and dynamic signal analysis.



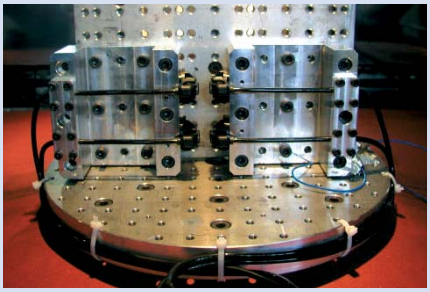
Testing engine cooling modules on a long-stroke shaker at Valeo Thermique Moteur, La Verrière/France

Common User Interface

All VibControl systems from four to high-channel count applications are controlled by the same proven Microsoft Windows-based software. A single interface with the same look and feel means that test specifications can be transferred from engineering to production without change or error, test data can be compared directly from one system to another, common reporting formats improve communication, data can easily be shared on a network and accessed from anywhere required. This all adds up to easy intra-company and inter-company data sharing and thus improved productivity. Since the user interface is common across the whole platform, features typically only available on high-end systems (e. g. notching in sine and random test mode) are also part of low-channel count system configurations.

The VibControl solutions for data reduction with/without throughput and acoustic control testing in a reverberation chamber are based on the same user interface and hardware platform as the shaker control systems. Therefore they can be configured as a control system by just adding software modules, thus highly reducing the purchase costs and operator training.

Vibration control on automotive connectors, Hirschmann Automotive GmbH, Rankweil/Austria



True Multi-Tasking

Since the real-time measurement and control processes are independent of the workstation, you can utilize all the capabilities of the host computer, e. g. generate and printout a test report or set up a new test while the front-end performs the measurement and vibration control tasks.

This multi-tasking concept not only guarantees powerful and time-efficient vibration testing even with time-critical tests but is also an important safety feature as any unwanted computer command or failure cannot affect the shaker controller.

Always in control: Test status reports via SMS text message

Automated Functional and Climatic Testing

With the VibUtil module, VibControl offers a versatile tool for automated vibration testing and combined environmental testing. VibUtil easily combines individual vibration tests of identical or different test modes in any complexity of nested loops. When the system is left unattended, e. g. for an overnight or weekend run, you can still be in control. Test status reports can be sent via email or via SMS text message to the mobile phone, enabling that important decision to return to work, or not, within minutes of the test stopping. A protocol file documenting the most important test events is attached to each email.

VibUtil can be easily extended to include eight digital input channels and eight digital output channels which provide links to external equipment such as environmental chambers for combined testing. With VibUtil, the user can also automatically control the power amplifier, i. e. shut it down at the test end and switch it on when a new vibration test is to be started.

Monitoring of high-channel count systems

Multi-Monitor Support

The highly flexible online display capabilities can be extended making monitoring of high-channel count systems quicker and easier. Operators can open up to 16 online graphics windows on a single monitor to display 64 channels and obtain all necessary information at a glance. The multi-monitor function also allows for remote shadow monitoring of the test. This enables customers to observe the channel information on remote PCs without any measurement hardware connected.

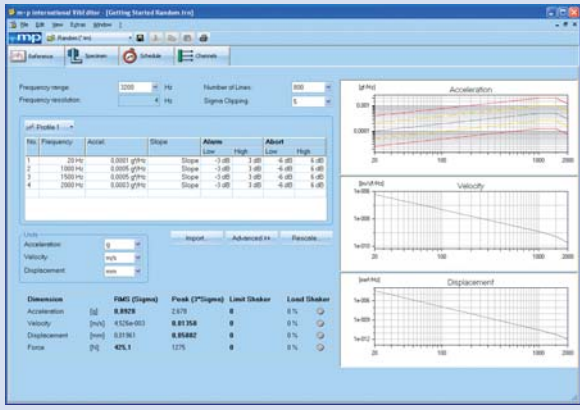
If you need to observe more than 64 channels, you can expand the multi-monitor function to the multi-screen option. A system can be configured with the multi-screen module and a dual or quad graphics card for support of up to four monitors and 256 channels or even more. Channel layouts for each monitor can be set up and stored for quick access.

Remote Client

Our VibControl systems provide an optional remote client licence which is invaluable to many operators. Many times a controller is crowded by engineers trying to view a vibration test as it is run. For operators this is not only a disturbance but can also lead to mistakes as they can be distracted by questions, requests etc. However with the remote client, live data can be viewed during an actual test via network or wireless network on a tablet or desktop PC in an entirely different area. The licence allows full VibControl functionality except running a test.

Test Modes

VibControl supports all test modes* used in today's vibration testing – everything from simple ESS random to mixed mode gunfire, drop table capture and unlimited time data replication. All tests are fully compliant with ISO, DIN, MIL-STD 810 and many other standards. In sine and random modes, you can designate all input channels as control, watchdog and/or measurement channels. DC signals can be measured and monitored for functional testing in all test modes.



- **Random incl. Notching/Force Limiting**
  Resolution up to 3,200 lines, selectable in 5 steps. Frequency range up to 12.8 kHz. Control strategies: average, maximum or minimum. Frequencies or frequency bands can be defined where limiters take control if the response vibrations exceed a predetermined limit.

- **Random Data Reduction**
  Online analysis of measured data or taped random data (PSD averaging). Measured data can be recorded on throughput disc.

- **Sine incl. Notching/Force Limiting**
  Frequency range up to 20 kHz. Measurement filters: RMS, peak, averaged or digital tracking filter. Control on acceleration, velocity, displacement and force.

- **Sine Resonance Search & Dwell**
  Control criteria: fixed frequency, fixed phase, defined phase, auto phase, peak amplitude.

- **Sine Data Reduction**
  Track and online analysis of measured data or taped swept sine data using a COLA signal. Time data can be recorded on a throughput disc.

- **Sine Displacement and Velocity Control**
  For sine testing starting at very low frequencies, displacement transducers can be used. At a defined frequency, the control changes automatically from a displacement transducer to an accelerometer.

- **Shock Classical**
  Reference waveforms: half-sine, haversine, sawtooth, triangle, rectangle, trapezoid. Alarm limits as per MIL-STD 810, DIN, GAM-EG 13 and user-defined. Peak-to-peak displacement to guarantee the best shaker performance.

- **Shock Response Spectrum (SRS)**
  Calculation of maximax, positive and negative SRS. Automatic SRS optimiziation. Wavelets and damped sine components.

- **External Pulse**
  Import of ASCII data for replication with pulse editor. Synthesis of any pulse form. Kinematic compensation for minimum shaker displacement.

- **Transient Capture**
  Capture of transient signals such as drop table or pyroshock pulses. Scope function. Various triggers. Measured data can be recorded on throughput disc.

- **Sine-on-Random (SoR)**
  Up to 20 independently sweeping sine tones are overlaid onto a random background. Sine tones and broadband random signal are generated separately. Gunfire burst simulation.

- **Random-on-Random (RoR)**
  Up to 25 independently sweeping narrowband random signals are overlaid onto a random background. Each narrowband with its own profile and limits.

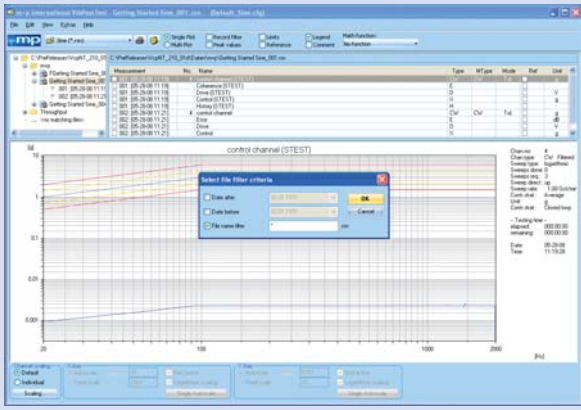
- **Sine-on-Random-on-Random (SoRoR)**
  Sine-on-random is combined with random-on-random.

- **Time Domain Replication (e. g. Road Load Simulation)**
  Complete solution for the transfer of data from the true environment to the vibration test lab. Unlimited time data replication. Continuous closed-loop control.

- **Time History Recording to Througput Disc**
  For the most critical tests time sample data can be recorded in parallel with control with no reduction in control performance. This facility is also available in recorder modes without closed loop control. Post-analysis of the time history data is possible using the Sine and Random Data Reduction modules with the benefit of using the same familiar user interface or data can be exported for analysis by m+p international's SO Analyzer package or other advanced analysis systems.

* Please refer to the VibControl product information sheets for detailed specifications. Specifications are hardware-dependent.

Comprehensive Analysis Functions



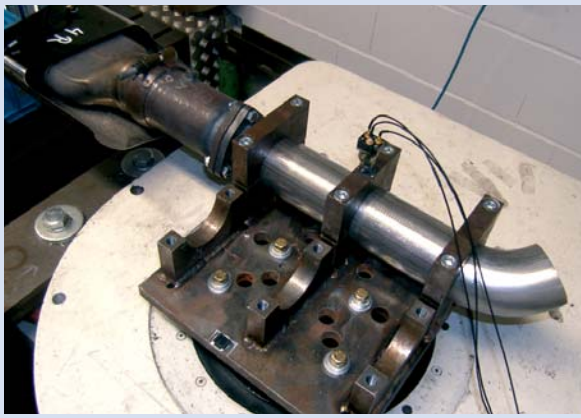
VibControl's post-testing includes extensive data handling, advanced cursor functions, single and multiple data graphing, peak search, mathematical functions, transfer function analysis as well as displaying and printing traces from different sources in a single window.

- Transfer function: Relating the behaviour of control and measurement channels in the test run (sine and random test mode).
- Mathematical functions: Converting the measured acceleration signal into velocity and displacement, or vice versa (sine and random test mode).
- Automatic peak search: Peak values will be marked automatically in the graphics and listed with their numerical data in a table, single or multiple plots. Q-factor calculation in sine.
- Graphical and numerical measurement and reference data analysis:
  - Control and response spectra with reference, alarm, abort and notch limits
  - Error
  - Drive
  - FFT amplitude and phase in sine and random
  - Coherence in random
- Printouts
  - Multiplot: Displaying and printing traces from different test types, several test runs or multiple test specimens in one graphic window.
  - Autoplot: Automatically printing a preselected series of graphics.
  - Printing a list of preselected test parameters.
  - Printing directly to MS Word using a customer defined template.

Earthquake simulation at Lucent Technologies, Whippany/New Jersey

Sophisticated Reporting

The presentation of the test results is as important as a successful test completion. Our VibControl solutions are perfectly positioned to meet the most demanding requirements. The reports are generated online while running a test or upon test completion. User comments, company logos and graph markers can all be added to create a complete report ready display. Data and graphics are copied and pasted to standard Microsoft Windows applications such as Word and Excel and can be exported into Universal File Format. The ultimate step in electronic report generation is using m+p international's e-Reporter software package to which the VibControl data can be directly exported.



Manifold testing at ArvinMeritor Emissions Technologies GmbH in Augsburg/Germany

High-Precision Measurement Hardware

VibControl is based on highly accurate hardware platforms from leading test and measurement suppliers. The measurement hardware is available from 4 input channels in a compact design to hundreds of channels as industry-standard VXI architecture, and you get the same quality VibControl software across the range. The functionality includes 24-bit analog-to-digital converter and a resolution of 3,200 lines as standard. The measurement hardware offers TEDS (Transducer Electronic Data Sheets) support for use with self-identifying transducers allowing completely self-configurable transducer setup.

m+p international's VibPilot is a compact multi-channel instrument meeting the most demanding requirements of today's vibration testing and dynamic signal analysis. It covers the full functionality of the VibControl software and all test modes. VibPilot handles general data acquisition and signal processing tasks as reliably as sine, random, shock and mixed mode testing, modal analysis, rotating machinery testing, acoustics, etc.

Calibration Services

m+p international offers on-site or return-to-bench commercial calibrations for all its VibControl systems and related measurement hardware.

Keeping your equipment at peak precision by calibrating it minimizes your testing downtime. Regular calibration of your m+p international systems is not only an investment in quality; it is also a valuable tool to save costs. Errors caused by inaccurate or invalid measurements can become very expensive, e. g. if they necessitate product recalls. The m+p international system calibration includes system verification, calibration of all modules and system, system check, cleaning of the filters as well as a calibration certificate.

Supplier of Complete Test Systems and Test Stands

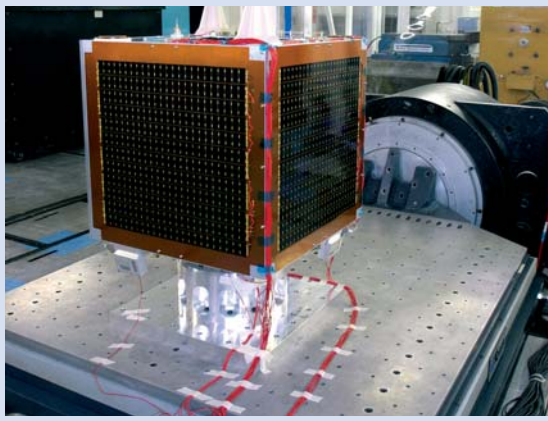
If you want to buy a complete vibration test system from one source, m+p international is the company for you. We have partnerships with renowned shaker manufacturers for many years and have the experience it takes to provide complete test stands including the control system, the computer platform, the shaker and accessories such as accelerometers.

And, if you want to combine climatic and vibration testing or if you need very special vibration test stands? m+p international has the necessary experience to provide a complete solution for you.

Combined climatic and vibration testing of car radios at Blaupunkt GmbH, Hildesheim/Germany

Data Acquisition & Analysis
Acoustic Control

The VibControl product family comprises other powerful configurations for online data reduction & continuous time data recording and for acoustic testing in a reverberation chamber. Based on the same hardware platform and featuring the same user interface as VibControl, these systems can be easily configured as a vibration control system, i. e. making the investment even more attractive.



Time domain recording in parallel to multi-channel vibration control on the MicroSat satellite at Astrium, Portsmouth/UK

Data Acquisition and Time Domain Recording

In addition to its versatile vibration control tasks VibControl can also be used as an online data reduction system for sine, random, shock and transient capture (including SRS) data. The throughput function records all channels continuously in the time domain directly to the hard disc – irrespective of the channel count and the frequency range utilized. The high-precision and powerful VXI measurement hardware is very flexible thus enabling applications from a few dozen inputs to high-channel counts. Depending on the selected hardware up to 384 input channels can be integrated into a single 13-slot VXIbus mainframe, with 32 fully differential input channels per VXI slot. By adding m+p international's SO Analyzer software modules, VibControl will also provide online and parallel throughput processing for acoustic data.

With vibration control and simultaneous gap-free data recording running in parallel in one system, you will significantly reduce your test costs and operator training requirements thus ensuring high test efficiency.

Spacecraft is tested in an acoustic reverberation chamber to represent the environments during lift-off

Acoustic Control in Reverberation Chambers

m+p international's AcousticControl system uses high-level noise to test the effects of acoustically induced vibration in a reverberation chamber. It is a fully automatic digital control system, providing fast, accurate and repeatable control of high-level noise to a reference octave band spectrum and the overall sound pressure level (OASPL). The control foresees a high level of product safety.

AcousticControl provides features such as unlimited number of microphones for control and/or measurement, continuous time domain octave analysis in 1/3 octave bands, a control bandwidth up to 10 kHz with multi-horn control, automatic microphone drop-out detection and exclusion from control, extensive octave band and OASPL alarm and abort checks for safe testing as well as comprehensive post-test analysis and reporting functions in 2D and 3D.

The user interface has the same look and feel as the interface of the VibControl shaker controllers for set-up, test run and analysis. Supporting the same VXI acquisition hardware, AcousticControl can be configured as a VibControl system by simply adding a software module.

VibControl

Many high-profile companies rely on our VibControl solutions for vibration testing and signal analysis to assure their highest product quality. The open hardware and software architecture, standalone or networked, ensure system longevity, meaning that we protect your investment reliably. VibControl supports high-precision measurement hardware from 4 to hundreds of input channels – available in a compact, rugged housing or as industry-standard VXI instrumentation. In cooperation with renowned partners, m+p international provides complete vibration test systems including shaker and combined climatic and vibration test stands.

Using true multi-tasking functionality, the control software is very robust in operation and allows multiple tasks to run in parallel from the same keyboard without loss of real-time control. Our VibControl products have a full range of test modes available, everything from simple ESS random testing to mixed mode gunfire simulation. Drop table capture, sine data reduction for increasing the channel count as well as unlimited time data replication and road load simulation mean m+p international can tackle the widest range of requirements. m+p international offers on-site or return-to-bench calibration for all its systems and related measurement hardware.

The VibControl solutions for data acquisition and analysis with/without time domain recording and acoustic testing in a reverberation chamber are based on the same user interface and hardware platform as the shaker control systems. Therefore they can be easily configured as a shaker control system by just adding software, giving them a double use and highly reducing the operator training requirements.

m+p international develops and manufactures test and measurement systems for vibration control, noise and vibration measurement and analysis, and process monitoring as well as custom-made functional test stands.

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