WHO..?
Acoustic Consultancy
Aerospace
Automotive
Civil Engineering
Defence
Education
Engineering
Environmental Test
Health & Safety
Manufacturing
Marine Engineering
Medical Research
Mining
Motorsport
Power Generation
Railways
R&D
Shipping
Transportation
Vibration Consultancy
Wind Tunnels

WHAT..?
Acoustic Studies
Audio Measurement
Production Testing
Fatigue & Durability
Hammer Testing
Human Biodynamics
Modal Analysis
Noise Path Analysis
NVH
ODS
Powertrain Investigations
Refinement Studies
Ride & Handling
Road Load Studies
Room Acoustics
Rotating Machinery
Shaft Balancing
Sound Quality Studies
Sound Mapping
Structural Animation
Vibration Testing
P8000
Fast, rugged, 24-bit, high precision, high quality
data acquisition systems

P8004
- Small, light, ultra portable
- 24-bit precision
- Sample at up to 400k samples/second/channel
- 4 analog channels plus tacho input
- 102dB dynamic range
- -120dB noise floor
- USB 2.0

P8012/8020
- P8012 - 3 card chassis
- P8020 - 5 card chassis
- Up to 40 analog channels plus tacho
- 24-bit precision
- Up to 100k samples/second/channel (24 bit)
- Up to 400k samples/second/channel (16 bit)
- 102dB dynamic range
- -120dB noise floor
- USB 2.0

P8048
- High channel count
- 12 cards per chassis
- Multiple chassis up to 1024 analog channels
- 24-bit precision
- Up to 100k samples/second/channel (24 bit)
- Up to 400k samples/second/channel (24 bit)
- 102dB dynamic range
- -120dB noise floor
- USB 2.0

P8000 input & output channel options
The P8012, P8020 and P8048 can be configured with a number of different input and output cards. The following cards are available...

- 4 channel high speed analogue and 1 channel tachometer input card, with BNC connectors.
- 4 channel high speed analogue and 1 channel tachometer input card, with 6 pin LEMO connectors.
- 4 channel high speed analogue charge input card.
- 8 channel thermocouple input card, with universal thermocouple connector.
- 8 channel analogue input card with IEPE support, with 50 way D type connector.
- 8 channel analogue input card with programmable excitation, with 50 way D type connector.
- 4 channel precision tachometer measurement input card, with BNC connectors.
- 4 channel digital to analogue output card, with optional digital I/O, BNC connectors.
- 2 channel CAN-BUS input card, with 9 way D type connectors.

WWW.PROSIG.COM
Comprehensive data capture, signal processing, automation and reporting for noise and vibration

**Capture**
- Customisable real time displays during capture
- Easy-to-use grid based setup
- Setup 'assistants' for simple test configuration
- Built-in transducer database
- Integrated project manager

**Analyse**
- Intuitive worksheet interface for easy investigation
- Huge range of analysis functions plus application add-ons
- 'Visual Scripting' for automated capture, analysis & reports
- DATS BASIC scripting for standalone applications
- Import/export from many other packages

**Report**
- Reporting closely integrated with Office applications
- Create reports with familiar Office tools
- Automate with DATS
- Generates 'live' graphs in reports - no more copy & paste
- Repeatable high quality reports
- Can be added to scripts for fully automated sequences

**Application software**
DATS software can be configured with a number of special solution add-ons that support a wide range of noise & vibration based applications...

- NVH Analysis
- Rotating Machinery Analysis
- Fatigue Life Analysis
- Structural Animation
- Multiplane Balancing
- Hammer Impact Analysis
- Sound Quality Audio Replay
- Sound Mapping

- Noise Path Analysis
- Human Response Biodynamics
- Modal Analysis
- Flight Test Software
- Time Frequency
- Acoustics Analysis
- Crash Biomechanics Analysis

WWW.PROSIG.COM
### DATS

**A complete list of all the analysis functions available in the basic DATS Toolbox package**

#### Arithmetic (Data & Data)
- Data & Data Arithmetic (+ - * /)
- Data + Ind. Var. Arithmetic (+ - * /)
- Data and Reference

#### Arithmetic (Data & Constant)
- Real Data & Constant (+ - * /)
- Complex Data & Constant (+ - * /)
- Mod/Phase Data & Constant (+ - * /)
- Remainder

#### Calculus
- Differentiate
- Integrate
- Integrate X with Y
- Omega Arithmetic

#### Complex Functions
- Complex to & from Mod/Phase
- Complex to Real
- Complex to Imaginary
- Complex Output (Imag+Real, Real+Im, Imag+0, Real+12)
- Data & Conjugate(Data) (+ - * /)

#### Curve Fitting
- Fit Stepned Data
- Fonymite
- Lagrange
- Lanczos
- Least Squares Polynomial
- Mean Median Despike
- Remove Spikes from Data
- Savitsky-Goley
- Smooth
- Spine fit

#### Data Acquisition
- Spreadsheet Style Setup
- Multi-channel realtime displays of numeric values, time histories, FFT, spectrum waterfalls, orders
- Setup Information Stored with Data
- Multi-channel range display
- Dynamic/Static Signal Calibration Tools
- Automatic Gain Ranging
- Over-range indications
- Automatic Increment of filenames

#### Event Processing
- Extract Event
- Mark Event
- Remove Event

#### Export Data
- ASCII
- Comma Separated Variables (CSV)
- SF (I/O) (Agilent)
- Matlab
- MS Excel
- RPC III
- TDM
- TecPlot
- Universal File (UFF)
- WAV

#### Filtering
- Alpha Beta Filter
- Bessel (Low, high & band pass & band stop)
- Butterworth (Low, high & band pass & band stop)
- Chebyshev (Low, high & band pass & band stop)
- Equalisation Filter
- Filter Octave (Band Pass)
- Impulse Response Filter
- Median Filter
- Notch
- RC Filter
- Remove Jitter
- Shrinking Filter
- Smoothing

#### Frequency Analysis
- Auto (Power) Spectrum
- Auto (Power) Spectrum (Limit Hold)
- Auto (Power) Spectrum (Hopping)
- Carpet Plot
- Cepstrum
- Coherence Spectrum
- Complex to Mod/Phase
- Cross Spectrum
- Cross Spectrum (Limit Hold)
- dB Weighting
- DFT
- DFT (Goertzel)
- Find Peaks in Spectrum
- Weighting (A,B,C,D)
- FFT (Full Range)
- FFT (Half Range)
- Hopping FFT
- Inverse FFT (Full / Half Range)
- Inverse FFT (Long Complex Full Range)
- Omega Arithmetic
- Third Octave Bands
- RMS Over Frequency Range
- Autoregressive Filter Coefficients
- Envelope (Complex Demodulation)
- Envelope (Fourier)
- Long FFT
- Instantaneous Frequency
- Interpolate Signal
- Minimum Phase Spectrum (Hilbert)
- Maximum Entropy Autoregressive
- Maximum Entropy Spectral Estimate
- Short Time FFT
- Spectrum Level
- Spectrum Level (Limit Hold & Hopping)
- Transfer Functions
- Window Transform
- Zoom FFT
- Zoom Auto Spectral Density
- Zoom Cross Spectral Density

#### Generate Data
- ADC Simulation
- Sine (Sine, Damped, Linear & Log Sweep, Haversine, Modulated & Pulsed)
- Random (Autoregressive, Gaussian, Rectangular, Narrow Band, Pink & Red Noise, Rayleigh Random Numbers)
- Random Time History From Spectrum
- Impulse
- Square (Pulse & Swept)
- Step
- Triangle (Triangle, Saw Tooth)
- Exponential Decay
- Straight Lines & Ramps
- Pulse (Rectangular, Triangular, Gaussian, Mono, Manning, Raleigh, Half Sine)
- Frequency Characteristics (Butterworth, Chebyshev & Bessel)
- Actuator (Stepped Sine, Swept Sine)
- Break Points
- Spectrum
- Spectrum from Break Points
- Gaussian Probability Density
- Log Probability Density
- Rayleigh Probability Density
- Sine Probability Density
- Classical Data Windows
- Cosine Taper Window
- Exponential Decay Window
- Force Window

#### Import Data
- Arctan
- ASCII
- Binary
- B & K Pulse
- CATMAN
- Comma Separated Variables (CSV)
- DASLab
- DSA / USAdam
- D3K
- SF (I/O) (Agilent)
- Matlab
- MS Excel
- nCode
- PICO-Log
- Realwave Pocket Analyser
- RES Data
- RIon WAV
- RPC / II / III
- Sony Convert Data
- Store Flex (Racial)
- Syen Log Data
- TAFMmat
- TDM
- Universal File (UFF)
- WAV
- WaveView (Iotech)

#### Math Functions
- Absolute
- Acos, Arccos, Arctan, Arcossec, Arcosch, Accosch, Accos, Arctanh, Arccosh, Arctanh, Arccosech, Arccoth
- Antilog
- Backward & Forward Difference
- Conjugate
- Error Function (ERF)
- Exponential
- Gamma Function
- Inverse Erf
- Linear to dB, dB to Linear
- Log e, Log 10
- Negate
- Nth Integer Root
- Raise To Power
- Reciprocal
- Sin, Cos, Tan, Cosec, Cot
- Sinh, Cosh, Tanh, Cosech, Sech, Coth
- Square Root
- Sum

#### Pulse Analysis
- Angular Vibration of Shaft
- Pulses to Rate
- Pulses to Amount
- Pulse Duration (All Crossings, Pos-Pos, Neg-Neg, Pos-Neg, Neg-Pos)
- Create Speed Signal
- Pulse Crossing Times
- Time Stamp To Pulse

#### Shock Spectral Analysis
- Primary, Residual & Composite
- Linear spacing, Logarithmic spacing & Octave spacing
- Shock Time History (Lin, Log, Octave Spacing)

#### Signal Manipulation
- Add Named Elements
- Amend Control Record
- Append Signal to Dataset
- Apply Classic Window
- Apply Exponential Decay
- Apply Force Window
- Apply Sine/Cosine/Ramp Taper
- Copy Common Length
- Copy Whole Signal
- Copy Section of Signal
- Extract Named Elements
- Include Signals to Dataset
- Join Signals
- Extend by Repetition
- Mesh Test Signals
- Recallibration
- Modify Named Elements
- Repair Signal
- Replace Signal
- Replace Single Named Element
- Reverse Signal
- Signal Quality Check
- Sort Signal
- View Signal History

#### Statistical Counting
- Level Counting
- Peak and Trough Count
- Rainflow Counting (Cycle Peak / Through)
- Rainflow Counting (Cycle Range / Mean)

#### Time Domain Analysis
- Apply Time Window (Auto / Cross Correlation (Logged products or Fourier Transform))
- Convolution in the Time Domain
- Cosine Taper Function
- Ensemble Statistics
- Normalise
- Resample
- Signal Decimation
- Signal Interpolation
- Speed from Vibration
- Statistics

#### Trend Analysis
- Bias removal
- Evaluate Trend (Mean, SD, RMS, skew, kurtosis, MS, M6, Min, Max)
- Trend Removal (Linear Averaging Points, Exponential Averaging & Linear Averaging Duration)

#### Probability Analysis
- Joint Probability Density Function
- Percentile Calculations
- Probability Density Function

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**PROSIG**

[www.prosig.com](http://www.prosig.com)
Pre-build Assessment of Vibration in Tower Block

The customer needs to check whether noise and vibration from an underground train line is going to cause a nuisance in a proposed multi-storey housing block. A sophisticated measuring system based on a triaxial accelerometer is connected to a Prosig P8000, which is used to capture the data. The results of further analysis are used to determine if the noise and vibration of the trains will fall within prescribed limits.

Brake Squeal Evaluation on High Performance Vehicle

The customer uses microphones, accelerometers, thermocouples & pressure transducers attached to a performance vehicle to measure brake squeal events. A Prosig P8020 is used to capture, store and analyse all significant events during a two hour road test. Sophisticated pre- and post-trigger capture along with data visualisation in DATS helps to achieve a better understanding of brake squeal. The Prosig system was selected after similar competitive systems were unable to cope with the environmental and capture/analysis requirements.

Assessment of Human Exposure to Vibration

A Prosig P8004 and the DATS Human Biodynamics Analysis Suite is used to make assessments on the exposure of the human body to vibration data. The data is captured on a moving train. Health and comfort criteria are calculated according to various ISO standards and provided to the user in the form of standard reports. The end-user has used many of the results in expert testimony work in legal cases.

Testing in Low Temperature Transonic Wind

A high channel-count P8048 system is used to capture the vibration signals from an aircraft model sited in a wind tunnel that can operate at temperatures as low as -261°C and flow speeds as high as Mach 1.3. Strain and acceleration measurements at various locations on the body of the model are taken over a preset range of tunnel conditions. An additional 8-channel Prosig system monitors the real-time forces and moments experienced by the balance gauge mounted inside the model.

Monitoring Flow in New Domestic Water Meter

Prosig have supplied a turnkey industrial monitoring system that measures the accuracy of an innovative new design of domestic water meter. A P8020 system is used to capture pre-conditioned fluid pressure waveforms together with other test rig control parameters such as temperatures and pressures. Advanced pulse analysis software in DATS analyses the captured signals and produces detailed reports that compare meter performance at different flow rates under various test conditions.

Measurement of Vibration and Pressure in Rocket Motor

The digital control lines from the firing control sequence from solid propellant rocket motors are used to control a Prosig P8048, which measures vibration and pressure signals. The P8048 system is configured with a digital control module and custom acquisition software for transducer calibration, automatic data structuring and rocket test sequence measurement.

Evaluation of Vibration in Industrial Packaging

A Prosig system is used to simultaneously capture CAN-bus data and vibration signals on an industrial robot. The robot is controlled by a CAN-bus and the Prosig P8000 measures the relationship between sending commands to the robot and seeing the vibration effects caused by the displacement of the hydraulics. The combination of CAN-bus and vibration measurement make the P8000 an ideal fit for this application.

Investigation of Road Surface Materials

The customer uses a Prosig P8004 connected to a custom triaxial accelerometer to study tarmac surfaces. As a car moves over a road it causes a ripple in the road surface. DATS is used to derive displacement from the measured accelerations. The results are used to study different types of surface and changes due to humidity and temperature. The goal is to find a surface that does not flex and break, but is not too rigid.

Motorcycle Helmet Compliance Testing

A weight is dropped on to a motor cycle helmet mounted on a dummy head. The acceleration of the weight and helmet is measured. Different accelerations profiles must be achieved for different test standards. The DATS Biomechanics software is then used to check if test has met the required profile and to verify whether the helmet meets the necessary standards.

Testing Seats Against ISO/ANSI Standards

A Prosig P8000 system is used to measure vibrations at defined points on seat designed for commercial / industrial / agricultural vehicles. The seats are tested on a 3-axis shaker rig while suitably loaded. The DATS Human Response software is then used to check that the seat complies with the relevant standard.

USER

Some of the real life stories of how our users benefit from using Prosig systems
ADD ONS
Optional measurement & analysis packages

NVH
Rotating Machinery
Modal Analysis
Acoustic Analysis
Human Response
Audio Replay
Multiplane Balance
Fatigue & Durability
Time-Frequency
Source Path Analysis

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THE EXPERTS IN NOISE & VIBRATION MEASUREMENT

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