

# SO Analyzer

## Dynamic Signal Acquisition and Analysis

m+p international's SO Analyzer acquires multichannel FFT and time data while displaying the data in real time for general FFT analysis and optional structural analysis, rotating machinery, acoustics and many other advanced applications. Acquisition, analysis and reporting are integrated within a common user interface for ease of use, and requiring a minimum of training.

### Key Features

- Real-time data acquisition, analysis and reporting in one package
- MS Windows like user interface
- Wizard-driven set-up of all measurement parameters for quick and easy operation
- Free installation of the SO Viewer to actively view/analyze data on any MS Windows/Office PC
- Supports a range of front-end hardware for maximum system flexibility, from the 4/8-ch portable VibPilot to hundreds of input channels for highest lab performance

### DSA Standard

#### Data Acquisition

- Multi-channel FFT and time history data acquisition
- Continuous or triggered measurements
- Peak and rms time history data reduction
- Real-time acceleration to velocity and displacement computations
- Display and storage of all intermediate results

#### Time History Recording

- Time recording to memory or file, limited to 2 M samples per channel, max. 16 channels

#### Data Analysis

- High-resolution online FFT analysis using the 2D/3D viewers of the SO Analyzer Core e-Reporter
- Copy & paste ActiveX elements to MS Word and PowerPoint
- Data import and export for \*.UFF, \*.SOT, \*.RPCIII file format
- Data import for m+p VibControl file format

### DSA Pro

includes all DSA Standard features plus:

#### Time Recorder

- Unlimited throughput to disk acquisition with scheduled recording
- Typical throughput of 50 KSamples/second for 48 channels
- Online display of time or spectrum data while recording

#### Post-Processing

- Analysis of large measured or imported time data files
- Wide range of analysis functions with up to 100,000 spectral lines (FFT, PSD, FRF etc.)
- Automated, comprehensive test reporting using the Reporting Wizard
- User programming for automation of tasks
- All data import/export filters
- Calculator

### DSA Add-Ons

- Real-Time Acoustic Analyzer
- Additional Input Channel Drivers

### Applications

- Multichannel recording of vibration signals
- Rugged portable, mobile and stationary systems
- Online and offline analysis in the time and frequency domain

## Overview

The Windows based Dynamic Signal Acquisition and Analysis software uses intelligent wizards that guide the user step by step through the process of data acquisition and analysis. Alternatively, the user can access any set-up menu directly for faster operation.

Data management is done with the central e-Reporter. For displaying data it uses 2D and 3D/Waterfall viewers. The viewers are the same for both the acquisition and the analysis process. A 2D viewer can show single or multiple data records. The Waterfall viewer's main purpose is to show time variances of multiple sequentially acquired data blocks. Both viewers offer a multitude of analysis functions like cursors, mathematical operations and data cuts. Data can also be copied from the viewers and pasted to ActiveX applications like MS Word or PowerPoint, providing the same user interface in those applications.

## General Data Acquisition and Time Recording

Multichannel data can be acquired as blocks of data or as continuous time data streams. Blocks can be stored as single or averaged functions like spectrum, PSD etc. while time recording provides gap-free storage of time domain data. For time records above 2M samples data are stored directly to disk<sup>1</sup>.

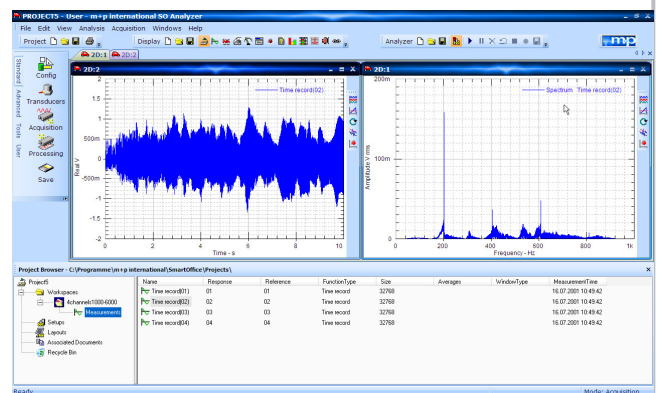
Data can be viewed online or offline in user-configurable windows.

All intermediate results (calculated functions) can be visualized in real-time on any measurement channel. This allows, for instance, to monitor time data, windowed time data, power spectra etc. while measuring a frequency response function. The calculated functions can also be saved. User-definable header information (metadata) can be entered and then be used as annotation in the 2D viewer during measurements or for offline analysis.

### Acquisition Setup

The available parameter options are defined by the individual frontend specifications.

- Unlimited and freely definable list of user-specific header information (metadata) for annotation, data retrieval, sorting and reporting
- Simple parameter entry for the channels in tables including engineering units, transducer calibration data and inputs
- Channel type: excitation, response, inactive; DC or AC coupled; input range, offset, pregain, acoustical weighting; FIR weighting filters hand, arm, body, user defined
- Channel input: V, ICP, Charge
- Enter transducer calibration data or import from Excel
- Source modes: random, burst random, periodic random, sine, stepped sine, burst sine, chirp, sine sweep, multiple level controlled fixed/swept sine and random
- Acquisition setup: sample rate or useful bandwidth, blocksize, arming
- Trigger modes: freerun, source, channel, pos./neg. slope, zone entry/exit; level, pretrigger view up to 100%
- Data processing: time record, spectrum, autopower, crosspower, PSD, cross-PSD, FRF, coherence, autocorrelation, crosscorrelation, histogram, probability distribution, probability density, impulse response
- Averaging: none, linear, exponential
- Windows: Uniform, Hanning, Hamming, Flattop, user definable force and exponential
- Throughput to disk<sup>1</sup>: total acquisition time, storage location on disk, throughput period and sequencing interval
- Autoranging: instant graphical feedback, automatic/manual ranging, range up only
- Overload handling: ignore, retry or break
- Save and recall measurement and display setups
- Save calculated functions
- Calibration: calibrate transducers and update calibration database, calibrate offset



<sup>1</sup> DSA Pro only

## General Data Analysis

The SO Analyzer DSA software supports a large number of analysis functions. The analysis functionality and the user interface are the same for acquisition and analysis. Data can be directly measured by the SO Analyzer or imported from other systems. The SO Analyzer allows interfacing with many third-party N&V data acquisition systems. Octave analysis, acoustic intensity analysis and sound quality are available as add-ons.

- High-resolution FFT analysis
- Copy & paste to ActiveX applications
- Data import/export

### Analysis with the 2D Viewer

- Same display functionality online and offline
- Unlimited number of displays and unlimited number of traces per display
- Change appearance of chart, plot area, axes, grids, traces, cursors
- Add header information to display
- Y-axis type: real, imaginary, amplitude, phase, log, dB, real+imaginary, amplitude+phase, log+phase, dB+phase, Nyquist
- Y-axis scaling: autoscale, free, fixed, rms, peak, peak-peak with automatic data conversion
- X-axis type: lin, log, octave
- X-axis scaling: autoscale, free, fixed
- Unlimited number of cursors
- Cursor functions: harmonic, nudge, seek to peak, seek to max, show value, show difference, RMS and Q factor calculation between/at cursor(s)
- Display calculator functions: acoustic weighting and unweighting, 1/1 and 1/3 octave, fft, integrate, differentiate, square root, orbit
- Tacho/frequency readout from time data
- Least squares fit analysis

- Amplitude distribution statistics: standard deviation, skewness, kurtosis
- Zooming, scrolling and rescaling with mouse, scroll mouse or keyboard entry
- Data cuts
- Export to clipboard for Excel import

### Analysis with the 3D Viewer

- Same display functionality online and offline
- Unlimited number of displays and up to 1024 traces per display
- Change appearance of chart, plot area, axes, grids, traces, cursors
- Traces as line, plate, shaded plate, surface, shaded surface, bar, shaded bar, 2D color plot XZ and ZX, colors configurable
- XYZ cursors and harmonic cursors
- Y-axis: real, imaginary, phase, log, dB; rms, peak and peak-peak scaling
- X-axis: lin, log, octave, order
- Z-axis: rpm, time, order, Z, record number
- Zooming and rescaling with the mouse
- 3D viewer for analog tacho inputs on any number of channels for RPM spectral maps and manual order tracks.<sup>1)</sup>

## Post-Processing<sup>1)</sup>

The additional Post-Processing function of the DSA Pro software provides the same advantages and functionality as the acquisition setup, with record size and sample rate being predefined.

- Simultaneous processing of multiple data sets (channel data)
- No limits on input sample rate, size or number of channels

<sup>1)</sup> DSA Pro only

## Real-Time Acoustic Analyzer (DSA Add-On)

The DSA Add-On Real-Time Acoustic Analyzer supports real-time octave analysis.

### Acquisition Setup

- Time domain based octave analysis, compliant with ANSI S1.4 and IEC 60651
- Octave spacing: 1, 1/3, 1/6, 1/12, 1/24
- Internal or external A/B/C weighting filters
- Start and stop frequency
- Response: fast, slow, impulse, custom, linear avg., LEQ

- Averaging: none, peak OASPL, peak bands, linear

### Post-Processing<sup>1)</sup>

- Same as Acquisition, with record size and sample rate being predefined

## Operating System

- Microsoft Windows XP/Vista/7

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<sup>1)</sup> DSA Pro only

**Germany:** m+p international GmbH · Phone: (+49) (0)511-85603-0 · Fax: (+49) (0)511-85603-10 · [sales.de@mpihome.com](mailto:sales.de@mpihome.com)

**USA:** m+p international inc. · Phone: (+1) 973 239 3005 · Fax: (+1) 973 239 2858 · [sales.na@mpihome.com](mailto:sales.na@mpihome.com)

**Great Britain:** m+p international (UK) Ltd · Phone: (+44) (0)1420 521222 · Fax: (+44) (0)1420 521223 · [sales.uk@mpihome.com](mailto:sales.uk@mpihome.com)

**France:** m+p international Sarl · Phone: (+33) (0)130 157874 · Fax: (+33) (0)139 769627 · [sales.fr@mpihome.com](mailto:sales.fr@mpihome.com)

**China:** Beijing Representative Office of m+p international · Phone: (+86) 10 8283 8698 · Fax: (+86) 10 8283 8998 · [sales.cn@mpihome.com](mailto:sales.cn@mpihome.com)