

# SmartOffice

## Dynamic Signal Acquisition and Analysis

m+p international's SmartOffice Dynamic Signal Acquisition and Analysis Platform acquires multichannel FFT and time data while displaying the data in real time for general FFT analysis, structural analysis, rotating machinery, acoustics and many other 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 SmartOffice Viewer to actively view/analyze data on any MS Windows/Office PC
- Supports a range of front-end hardware for maximum system flexibility, 4 ch portable to hundreds for highest lab performance

#### General Data Acquisition

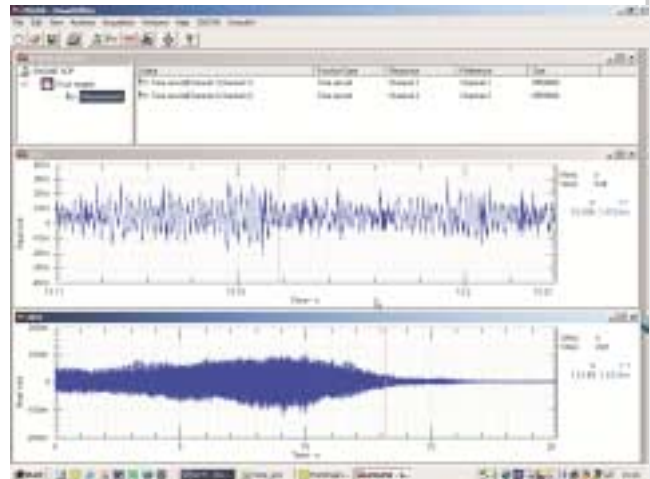
- Continuous or triggered measurements
- Multiple Input/Multiple Output (MIMO)
- Online FFT and Octave analysis
- Acoustic Intensity analysis
- Online analysis and display of all intermediate results

#### Time Recorder

- Throughput to disk acquisition of large time records for postprocessing, replacing conventional tape recorders
- Online display of time or spectrum data while recording
- High throughput rate to disk

#### Postprocessing

- Large range of analysis functions
- Analysis of large measured or imported time data files
- Offline FFT and Octave analysis
- High resolution FFT with data block size of up to 262.000
- Automated, comprehensive test reporting using the e-Reporter
- Copy & paste to ActiveX applications
- Data import/export for standard applications like Excel and MATLAB
- Automation of repetitive tasks



### Applications

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

The SmartOffice Dynamic Signal Acquisition and Analysis software supports sources for single or multiple outputs, addressing MIMO (multiple input/multiple output) applications. Multiple reference data are collected in a real time MIMO mode. The post-processing module analyzes measured or imported time data, including octave analysis and acoustic intensity. The same 2D viewer that is used in the SmartOffice e-Reporter is also used for acquisition and analysis.

The SmartOffice e-Reporter also provides functionalities like copy & paste a 2D display to ActiveX applications such as Microsoft Word and PowerPoint, a calculator for standard and complex mathematical operations, geometry creation, ODS analysis, Visual Basic compatible programming and data interfaces to standard applications like Matlab and Excel.

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.

## 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 to the local disk or to a front-end memory. SmartOffice supports throughput rates such as 50 KSamples/second for 32 channels to standard PC disk drives. One or more sources can also be active during acquisition.

Data can be viewed in real time or in post-processing in user-configurable windows. It is also possible to play back and analyze data with a stand-alone SmartOffice system using the postprocessing module that does not require a frontend connection.

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 and reporting.

### 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
- Channel input = V, ICP, Charge
- Enter transducer calibration data or import from Excel
- Source modes: random, burst random, sine, stepped sine
- 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
- Time domain based octave analysis 1, 1/3, 1/6, 1/12, 1/24 with time constant from 0.1 s to 10 s and weighting functions A, B or C
- Acoustic intensity: set density, distance
- Averaging: none, linear, exponential
- Windows: Uniform, Hanning, Hamming, Flattop, user definable force and exponential
- 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

## Post-Processing

The Postprocessing option supports a large number of analysis functions: time (raw and windowed), spectrum (instantaneous and averaged), auto- and crosscorrelation, auto- and crosspower (instantaneous and averaged), auto- and crosspower density (instantaneous and averaged), frequency response function FRF, coherence, impulse response, principal input spectra, histogram, probability density and probability distribution. The analysis functionality and the user interface are the same for postprocessing and acquisition. Octave and acoustic intensity analysis are available as options.

Data can be directly measured by the SmartOffice analyzer or imported from other systems\*. The SmartOffice Dynamic Signal Acquisition and Analysis system allows interfacing with many third-party N&V data acquisition systems.

### Post-Processing

- Data import\*
- Simultaneous processing of multiple data sets (channel data)
- No limits on input sample rate, size or number of channels
- Enter user specific header information (meta data); the layout for the data entry is user definable
- Entry of channel names and engineering units
- Acquisition setup: blocksize, arming, digital filtering (Butterworth hi-, low-, bandpass)
- Data processing: time record, spectrum, autopower, crosspower, PSD, cross-PSD, FRF, autocorrelation, crosscorrelation, histogram, probability distribution, probability density, impulse response
- Averaging: none, linear, exponential
- Windows: Uniform, Hanning, Hamming, Flattop, Exponential
- Overlap 0-100%; define time record range
- Octave processing: 1/1, 1/3, 1/6, 1/12, 1/24; A, B, C weighting; define frequency range
- Acoustic intensity analysis: 2D and color coded single plane display, different color codes for positive and negative directions, 100 dB color code range, instantaneous update of color plane display with 2D cursor movement, conversion to octave spacing using the SmartOffice e-Reporter's Calculator
- Save and recall analysis setups
- Save calculated functions

### 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, fft, integrate, differentiate, square root, orbit
- Zooming, scrolling and rescaling with mouse, scroll mouse or keyboard entry

### 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
- 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

## General Information

### Operating System

- Microsoft Windows NT/2000/XP

### Ordering Information

- SO-2011 Dynamic Signal Acquisition and Analysis bundle includes:
  - SO-1202 e-Reporter
  - SO-1302 DSA Measure
  - SO-1312 Time Recorder
  - SO-1352 DSA Post-Test

### Optional SmartOffice Software Modules

- SO-1313 Stepped Sine
- SO-1402 Impact Testing
- SO-1412 MIMO Measure
- SO-1452 Modal Analysis
- SO-1502 RPM Measure (Rotating Machinery)
- SO-1552 RPM Post-Test (Rotating Machinery)
- SO-1602 Acoustic Measure
- SO-1603 Pass-by-Noise
- SO-1612 Acoustic Intensity
- SO-1652 Acoustic Post-Test
- SO-1752 SRS Post-Test
- SO-1762 Sine Reduction Post-Test
- SO-1772 Random Reduction Post-Test

\* see the m+p international SmartOffice e-Reporter Product Information.

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