

Sound & Vibration: Software and Hardware



PREMAX MEASUREMENT INSTRUMENTS

Alternative Hardware solutions.

Type MI-7008: 8 input channels and 2 wave source output channels



Type MI-7016: 16 input channels and 4 wave source output channels



Overview

Our offer is a popular integrated solution for measurement and analysis of vibration and noise, environmental data reduction, acoustics octave, order tracking, modal test. It is designed based on distributed processing structure, integrating the up-to-date technology of multi-DSPs computation, low noise hardware design and data transmission.

Its USB 2.0 connectivity ensures easy PC connectivity and high-speed disk throughput. AVANT also presents engineers versatile and flexible software applications, helps them to get measurement results and generate report easily and quickly.

Features

Real-time Processing is a solid analyzer independent of PC. Based on its superior DSP computation, you can see your analysis results instantaneously on-screen as they are measured, thus enabling you to validate your data immediately.

Superb Accuracy All inputs have 24-bit resolution, and additional analog and digital anti-alias filters protection are effective to assure the data integrity.

Powerful and Flexible is a powerful platform for multiple tasking analyses; also it can perform FFT or other different analysis simultaneously on the same or different channel or signals..

Easy to Use With quick and easy measurement setup, you can learn to use its software easily and get results instantly. And it is easy to be connected with any PC thru USB 2.0 Connectivity as a true USB device.

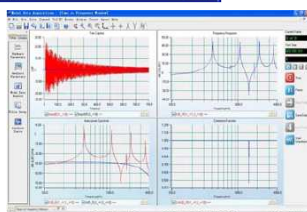
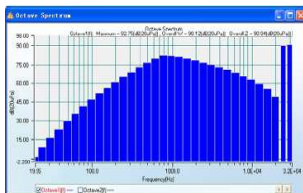
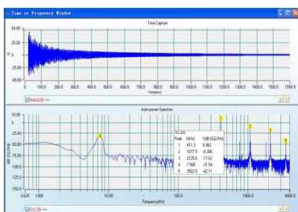
Portable Only weighs below 5kg, with its solid rugged design and the ability to record data in high frequency and accuracy, you can carry it from field to lab. AVANT tackles data acquisition in vehicle, aircraft and any industrial environment with ease and efficiency.

Application

- Real-time Signal Analysis
- Waveform Source GEnerator
- Data recording & Playback Analysis
- Modal Analysis
- Machine Diagnostics (Order Tracking)
- Transient capture and Shock Response Spectrum (SRS) Analysis
- Acoustic analysis and Sound Power)

General Options

- Automatic Word Test Report Generation
- Data and File Management
- Signal Calculator
- Annotated Cursor Indicator
- MATLAB Interface



Technical data

Inputs

Analog channels	8 or 16 synchronized
Filtering	Independent analog anti-alias filter and 160dB/Octave digital filter for each channel
Resolution	24-bit
Voltage range	±10 VPEAK
Coupling mode	AC, DC, ICP, TEDS(option)
Dynamic range	110dB
THD	<-95dB
Channel match	±0.5 degree phase ±0.05dB amplitude
Signal-to-noise	>100dB
Frequency accuracy	0.0075%
Sampling rate	192kHz/channel
Input impedance	220kΩ
PC Connection	USB2.0 Windows 2000/XP/Vista

Outputs

Channels	2 to 4 Channels (waveform sources)
Filtering	Independent analog anti-alias filter and 160dB/Octave digital filter for each channel
Resolution	24-bit DA converter (DAC)
Voltage range	±10 VPEAK
Dynamic range	> 110dBfs, 100dB min. in FFT mode
Frequency range	20kHz
Amplitude resolution	0.5mV(≤100mV) 0.05dB(> 100mV)
Frequency accuracy	0.005%

Operating

Temperature	41 to 113 °F / -10 to 50 °C
Humidity	20% to 90% RH non-condensing (40 °C)
Power supply	AC Power DC 9 to 36 Volts
Consumption	MI-7008: 30W MI-7016: 60W
Compliance	CE Marking

Triggering

	Input channel or no trigger
Slopes	Positive, negative or bi-polar
Level	Voltage level within voltage range
No trigger mode	Free run or manual run, time delay

Trigger mode	Pre-trigger or post-trigger
Run mode Free	Run after First Trigger Manual Trigger Every Frame Auto Trigger Every Frame

Waveform Source

Setup parameters	DC, Sine, Square, Triangle, Impulse, Swept Sine, White Noise, Chirp, Pseudo
Controls	Amplitude, Frequency etc.

Status displays	Running time, frames, running status
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Signal calculator	All signals are calculated and displays on line during test
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Feature	add/subtract/multiply/divide, square, histogram, window, correlation etc.
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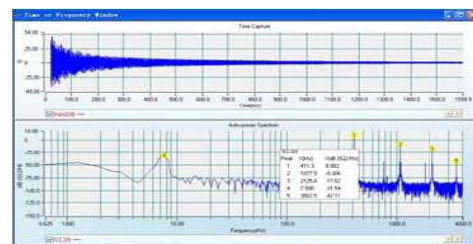
Real time signal analysis

Signal Analysis

Time domain	Time capture, correlation, orbit plot, oscillograph
Frequency domain	FFT, power spectrum, FRF, coherence, polar plot, octave analysis
Amplitude domain	Histogram
Channel calculation:	Single/double integral and differential
Averaging	Time domain or Frequency domain
Types	Exponential, Linear, Peak hold
No. of averages	1 to 100,000 frames
Data Reject	Reject data manually; Reject overload data automatically or manually;

Spectrum Analysis

Span	Up to 76800Hz
Lines	50, 100, 200, 400, 800, 1600, 3200, 6400, 12800
Window	Rectangle, Hanning, Hamming, Exponential, Bartlett, Welch, Tukey, Blackman, Blackman Maximum, Blackman Minimum, Flat-Top, Kaiser-Bessel
Capture	Sampling frequency Up to 192kHz
Points	128, 256, 512, 1024, 2048, 4096, 8192, 16384, 32768
Overlap	12.5%, 25%, 37.5%, 50%, 62.5%, 75%, 87.5%



Signal display

	Single pane, two pane, four pane, thumbnails
Display content	signals, color and line, marks etc.
Waterfall display	3-D or color graph; number and interval of frames can be set
Cursors	Single or dual with X1, Y1, X2, Y2, power, ΔRMS, Cursors in different panes, synchronized moving
Harmonic cursor	Marks and auto-calculate THD
Peak/valley cursor	Auto-detection and marks

Test Report

	customized, contains parameters, panes, template customized, etc.
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Data saving

Save contents	On-line save and auto save Signals and panes
Signal file formats	ECON binary/ASCII or UFF binary/ASCII
Data export	Excel, MATLAB
Data recording	Used for offline analysis

Transient Capture and Real time signal analysis

Test Types

Types	Based on classical shock or SRS
Classical shock	Setup ideal waveform and RRS; contains shock test, Impact test and general type Setup SRS profile

SRS

Transient Capture

Sampling frequency	Up to 192kHz
Acceleration range	Up to 100,000gn
Pulse duration	0.5 to 1,000ms
Sampling time	1, 2, 5, 10, 20, 50, 100, 200, 500, 1,000, 2000, 4000, 7000, 10000, 13000, positive, reverse

Direction

Ideal waveform

Waveform	Half-sine, trapezoid, terminal peak sawtooth
Standard	GB, GJB, ISO, MIL810
Tolerance	According to each standard
Auto-match	the acquired data matches ideal waveform
Comparison	compare acquired data with ideal waveform

RRS

Resolution	1/1,1/2,1/3,1/6,1/12,1/24 octave analysis
Parameters	Damp coefficients and Q, lower/upper/reference frequency Calculate SRS automatically from ideal waveform or set RRS manually, compare measured SRS with RRS

SRS definition

Comparison

SRS Profile

Resolution	1/1,1/2,1/3,1/6,1/12,1/24 octave analysis
Parameters	Damp coefficients and Q, lower/upper frequency
Profile definitions	setup frequency, amplitude, lower/upper tolerance of breakpoints in the
Comparison	compare measured SRS with RRS

Filtering

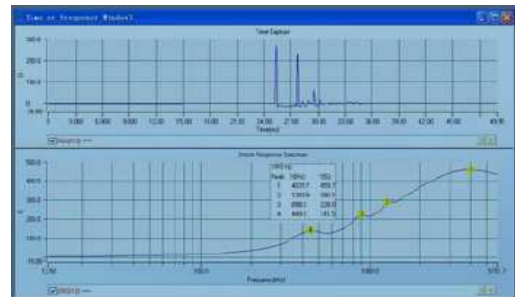
Filters	Low-pass and high-pass filters
Low-pass filters	Set cutoff frequency or filter rate
High-pass filters	Enable or disable

Triggering

Source	Input channel or no trigger
Slopes	Positive, negative or bi-polar
Level	1 to 99% of ideal waveform or acceleration
Trigger mode	Pre-trigger or post-trigger
Run mode	Free Run after First Trigger Manual Trigger Every Frame Auto Trigger Every Frame
Remove DC	Enable or disable
Remove noise	Enable or disable

Measurement Controls

Controls	Start/stop, pause/continue, next frame
Status displays	Running time, frames, running status
Low-pass filters	Set cutoff frequency or filter rate
High-pass filters	Enable or disable



Shock measuring and analysis

You can capture the shock pulses easily and simultaneously when shock or impact event happens. And besides time domain analysis, you can use shock response spectrum (SRS) to estimate the potential damage due to peak values on different natural frequencies in shock. ISO, MIL-STD-810 criterions of tolerance are available. Detailed specifications are given below.

Measurement Controls

Controls	Start/stop, pause/continue, next frame
Status displays	Running time, frames, running status

Test Report

Content	customized, contains parameters, panes etc.
Report template	customized

Data saving

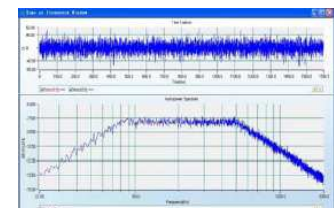
Save modes	On-line save and auto save
Save contents	Signals and panes
Signal file formats	ECON binary/ASCII or UFF binary/ASCII
Data export	Excel, MATLAB

Data recording

Playback	Used for offline analysis Replay shock waves manually
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Data Recorder and Playback

We provide over 8M sample/sec throughout rate based on USB 2.0 connectivity to any PC. It can record and transmit all channels' raw data rapidly and continuously to a USB equipped PC. Playback analysis software can run on any computer without analyzer, all analysis content and analysis parameters just like on-line functions. Data format binary or ASCII, all channels data recording up to 96kHz sampling rate



Waveform Source

This module is used to generate multiple types of wave source to excite external equipments. It can generate Sine, Square, Triangle, Swept Sine, White Noise and so on. You can set amplitude and frequency range of them

Modal Analysis

Analysis

FRF/Coherence Between excitation and response channels
Spectrum analysis auto power spectrum, cross power spectrum

Excitation From impact hammer or shaker excitation
Sampling frequency Up to 192kHz
Frame size Up to 32768
Specified window Force/Exponential window,
Set different windows for each channel

Modal coordinate Set number, direction, window for each point

Auto-increment Auto-calculate numbers of next group
Playback analysis Replay data frame one-by-one, re-edit and select data

Analysis

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Triggering

Source Input channel or no trigger
Slopes Positive, negative or bi-polar
Level Voltage level within voltage range
No trigger mode Free run or manual run,
time delay is available

Trigger mode Pre-trigger or post-trigger
Run mode Free Run after First Trigger
Manual Trigger Every Frame
Auto Trigger Every Frame

Averaging

Domain Time domain or Frequency domain
Types Exponential, Linear, Peak hold

Filtering

Low-pass filters Set cutoff frequency or filter rate

Measurement Controls

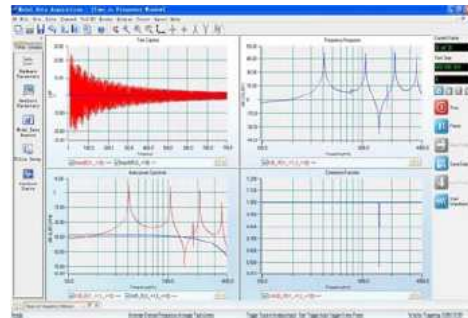
Controls Start/stop, pause/continue, next frame
Status displays Running time, frames, running status

Data saving

Save contents Time Capture, FFT, Coherence Function,
Correlation, FRF and Power
Save formats ECON binary/ASCII or UFF binary/ASCII
ME'Scope ASCII Spreadsheet
File formats Save the file according to single signal, signal type or test point

Modal data acquisition

This tailored module is available for both impact hammer and shaker excitation. With flexible triggering and a graphically adjustable Force/Exponential window, it is easy to set up and acquire data using an impact hammer. For shaker excitation, a variety of source waveforms, including shaped random and burst-random, pseudorandom, and chirp provides the optimal signal to give the best FRF measurements possible. Moreover, this module supports varied data saving file formats which are easily compliant with popular modal packages.

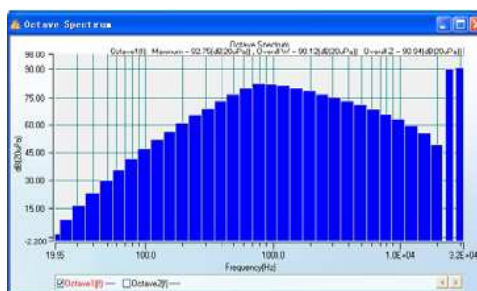


Acoustic Analysis

Sound pressure analysis	
Conform standard	IEC 61672-1 (2002-05) Class 1
	IEC 60651(1979) plus Amendment 1(1993-02) and Amendment 2:(2000-
	IEC 60804 (2000) Type 1
	IEC 61252 (1993) plus Amendment 2000
	IEC 61260 (1995-07) plus Amendment 1(2001-09) Class 0
	ANSI S1.4-1983 plus ANSI S1.4A.1985 Amendment Type 1
	ANSI S1.43-1997 Type 1
	ANSI S1.11-2004, 1/1-octave Bands and 1/3-octave Bands Class 0
Analysis Content	
Signals	Time domain, FFT, Auto power spectrum, Octave
Analysis	Instantaneous Sound Level, Equivalent Sound Pressure Level, Day-night Equivalent Sound Pressure Level, Sound Exposure, Sound Exposure Level, Noise Dose, Percentile Level and so on
Analysis parameter	
Resolution	1/1,1/3,1/6,1/12,1/24 octave analysis
Lines	400, 800, 1600, 3200, 6400, 12800
Frequency range	From 10Hz to 20,000Hz
Weighting	A, B, C, D and Linear
Window	Rectangle, Hanning, Hamming, Blackman, Flat-Top
Detector	RMS detector and peak detector
Averaging	Exponential, Linear, Peak hold
Level histogram	Defines level segment
Integral Parameters	
Occupational health parameters	Exposure Time, Reference Time, Threshold Level, Criterion Level,
Lden Periods parameters	Day Start, Evening Start, Night Start, Day Start, Evening Start, Night Start, Evening Penalty, Night Penalty
Percentile	Level parameters, Setup Percentile
Sound power analysis	
Analysis Content	Signals Time domain, FFT, Auto power spectrum, Octave
Standard	GB 6882-86
Surface type	Ball, Hemisphere, Parallel Plane, and User Defined
Test process	Exponential, Linear, Peak hold
Analysis Parameters	Instantaneous Sound Level, Equivalent Sound Pressure Level, Day-night Equivalent Sound Pressure Level, Sound Exposure, Sound Exposure Level, Noise Dose, Percentile Level and so on

Sound Level Meter and RT Sound Analyzer

Acoustic analysis offers sound field to lab. It provides 1/n octave filter functions compliant with ANSI S1.11-1986 criterion, and A, B, C, D or linear weighting are available.



AVANT Integer provides a perfect solution for field measurements. It integrates a high performance dynamic signal analyzer with an embedded microcomputer, so as to simplify complicated measurement setup, and more important, to essentially enhance the reliability. Engineers may start a desired measurement immediately anytime on field, with its solid touch screen operation, easy to use software components, plus wireless communication capability. AVANT Integer is your hands on assistant for field measurements.

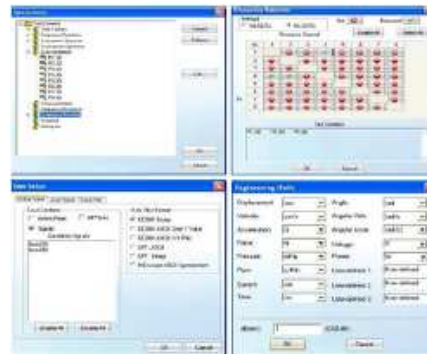


Auxiliary application

Cursors and Annotation

You can take advantage of cursor, zoom, and annotation features.

Single, dual, peak/valley and harmonic together with dynamic markers make it simple to precisely quantify test results. Also you can use linked cursor movement to synchronize the cursor position on multiple display panes. Additionally, annotation can be inserted anywhere on a plot for a permanent record of on-the-spot analyses.

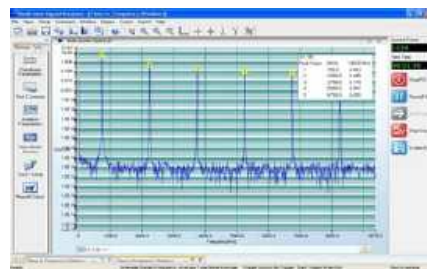


Signal Calculation

This tool helps you to calculate signal using mathematical calculation like addition, subtracting, division and multiplication etc.

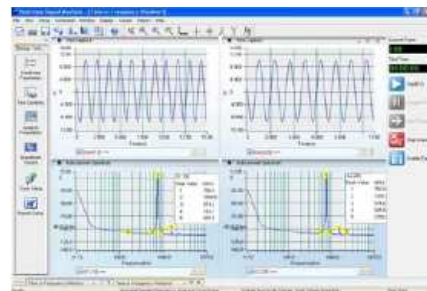
And you can perform power spectrum calculation of IFFT, FFT.

Moreover, you can integrate or differentiate time domain signal.



Graphical Program Interface

User definable and friendly graphical program interface shortens learning curve and makes it easy to get test results

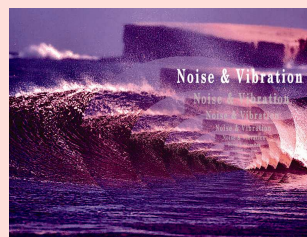


Quick Test Report Generation

AVANT can rapidly generate a professional test reports for you just by "one click", ready for distribution on-line or printing.



SCS-EUROACOUSTIC srl
 Italia: Office – via Antoniana 278
 35011 Campodarsego PD – IT
 Tel. +39 049 9200 975 / Fax +39 049 921 8805
 Italia: Laboratory – via Gandhi 13
 10051 Avigliana TO – IT
 Tel. +39 011 9348 714 / Fax +39 011 9348 703
<http://www.scs-controlsys.com>
info@scs-controlsys.com



ASIA-PACIFIC area

Hong Kong LUCA Consulting Co.,Ltd
 UNIT 1A 2/F - FU TAO BLDG- 98 ARGYLE MONGKOK-KL
 Hong Kong - Tel and Fax: +86 020 61396510
max@luca-consul.com

Scientific and Technical Services &
 Edge Top Consultancy