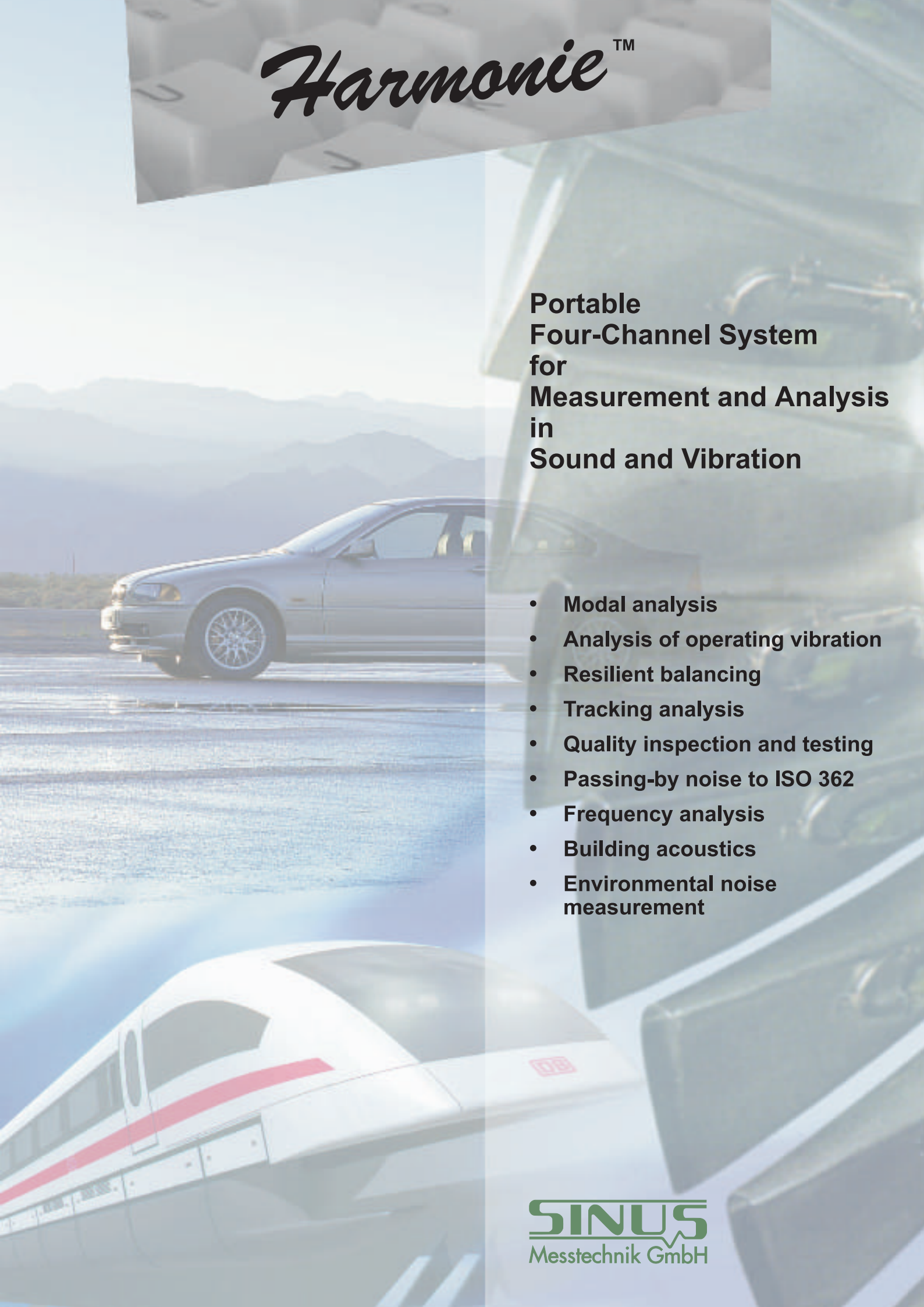
Harmonie™



Portable Four-Channel System for Measurement and Analysis in Sound and Vibration

- Modal analysis
- Analysis of operating vibration
- Resilient balancing
- Tracking analysis
- Quality inspection and testing
- Passing-by noise to ISO 362
- Frequency analysis
- Building acoustics
- Environmental noise measurement

SINUS Messtechnik GmbH

Harmonie™

Four-Channel System for Sound and Vibration Measurement and Analysis in Mobile and Stationary Applications

This powerful and versatile system features small dimensions and minimum power consumption. Its integrated sensor interface allows commonly used sensors to be connected. It is prepared for the Smart-Sensor interface standard.

Apart from four input and output channels for highly dynamic signals, Harmonie has additional inputs for rotational speed and slowly-fluctuating operating data. This makes Harmonie especially suitable for measurements in vehicles and on test stands.

Harmonie was developed for use in the following fields:

- **Car manufacturers and their subcontractors**
  - **Design and development**
  - **Quality assurance**
- **Engineering services**
- **Environmental and labor protection**

- **Frequency analysis**

  Real-time 1/1-1/3 oct-band analysis, FFT, auto and cross spectra, transfer function, coherence • Cantilever to ISO 9052 • Transient analysis module • Psychoacoustics module • Sound recording

- **Sound intensity**

  Active and reactive intensity in real-time • Determination of sound power to DIN ISO 9614 • Real-time FFT • Sound recording

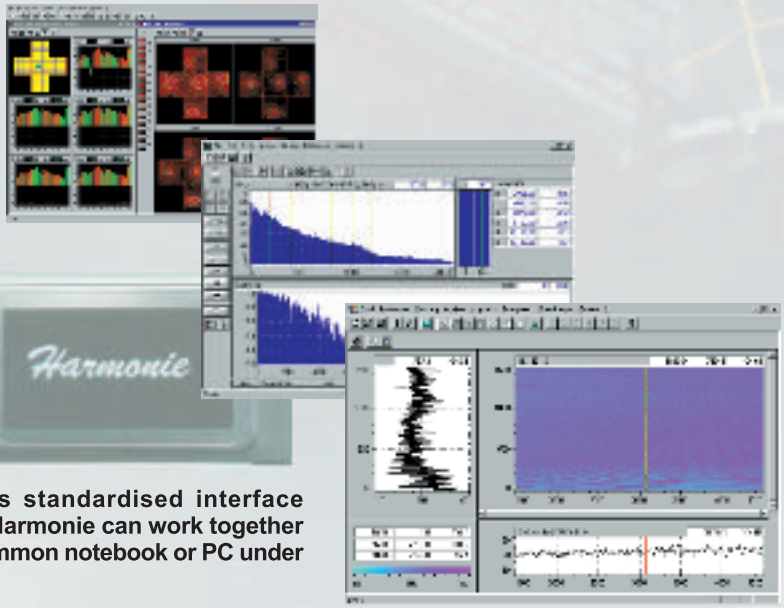
- **Building acoustics**

  Airborne and impact sound transmission loss to ISO 717, ISO 140, DIN 52210 • Measurement of reverberation time by the noise and pulse methods • Real-time 1/1-1/3 oct-bands • Signal generator • Sound recording

- **Environmental noise measurement**

  Noise monitoring • Long-term measuring system • Real-time 1/1-1/3 oct-bands • Triggered sound recording • Approved for verification

SINUS Messtechnik offers complete modular software packages from competent partners which meet the demands of a wide range of applications. Apart from the hardware, a clearly-documented driver interface for Windows 95/98/NT is available on demand for user-specific applications.



Through its standardised interface (PCMCIA), Harmonie can work together with any common notebook or PC under Windows®.

- **Modal analysis**

  Geometry editor • SDOF, MDOF and Handfit • Structure modification
- **Analysis of operating vibration**

  Determination of vibration modes in frequency and time • Visualisation by geometry and animation modules
- **Resilient balancing**
- **Tracking analysis**

  Measurement of vibration and speed signals • Evaluation and visualisation of waveforms, tracking and FFT spectra as well as 1/1-1/3 oct-band spectra • 3D-waterfall and colour graphs
- **Passing-by noise to ISO 362**
- **Quality inspection and testing**
- **Harmonie-Toolbox for Matlab™**

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Technical Specification

- Class 1 to IEC 651/804
- 4 input channels for microphones and ICP sensors
- 120 dB dynamic range for measurements in two channels, each with two inputs in cascade
- 6 additional channels for slowly fluctuating data, e.g. temperature
- Speed input (1/60 Hz ...100 kHz: TTL level; 1/60 Hz ... 1MHz: ±10 V)
- 4 output channels
- Integrated signal conditioning
- 20 Bit A/D converter
- Sampling rate per channel 48 kHz or 51.2 kHz
  (44.1 kHz as optional extra)

Technical specifications

Input channels 1-4:

Resolution:	16 bit in four-channel mode 20 bit in two-channel mode
Real-time bandwidth	20kHz
THD+N	> 80dB
Cross-talk attenuation	> 80dB
Noise	1.4 V 2.2V (lin. 20Hz...20kHz)
Sampling rate	48kHz or 51.2kHz
Digital splitting factor	1/2/4/8... 1024 (via DSP)
Anti-aliasing filter	yes (0...22.4kHz)
Max input voltage	V_{Peak} (overmodulation reserve 1dB)
Amplification	-20dB ... 40dB in 40dB steps
Overload detection	indicator for out-of-band frequency
Phase mismatch	<0.1° at gain –20dB (20Hz ... 20kHz)
Offset adjust	yes
Input filter	DC, AC 0.15Hz, HP 10Hz, LP 2kHz
Channel cascading for dynamic expansion	channel 1-2, channel 3-4
Sensor power supply	microphone 14V, +200V; ICP: 2mA
Support of IEEE P1451.4	yes

Input channels 5-11: (channels in combination with digital I/O)

Resolution:	12 bit
Sampling rate	total 50Hz (100Hz, 200Hz)
Input voltage	0...15V for 5 channels
Input resistance	12 kΩ for channels 5-9 2.5 kΩ for channel 10 and 11

Output channels 1-4:

Sampling rate	48kHz or 51.2kHz
Bandwidth	0...22.4kHz
Max. output voltage	3.16 Vpeak
Attenuation	+10dB...-50dB in 1dB steps

Speed Input:

Frequency	1/60Hz...1MHz
Input voltage	min TTL, max +15V

Remote control/ Trigger interface:

Inputs	2 (1 in combination with speed)
Input voltage	min TTL, max +15V
Outputs	2 (in combination with input 8 and 9)
Output voltage	5V/Off

Connector/Plug:

Input channels 1-4	4 x LEMO 7
Output channels 1-4	2 x 6.3mm stereo jack
Input channels 5-11,speed, remote control,trigger	1 x LEMO 8

Power supplies:
Via PCMCIA interface

Weights and measures:

Dimensions	215 x 100 x 35 mm³
Weight	750 g

Environmental conditions:

Temperature range	-10°C...+40°C
Humidity	30...90%

Interface:

Notebook/ PC	PCMCIA
Alternative PC-cards	Harmonie-ISA and Harmonie-PCI

System includes:

- **Signal processing unit**
- **PCMCIA card with connecting cable**
- **Software package with options**

Wide range of accessories available

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