INTELLIGENT MEASURING EQUIPMENT
www.roga-instruments.com

ROGA Instruments

RogaDAQ 16

ROGA Mobility package
USB 2.0 System

- USB 2.0 / 480 MBIT (USB1.1 / 12 MBIT COMPATIBLE)
- 16 analog input channels (16 bit / 500 kHz max.)
- IEPE sensor supply (24 V / 4 mA)
- 0.125 V to 10 V input range
- Individual preamplifiers
- 4 analog output channels (16 bit / 100 kHz)
- Powerful DSP (255 MIPS) for filtering, control etc.
- 24 digital I/Os
- Optional 24 bit counter, timer,
- PWM, incremental encoder
- Free drivers for major application software

SPECIFICATIONS

Analog Inputs	
Number of Inputs	16
Input Impedance	1 MOhm differential
Analog bandwidth	0 – 20 kHz (DC mode); 1 Hz – 20 kHz / 1 dB AC, IEPE (low frequency version on request)
ADC sample rate	500 / 400 kHz
Resolution	16 bit
Input voltage ranges	±0.125, ±1.25, ±2.5, ±5, ±10 V
IEPE sensor supply	4 mA / 24 V
Maximum input voltage	±40 V
Gain accuracy	0.2 % typical

Analog Outputs	
Number of outputs	4
Sample rate	100 kHz/ch.
Resolution	16 bit
Settling time	±20 V / 10 µ, ±1 V / 1 µ
Output ranges	0 – 10 V, ±10 V
Maximum current	5 mA
Impedance	0.2 Ohm

Digital Outputs	
Number of inputs / outputs	24
Type	LVCMOS, 5V tolerant
Maximum current	2.5 mA
Number of counters	2
Resolution	24 bit
Modes	up/down, frequency, period
PWM channels	1
Resolution	24 bit
Frequency range	2 Hz – 2.5 MHz
Incremental counters	24 bit incremental 16 bit time stamp
Interpolation	1 / 2 / 4
Maximum frequency	20 MHz
Dimensions	180 mm (w) x 167 mm (d) x 80 mm (h)
Weight	Approx. 2 kg
Power Supply	Adapter 100 V – 230 V AC / 5V DC (included)

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With the introduction of the RogaDAQ16 USB2.0 data acquisition system, a new age of measurement technology begins.

The RogaDAQ16 is an affordable multichannel IEPE solution. The USB 2.0 interface permits unrivalled portability. Hotplugging the data acquisition unit during operation has now become a reality. The compact and rugged measurement unit with its BNC connectors breakout boxes obsolete. Downward compatibility to USB 1.1 also permits to run this high performance measuring system with older hardware. Simplicity of integration, whether mobile or stationary, has reached a new level.

ANALOG INPUTS

The input signals are digitized using the multiplex method. All 16channels may be used as differential or single-ended inputs. The maximum sampling rate is 500kHz at 16 bit resolution (400KHz for multiple channels). The maximum bandwidth per channel is DC to 22KHz (higher bandwidth on request). In single-ended mode, AC coupling is also available and constant current sensor supply for IEPE-type sensors can be provided.

The input circuitry consists of a software programmable precision amplifier with gain 1/2/4/8/10/20/40/80.
The input voltage ranges are 0.125V to 10V in eight steps, either bipolar or unipolar. The highly flexible signal conditioning and connectivity make the RogaDAQ16 the perfect choice for the majority of measurement applications.

Along with the analog lowpass filters the system can make use of integrated oversampling filters (up to 16x, depending on channel count and sampling rate) in order to improve rejection of noise, distortion and out of band signals
DSP-filters suppress undesired frequencies and distortions. Therefore the user gets clean data.

There is no need for any additional hardware. Signal degradation caused by cabling, contacts and add-on signal conditioners is avoided.
The RogaDAQ16 is a truly affordable and powerful platform for multichannel IEPE-sensor applications.

ANALOG OUTPUTS

RogaDAQ16 offers four analog outputs. The output sampling rate is 100 kHz per channel at 16 bit resolution. The output voltage ranges are 0V-10V und ±10V. They can be used as generator outputs, monitoring outputs or for control loops. It is also possible to download data to RogaDAQ16 and output it to the D/A converters time synchronized by the DSP.

TRIGGERS

There are several trigger options available: Level, edge, limit or window conditions. It is even possible to use mathematically processed data for triggering (e.g. steepness of slope). Trigger conditions can start or stop a measurement, set digital outputs or control analog outputs. Several trigger conditions can activate or deactivate each other. So a network of dynamic triggers is possible, automatically adjusting to the current condition.

DIGITAL INPUTS/OUTPUTS

There are 24 digital inputs / outputs available. Any of these ports may be individually controlled by the DSP as input or output.

The digital inputs optionally support counter, pulse width, period length or frequency counter. Incremental encoders can also be supported on request.

The outputs can optionally be used for PWM signals with a resolution of 100ns and output frequencies between 2Hz and 2,500,000Hz with zero pulse discontinuities. Modulation of frequency and pulse width is supported at the same time and independently. It is fully transparent to the user, who only specifies a frequency and pulse width in percent.

SOFTWARE

One of the most important criteria for modern measurement systems is software support. Even the most powerful hardware is useless without respective drivers.

RogaDAQ16 uses an optimized concept which ensures extensive application software sup-port and easy adoption to new software environments.

Besides free of charge drivers for most common measurement applications like EVApro, DIAdem, LabView or DasyLab, further application programs are available. Custom driver support is possible on request.

SOFTWARE AND DRIVER UPGRADES

The most recent versions of drivers, programming interface and software are obtainable through ROGA-Instruments.

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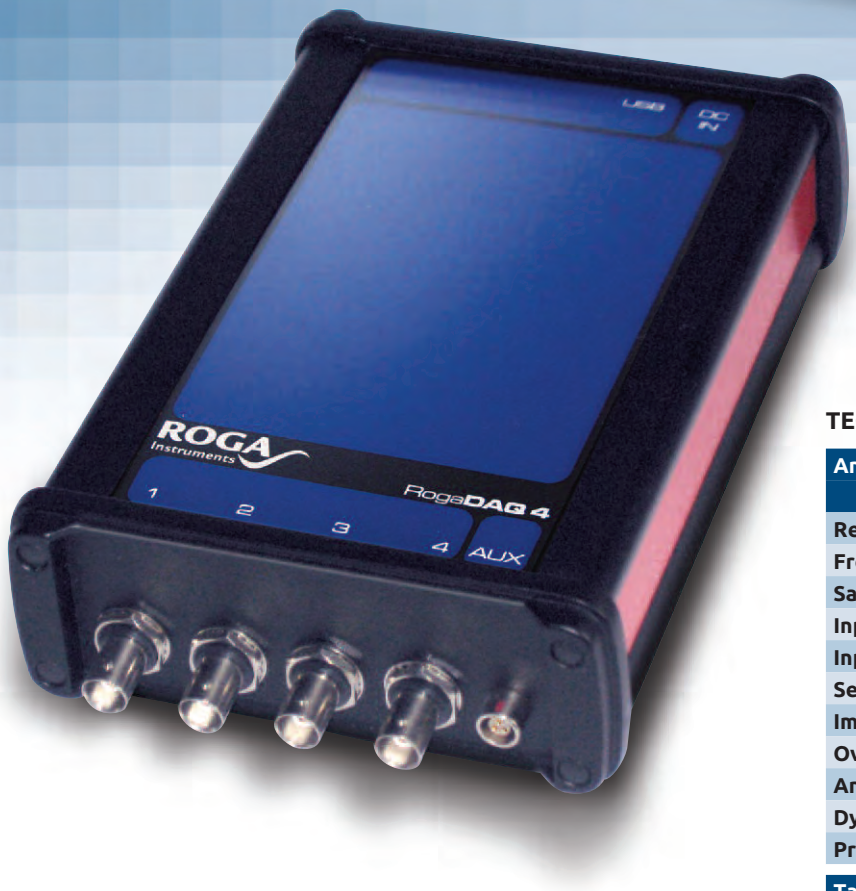

RogaDAQ 4

Four Channel USB Data Acquisition System

RogaDAQ4 Front End is a high precision portable data acquisition system. Four simultaneously sampled 24bits resolution channels measure precisely any signals with frequencies up to 80kHz. RogaDAQ4 combined with PC or notebook is a perfect measurement solution. It offers high levels of precision and it is very easy to use.

Possible Applications

- PC based portable data acquisition
- Frequency analysis in the range 0 - 80kHz
- Structural analysis
- Modal analysis
- Machine maintenance
- Building acoustics and building oscillation analysis
- Process monitoring
- Final check

Properties

- Four high precision inputs with 24bits A/D converter
- 8 - 192 kS/s selectable sample rate
- Integrated anti alias filter ensures perfect signal integrity
- AC, DC coupling or IEPE for direct power supply
- Tachometer input
- 5 Volt power supply
- Rugged aluminium case

Technical Details

RogaDAQ4 high precision inputs are designed for measuring dynamic signals. They are sampled simultaneously. Signals are digitized at a maximum of 192kS/s with 24bits resolution.

TECHNICAL DATA:

Analog Inputs	4 BNC Input Channels, differential & single ended, optically decoupled
Resolution	24bits for each channel, simultaneous sampling
Frequency range	DC - 80 kHz
Sample rate per channel	8/16/24/32/48/92/192 kHz
Input voltage range	±10 V / ±1 V selectable
Input coupling	DC/AC/IEPE selectable
Sensor supply	4 mA @ 24 V
Impedance of input	1 MΩ, 20 pF
Over voltage protection	±40 V
Anti alias filterer	800 dB / octave
Dynamic range	free of distortion > 123 dB
Precision of amplitude	better 0.1 %

Tachometer input	Two inputs
Resolution	32bits
Input voltage range	±30 V
Basic frequency	10 MHz

Miscellaneous	
Interface	USB 2.0
Connectors	BNC receptacles, counter Lemo Type EPG.0B.303.HLN
Power supply	inklusive Netzteil für Spannungsversorgung 220 V AC / 5.2 V DC
Rugged aluminium case closed on all sides	
Dimensions	180 x 118 x 64 mm
Weight	400 g
Operating temperature range	0 - 55 °C

Preamplification is realized with noise reduced instrument amplifiers with extremely low distortion. For IEPE compatible sensors a constant current source can be activated by software.

User Software

The RogaDAQ4 front end can be operated directly out of DasyLab version 13.0. This allows to perform complex monitoring tasks like final checks in production lines or monitoring of a frequency range with signaling if predefined intervals are left. And all of this without writing a single line of code. Beside this drivers are available for customer specific programming for .NET, ANSI C, Visual C++ 6.0, Delphi, DasyLab, LabView, and MatLab.

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ROGA Instruments

RogaDAQ2

Portable Data Acquisition and Analysis

Analog Inputs	
BNC-Inputs	2, for analog signals
Simultaneously sampling ADCs	2
Resolution	24 Bit
Sampling rate	48 kHz max.
Range input	±5 V max.
Selectable AC- or DC-coupling	
Selectable IEPE sensor	supply (4 mA/28 V)
Self adjusting Anti-Aliasing filter	
Accuracy	better ± 0,1 dB, Dynamic Range > 100 dB, THD < 0,005%, Frequency Response ± 0,05 dB
Channel deviation	< 0,01 dB, < 0,05°
Channel separation	> 85 dB

Supported PC Systems
Win95, Win98, WinME, Win2000, WinXP & Vista

RogaDAQ2 is a high performance portable Data Acquisition Device. It features two high quality, high speed, simultaneous sampling inputs.

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RogaDAQ1

ROGADAQ1

RogaDAQ1 is a high performance USB Data Acquisition Device. It features one high quality, IEPE sensor input for vibration sensors or IEPE microphones.

SPECIFICATIONS

Analog Inputs	
BNC-Inputs	1 IEPE Input
ADC	1
ADC Resolution	24 Bit
Sampling rate	96 kHz max.
Range input	± 5 V max.
AC-coupling	
IEPE sensor supply	4 mA/28 V
Self adjusting Anti-Aliasing filter	
Accuracy	better ± 0,1 dB, Dynamic Range > 100 dB, THD < 0,005%, Frequency Response ± 0,05 dB

Supported OS
Win95, Win98, WinME, Win2000, WinXP & Vista

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ROGA Instruments

Plug.n.DAQ

USB Front-End

ROGA Plug.n.DAQ

Plug.n.DAQ is a compact 2channel in/out data acquisition device for recording and analysis. It features the widespread USB1.1 interface and requires no driver installation. In addition to AC inputs it directly supports IEPE-type sensors, such as microphones and accelerometers. The outputs may be used for monitoring, playback or signal generation. SPDIF I/O is supported as well.

Filters on the input and output and instrumentation-quality amplifiers ensure reliable 16-bit data. With a bandwidth up to 24KHz per channel and simultaneous sampling Plug.n.DAQ is highly flexible and may be used with all software packages supporting audio devices. It comes in a rugged aluminum housing, prepared to go wherever the measurement job requires.

Supported operating systems: Win ME, 2K, XP and up; Linux; MacOS (depending on application software.)

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TECHNICAL DATA:

Analog Input:	2ch single ended BNC, IEPE
Impedance	100 kOhm
IEPE power	24 V/4mA
Input ranges	0.1 V, 1 V, 10 V
Bandwidth	3.5 Hz to 24 kHz (-3 dB) 10 Hz to 22 kHz (-0.5 dB)
Sampling Frequency	32 kHz; 44.1 kHz & 48 kHz
Absolute accuracy	2 % typical
Gain accuracy	0.2 % or better
Distortion	< 0.05 %
S/N	> 85 dB (90 dB typical)
Aliasing rejection	-70 dB (up to 0.4 xfs)
Pass band ripple	0.05 dB

Analog Output:	2ch single ended BNC
Output	1 V, 100 Ohm
Bandwidth	1 Hz – 22 KHz (+/-0.5 dB, 48 KHz FS) 0.5Hz – 24KHz (-3 dB, 48 KHz FS)
Absolute accuracy	2 % typical
Distortion	< 0.02 %
S/N	> 90 dB
Pass band ripple	0.2 dB
Out of band rejection	-50 dB or better

SPDIF in/out	48 KHz, 44.1 KHz, 32 KHz
Sampling rates (simultaneous sampling 16bit)	48 KHz, 44.1 KHz, 32 KHz, 22.05 KHz, 16 KHz, 11.025 KHz, 8 KHz (analog in only)
Powered by USB (power consumption < 1W)	
Usable temperature range	+/- 0 to +50 °C
Storage temperature range	-10 to +60 °C
Dimensions	82 (w) x 150 (d) x 32 (h) mm
Weight Approx.	150 grams

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ROGA Instruments

Plug.n.DAQ Lite

IEPE USB Front End

ROGA Plug.n.DAQ Lite

Plug.n.DAQ Lite is a compact 2channel in/out data acquisition device for recording and analysis. It features the widespread USB interface and requires no driver installation. In adition to AC inputs it directly supports IEPE-type sensors, such as microphones and accelerometers. The outputs may be used for monitoring, playback or signal generation.
Filters on the input and output and instrumentation-quality amplifiers ensure reliable 16-bit data. With a bandwidth up to 24KHz per channel and simultaneous sampling Plug.n.DAQ Lite is highly flexible and may be used with all software packages supporting audio devices. It comes in a rugged aluminum housing, prepared to go wherever the measurement job requires.

Supported operating systems: All

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TECHNICAL DATA:

Analog Input:	2ch single ended BNC, IEPE
Impedance	100 kOhm
IEPE power fixed	24 V/4mA
Input ranges	5 V
Bandwidth	3.5 Hz to 24 kHz (-3 dB) 10 Hz to 22 kHz (-0.5 dB)
Sampling Frequency	32 kHz; 44.1 kHz & 48 kHz
Absolute accuracy	1% typical
Gain accuracy	0.2 % or better
Distortion	< 0.05 %
S/N	90 dB typical
Aliasing rejection	-70 dB (up to 0.4 xfs)
Pass band ripple	0.05 dB

Analog Output:	2ch single ended BNC
Output	1 V, 100 Ohm
Bandwidth	1 Hz-20 kHz (+/-0.5dB, 48KHz FS) 0.5Hz–24KHz (-3dB, 48KHz FS)
Absolute accuracy	1% typical
Distortion	< 0.02 %
S/N	> 90 dB
Pass band ripple	0.2 dB
Out of band rejection	-50 dB or better

Others:	
Sampling rates (simultaneous sampling 16bit)	48 KHz, 44.1 KHz, 32 KHz, 22.05 KHz, 16 KHz, 11.025 KHz, 8 KHz (analog in only)
Powered by USB (power consumption < 1W)	
Usable temperature range	+/- 0 to +50 °C
Storage temperature range	-10 to +60 °C
Dimensions	82 (w) x 150 (d) x 32 (h) mm
Weight Approx.	50 grams

ROGA Instruments

MI-17

1/4" Compact Microphone

ROGA MI-17

These 1/4"-measuring microphones are pressure transducers. The model MI-17 have integrated electronics, and can be delivered with sensitivities from 10 to 100 mV/Pa at tolerances of within ±1. 5 %. Special custom versions are also possible. Power supplies for the microphones can be either a constant current source of 2 – 6 mA (standard version) or a constant voltage source 4 – 30 Volts. Normally the microphones are fitted with BNC-connectors (fem.) allowing standard BNC-BNC cables to be used. Other connectors such as TNC, SMB, Lemo or µdot are also available on request. These microphones are quite suitable for array applications.

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TECHNICAL DATA (Type 1):

Frequency response (typical)		30 Hz – 4 kHz: ± 0.5 dB
		4 kHz – 20 kHz: ± 1.5 dB
Temperature range		-10 – +50 °C
Sensitivity		≈ 50 mV/Pa
Noise	(Lin: 20 Hz – 20 kHz)	≈ 35 dB (SPL)
	(„A"-wighted)	≈ 26 dB (SPL)
Max. peak SPL		≈ 130 dB (ref. 20µPa)
Constant supply current		2 – 6 mA
Output impedance		50 Ω
Dimensions – total length		93 mm
Tube – diameter		8 mm
Connector		BNC (fem.)
Weight		23 grams

ROGA Instruments

RG-50

¼" Compact Microphone

ROGA RG-50

These 1/4"-measuring microphones are pressure transducers. The model RG-50 have integrated electronics, and can be delivered with sensitivities from 10 to 100 mV/Pa at tolerances of within ± 5 %. Special custom versions are also possible. Power supplies for the microphones can be either a constant current source of 2 – 6 mA (standard version) or a constant voltage source 4 – 30 Volts. Normally the microphones are fitted with BNC-connectors (fem.) allowing standard BNC-BNC cables to be used. Other connectors such as TNC, SMB, Lemo or µdot are also available on request. These microphones are quite suitable for array applications.

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TECHNICAL DATA (Type 2):

Frequency response (typical)		30 Hz – 4 kHz: ± 1 dB
		4 kHz – 20 kHz: ± 1.5 dB
Temperature range		-10 – +50 °C
Sensitivity		≈ 50 mV/Pa
Noise	(Lin: 20 Hz – 20 kHz)	≈ 35 dB (SPL)
	(„A"-wighted)	≈ 26 dB (SPL)
Max. peak SPL		≈ 130 dB (ref. 20µPa)
Constant supply current		2 – 6 mA
Output impedance		50 Ω
Dimensions – total length		93 mm
Tube – diameter		8 mm
Connector		BNC (fem.)
Weight		23 grams

ROGA Instruments

ROGA MP40/PA-01

IEPE 1/2" Measurement Microphone

ROGA MP40/PA-01

- Constant current powered measuring microphone preamplifier PA-01 with electret condenser microphone capsule type MP40. The current powered 1/2" Measuring Microphone offers facilities for the use of a high-quality noise measurements.
- Typical applications like array arrangements and covered area measuring procedures, e.g. automotive acoustics, can be taken into account.
- This acoustic sensor can be connected to any IEPE input via BNC cable. The PA-01IV preamplifier accepts in addition phantom voltage supply from 4 to 25 Volt.

TECHNICAL DATA:

Connector	BNC
Microphone thread	11.7mm x 60UNS
Noise voltage	1,5µVrms (A-weighted)
Frequency response	20Hz-100kHz +0dB -0,5dB
Input impedance	> 10 GOhm
Output impedance	< 300 Ohm
IEPE current supply	1mA-5mA
Phantom power	4V - 25V (4-20kOhm)
max output voltage	7 Vpp

MP40 capsule	
Frequency response	20 – 20 kHz
Sensitivity	50 mV/Pa
Type	Free Field Pre Polarized
Noise Floor MP-40/PA-01	16 dBA

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ROGA Instruments

ROGA PS-01

IEPE Signal Conditioner

ROGA PS-01

- The PS-01 is a portable 1 channel IEPE signal conditioner.
- It has 4 mA/24 V supplies for sensors with integrated amplifiers like IEPE measurement microphones or accelerometers.

TECHNICAL DATA:

Supply Voltage	max. 24.0V ± 5%
Supply Current	5mA ± 10% (adjustable between 0.5mA – 5mA)
Input impedance	100k Ohm
Lower Frequency Limit	0.15Hz (- 3db)
Upper Frequency Limit	100 kHz
In- / Output	BNC-Connector
Power	9V battery , power switch with on-/off-indication
Dimensions (L x W x H)	120 x 60 x 32 mm including belt clip
Weight	approx. 120g including battery
Operating temperature	0 °C – 50 °C
Storage temperature	-10 °C – 60 °C

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ROGA Instruments

AS-10

Professional Microphone for Acoustical Quality Assurance

AS-10

The AS-10 is a compact professional microphone which is used to hear and to evaluate airborne noise. It has a length of 30cm and is equipped with a goose neck with a length of 30 cm. To the output receptacle at the back a headphone can be connected. The power supply is realized with a 9V block battery, which is located on the bakkside of the device. The battery can be changed by unscrewing the rear tube. After unscrewing the battery can be accessed and changed.

After the device is switched on, the green operation LED is lit. The unit offers two amplification ranges with 30dB and 60dB.

The volume fine adjustment for the headphone is performed with the latching potentiometer (11 positions) on the user panel.

The brightness of the LED decreases if the battery voltage drops below 8V. At 7V the LED is weak. At this time the battery should be changed immediately. Up to this supply value all specifications are kept operative. The only exception is the maximum output voltage.

PROPERTIES:

- Flexible goose neck microphone
- Headphone amplifier
- Operated with an integrated battery
- Single-handed operation

APPLICATIONS:

- Measurement of airborne noise
- Engine diagnostics
- Locating noise sources
- Detection of acoustical disturbance sources

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SPECIFICATIONS

General	
Acoustical operating principle	pressure-gradient transducer
Directional pattern	cardioide
Front to back ratio	20 dB
Frequency response	see diagram
Pressure sensitivity @ 1000Hz	approx. 50mV/Pa
Source impedance	1000 Ohm +/- 40%
Total harmonic distortion @ 28Pa (123dB) SPL	< 3%
Range of supply voltage	0,8...15 V
Current consumption	< 0,2 mA

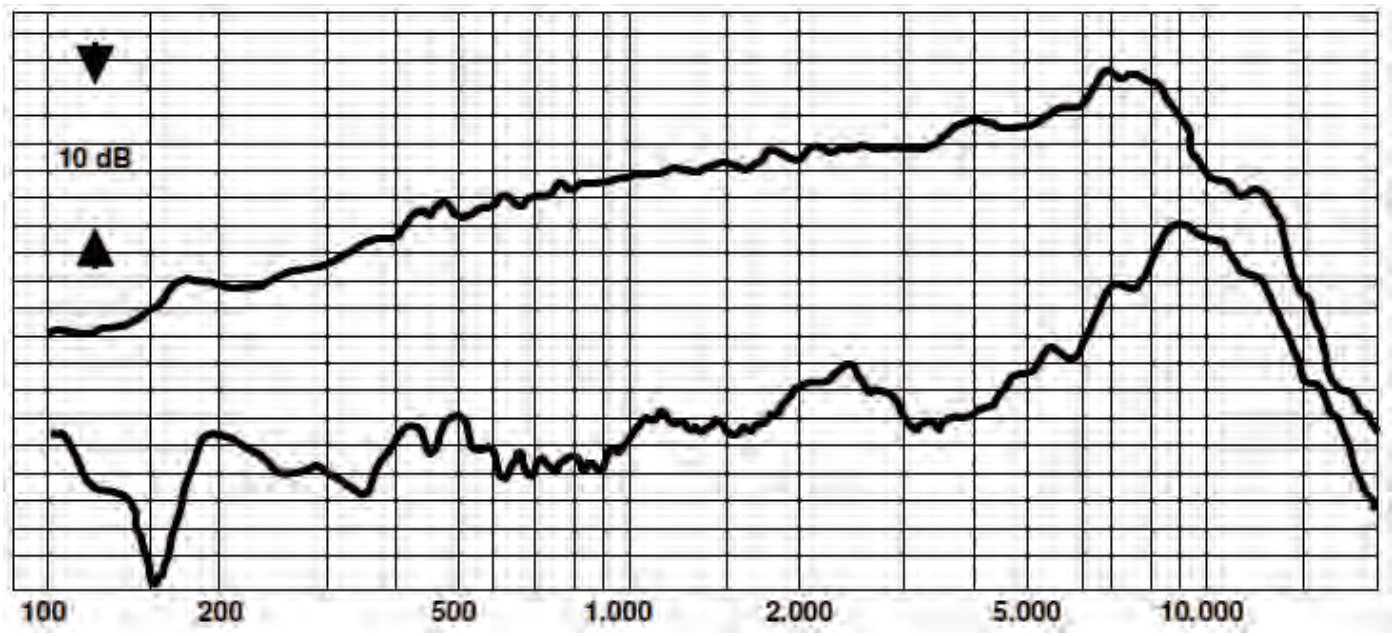
SPECIFICATIONS

Operating Conditions	
Temperature storage	min. -25°C, max. +60°C
Temperature operation	min. -20°C, max. +55°C
Relative humidity	20°C/99%, 60°C/95%

Dimensions	
Diameter x Lenght	35Ø x 490 mm
Weight incl. battery	350 g

FREQUENCY RESPONSES

- @ 0° and 180° angle of incidence



ROGA RECOMMENDATION

For professional applications of the AS-10 the use of a professional headphone is recommended. Roga Instruments offers the Beyer DT 770 Pro headphone with the necessary Lemosa connector (0B-2-pin).

HEADPHONE AMPLIFIER: SPECIFICATIONS

General	
Frequency response (-3dB):	30 Hz - 18 kHz
Output voltage max.	4 Vpp
Total harmonic distortion:	<1% @ 1kHz and 4Vpp
Output impedance:	50 Ohm in line with 10µF
Power supply:	9V battery
Current consumption:	approx. 7mA with closed headphone amplifier input; approx. 15mA max.
Duration of battery operation:	approx. 12h - 15h, depending on the adjusted loudness and on the type of battery

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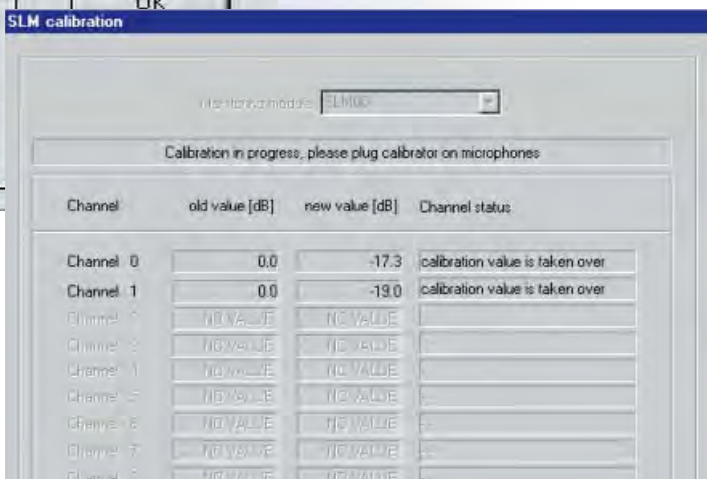
SLM

Sound Level Measurement Module



RogaDAQ16 in combination with MI-17 as a recommended hardware.

SOUND LEVEL MEASUREMENT MODUL

The sound level measurement module has the following features:

- Time weighting: fast, slow, impulse, leq following DIN IEC 651 and DIN IEC 804.
- Easy microphone calibration with a pistonphone; in calibration mode, DasyLAB 6 detects the channel/microphone to calibrate and calculates the correct values.
- The correction values are stored with the worksheet.
- The module has 16 inputs and 16 outputs for the weighted and dB scaled sound levels.
- We recommend a 16 bit AD-converter with microphone power supply.

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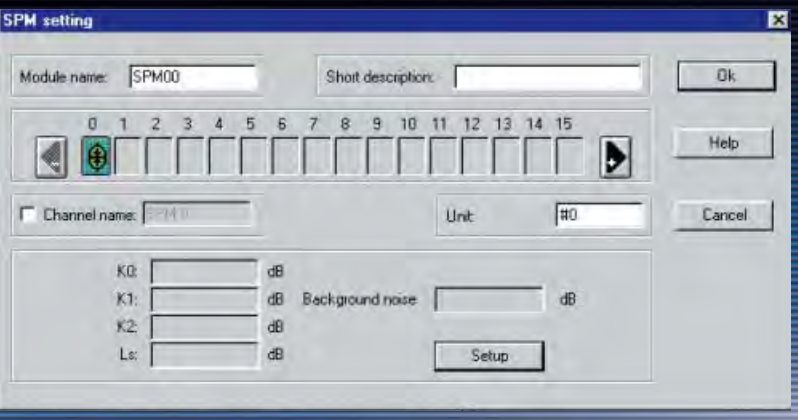
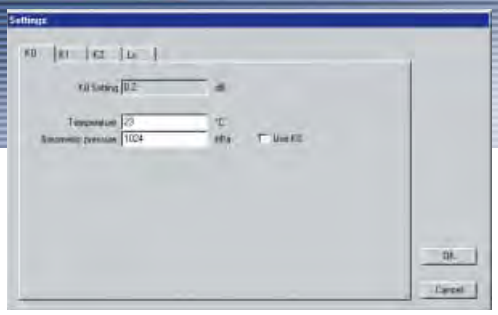
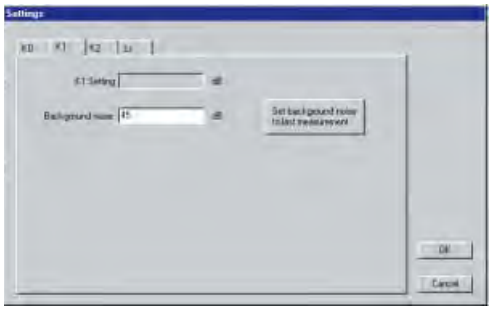
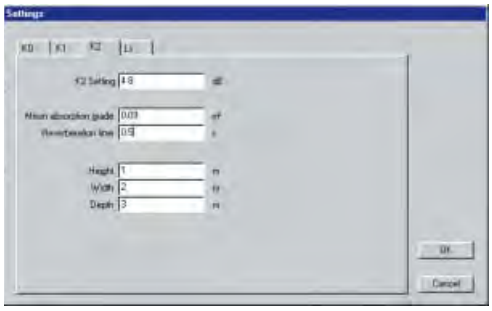


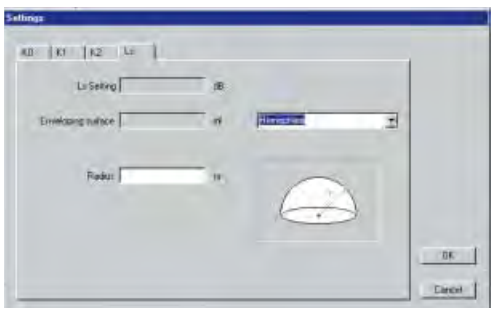
SPM

Sound Power Measurement Module









SOUND POWER MEASUREMENT MODULE

The sound power measurement module can calculate the sound power for a maximum of 16 input channels (from the sound level measurement module) 1 output channel, switchable to:

- Measurement surface sound power.
- Sound power level (SPL) of all active channels.

The module properties allow you to set the four corrective values in dB or use the "wizards" to determin them:

K0: Correction value for air pressure and temperature. Direct input of the dB value or pressure and temperature. (Only necessary for class 1 measurements according to DIN 45 635.)

K1: Correction value for extraneous noise correction (background noise, signal-to-noise-ratio). Direct input of the dB value or taken from last measurement.

K2: Correction value for environment feedback (reflections). Direct input of the dB value or input of the room's metrics:
– volume
– reverberation time ...

Ls: Correction value for for the enveloping surface. Direct input of the dB value or input of the surface metrics (guided with graphics). Like DIN (2a, 2c, b)
– Spherical, hemisphere, quarter globe
– Cuboids (detached, at a wall, at a wall and ceiling)

The module works according the following standards: DIN 45 635, DIN EN 23 741, ISO 3741, DIN EN 23 742, ISO 3742, DIN EN 23 744, EN ISO 3744, DIN EN 21 680, ISO 6395

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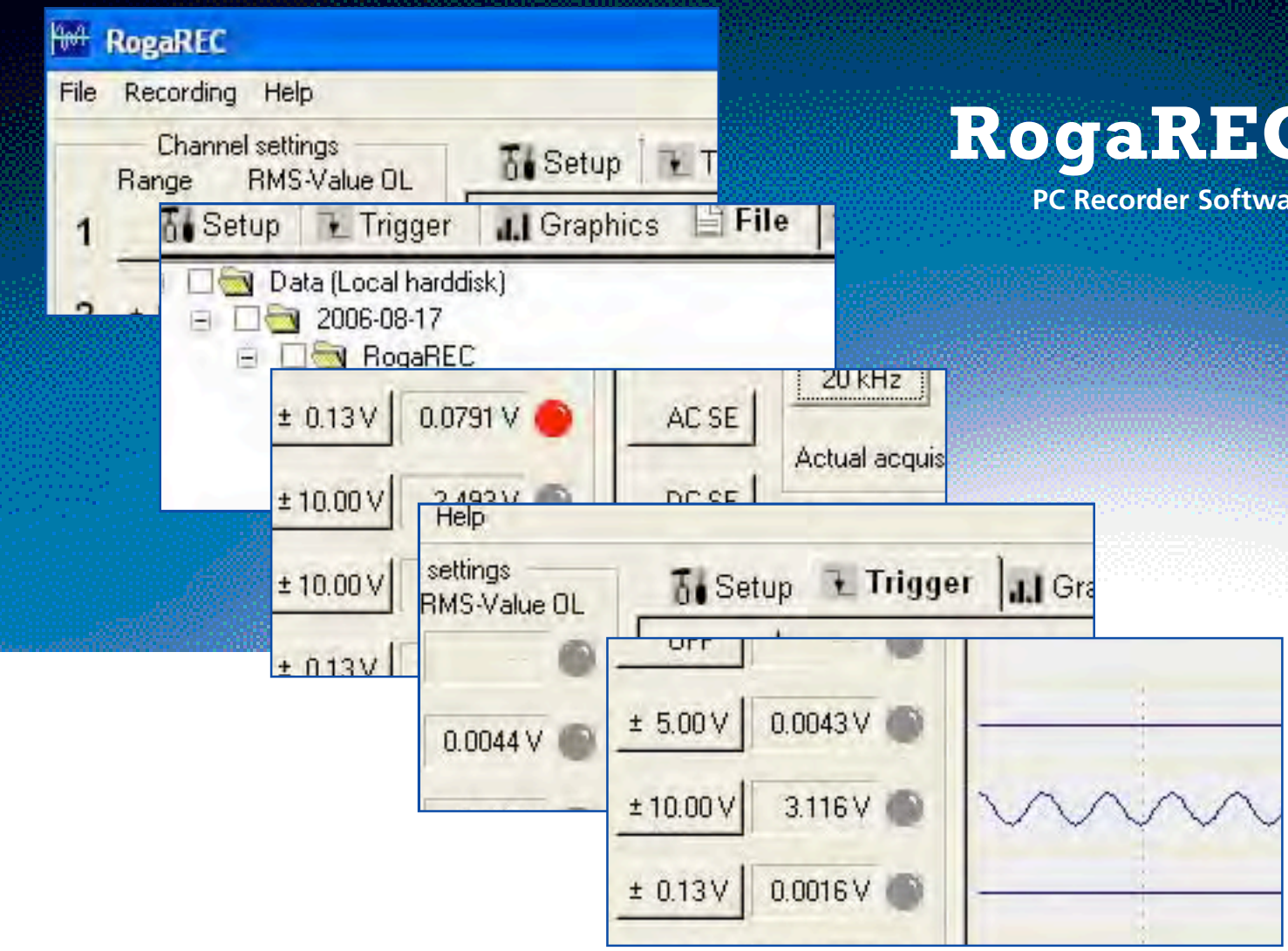
RogaREC

PC Recorder Software



ROGAREC

RogaREC software is specially designed for many different T&M devices which allow using such Front End system as a PC based Data Recorder.

The main feature of the RogaREC is the simulation of an tape recorder or stand alone data recorder, so that a user manual is not necessary.

- RogaREC supports the analog input channels for example of the RogaDAQ16. Range input settings and IEPE sensor supply can be selected for each channel individually.
- The measurement bandwidth is indicated in Hz or kHz, according to the T&M measurement hardware.
- The display allows changing between Bar graph and wave form (oscilloscope) view.
  Cannel overload indicator for each channel and Pre & Post Trigger, recording time function roundup the RogaREC product.
- The channel data's are stored in the TEAC TAFFmat file format, which is compatible to FlexPro, DaDisp, DiaDem, ArtemiS, FAMOS, LMS and other post processing analysis products.
- The combination of the RogaDAQ16 and RogaREC replace the SONY PC208, PC216 and the TEAC RD-120, RD-130, RD-125T, RD-135T, RD-145T and RD-200T DAT data recorder.

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