

SCS-EUROACOUSTIC

Application Note

DIRECT SUPPORT OF ALL 01dB APPLICATION SOFTWARES AND HARDWARE PLATFORMS



Solo: single channel Sound Level Meter and Real Time Analyzer



Symphonie: dual-channels PC based Sound Level Meter and Real Time Analyzer



Harmonie-01dB: quad-channels PC based Sound Level Meter and Real Time Analyzer



Orchestra: multi-channels (4-200) PC based multi-purpose Real Time Analyzer

DIRECT SUPPORT OF SCS-MESA PLATFORMS



MESA DSPlus: 12 channels Sound Level Meter and Real Time Analyzer



MESA MUX 10A: 10 channels Multiplexer with Instrumented Inputs and ICP support



MESA S4 Plus: 4 channels - 24 bits - PC card Instrumented Inputs and ICP support

OPTIONAL SUPPORT OF OTHER HARDWARE PLATFORMS FROM PRIMARY TRADE-MARKS



Major Trade-marks supported:
Rion NL & SA series (w/out Multiplexer)
B&K 2250-2260 (w/out Multiplexer)
Norsonic SA 118 and 121
National Instruments: Sound and Vibration products as PCI card, PXI frame, CRio series



SCS 8400 series: Advanced and Multiplatforms Software Packages for Acoustic Power Determination according to International Standards

Standards supported:

ISO 3741, 2, 3, 4, 5, 6, 7 - ISO 6393, 4, 5, 6 - ISO 11094 - ISO 7779 - EU 2000/14/CE

G.Amadasi

The SCS 8400 series software calculate Sound Power level according to all relevant standards ISO and EU by taking measurements from a wide range of hardware and software platforms manufactured from major trade-mark on the market. Some peculiar and rather unique features are:

- the Wizards to guide step by step the user through all procedures up to the final results,
- the menu driven characteristics without many windows to open and close,
- the Windows Explorer database navigator,
- the MS-Office Access standard database,
- the support of Wireless Lan for data transmission
- ear driver Lp measurement

Wizard

By using wizards the user is guided through all steps.

Standard selection to select the standard to be applied.

Hardware selection:

Select the hardware available. If you select the 2000/14/CE directive only, than any supported SLM/RTA w/out MUX10A hardware can be used. Within 01dB products range is not even necessary to chose the hardware since all of them are automatically supported as the interface is directly to the 01dB dBTrig software.

Frequency range: some frequency band can be excluded from data acquisition and Sound Power calculation.

Measurement surface type can be selected and the position of the machine inside the measurement surface.

Measurement surface coordinates (X,Y,Z can be inserted and the software will calculate automatically the measurement surface area S. Than, it has to be select the number of microphones (measurement points).

Sound field selection if the measurement zone is in a free field or not. In a free field is not necessary to calculate the K2 factor (environmental factor). The K2 table can be defined manually or can be calculated using reverberation time data (MESA DSPlus feature).

Time history (raw signal) can be saved for further processing as wav files or other format supported. "Total measurement time..." is the maxi-

mum measure time for every channel.

Machine property. The user can define the values of each property (machine name, type, engine type, ...). The LWA limit value will be used to validate or not each LWA measurements.

After completion of the "new file wizard" there will be two new window in the main window : "General information" window related to file properties, and "Microphones" where it's possible to configure every microphone. To change the position of one microphone just have to right click on the microphone number and move the mouse pointer to new position, than change its status (Green = enabled, Red = disabled, Yellow = enabled only for operator ear noise measurement)

Calibration

Inside SCS 8400 Sound Power Software it's possible to perform a "Standard calibration" or an "Automatic calibration".

Depending from the hardware selected the aspect/features of the calibration window will vary.

To run the Standard calibration a calibrator is fitted on each microphone in turn and correction factors can "Accepted" to store the new correction factor or "Cancel" to abort the procedure.

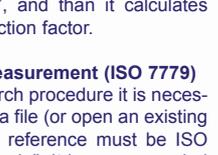
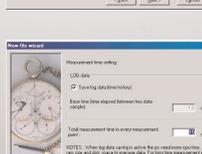
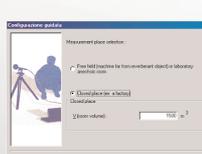
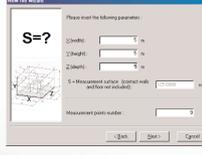
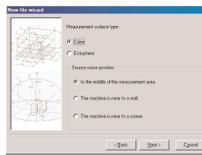
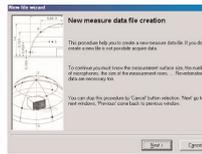
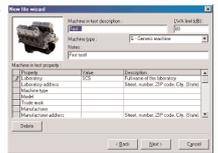
In Automatic calibration the software sense all available channels to detect where the calibrator is actually fitted and switched "On", and than it calculates automatically the new correction factor.

"Discrete tone search" measurement (ISO 7779)

To run the discrete tone search procedure it is necessary to have build a new data file (or open an existing one) and the selected ISO reference must be ISO 7779 or "engineering test mode". It is recommended to conduct the following listening tests in addition to the measurement procedure.

1. Conduct a general listening test without any comparison to the reference tones. If the equipment under test sounds tonal, the measurement procedure should be performed for any such tones and those identified as prominent according to the criteria "Prominent discrete tones".
2. Perform the measurement procedure on all tones that appear to be prominent in the narrow-band analysis. For any tones exceeding the tone-to-noise criteria ("Prominent discrete tones"), play a sine-wave (having the same frequency as the tone in question) over a headset or loudspeaker and compare it to the sound from the product, noting whether or not a tone at the sine-wave frequency is audible in the product sound emission.

In case where there is a doubt as to whether audible tones are present or not, other, more objective, evidence should be sought (such a narrow-band analysis of the



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noise). In this case to be sure if one or more discrete tones are present or not it is necessary to run the "Discrete tone search" procedure. A specific wizard has been prepared and once the hardware is ready the incoming signal is displayed on the screen.

"Auto range" button perform an autorange for all the configured channels and then recording can be started. A progress bar will show on the screen the recording status.

When the recording is completed a page appears on the screen with stored data. On each data recording an FFT can be applied by selecting the corresponding row and FFT lines resolution. A new row with FFT data result will become available and displayed.

Autospectrum (FFT result) of the selected record appears on the screen; cursors position can be set and then apply "Search tone" option.

Cursors position can be set using mouse left and right buttons, by press and drag operation. Once the cursor range is defined than it can be pressed "Calculate".

The program perform the following calculation :

- F0 : Central frequency of the tone (between F1 and F2)
- F1 : Left cursor position
- F2 : Right cursor position
- DeltaF : Frequency range from cursor F1 to cursor F2
- Lt : Sound pressure level (dB) of the discrete tone
- F1c : Left cursor that define the critical bandwidth area
- F2c : Right cursor that define the critical bandwidth area
- DeltaFc : Size of the critical bandwidth
- Ln : Sound pressure level (dB) of the masking noise, exclusive of the tone, contained within the critical band (F1c-F2c) centered at the frequency of the tone (F0)
- Lt-Ln : Tone-to-noise ratio (dB)

The level Lt is taken as the sound pressure level contained in the narrow band that just delineates the tone. The Lt value is determined by bracketing the data points that define the tone with the analyzer's band cursors, and then computing the power in this band. If the width of the frequency band selected to bracket the tone is greater than 15% of the width of the critical band, the measurement should be repeat with a different resolution bandwidth. If it continues to produce a signal for which the bracketed tone's bandwidth is greater than 15% of the critical bands, then the tone is bracketed by a band centered on the fre-

quency of the tone whose width is 15% of the critical band. When this condition is detected a message box appear on the screen.

In this example select the "Cancel" button to set the size of the DeltaF to the 15% of the DeltaF critical band. Select the "Cancel" button only if you have already tried to use a greater FFT resolution but the result are still the same.

Calculation are completed and the result is show in the "Calculation result" frame.

A discrete tone is identified as prominent if, and only if, the condition is detected: $(Lt - Ln) \geq 6.0 \text{ dB}$

At any moment during the wizard press the button "Cancel" to abort the "Discrete tone search" procedure. To save data result select the "Next" button. The wizard is completed, data will be stored in the current open SoundPower data file and a data summary will display on the screen.

"Reverberation time" measurement

This option is enabled only if selected measurement area is indoor. Reverberation time measurement procedure varies depending of the hardware selected, some devices wil directly measure the RT, alternatively the software can record the audio signal and perform directly the calculation; a new window appear on the screen.

Option "Use two channels" is available (depending of the hardware) for reverberation measurement using two channels at the same time. Option "Noise generator" is also available in case of some 01dB devices and Mesa DSPUs.

Once the measurement recording has been completed, data are automatically stored into the current open data file and a window appear on the screen (reverberation time edit window) showing a decay curve for each frequency band. Using the option "Lock cursors" all set of RT value will be calculated according to the cursor positions on any of them.

Sound Power measurement window

Upon completion of wizard, calibration and RT optional measurements, the determination of

Sound Power becomes an easy task with few mouse clicks.

Data acquisition

By starting data acquisition a dynamic window shows the spectra in Real Time of a certain number of channels, depending of the hardware devices connected.

Background noise measurement

Background noise measurement can be taken at any time by selecting Data acquisition.

Miscellaneous table allows to identify each single item undergoing the LWA test, connect a meteo data station, associate to the file other information and notes.

Results Data

Measurements taken and stored into the database gives the LW result simply by pressing a button, more than one measurement can be stored in the same file.

A gray characters set on a measurement column means that data will not be used in the LW calculation, a red font color for a single number means a calculation error. Data can be viewed as tables or graph.

Export menu offer several choices for exporting data, current selection, to text file or other format.

Post processing

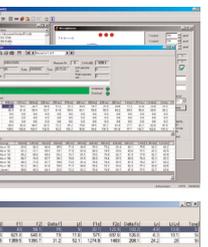
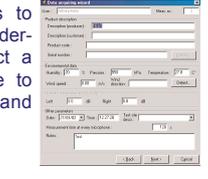
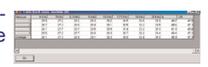
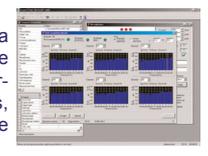
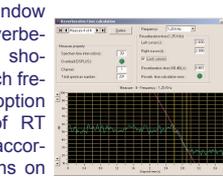
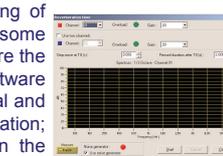
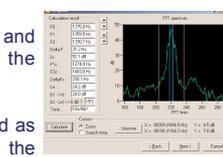
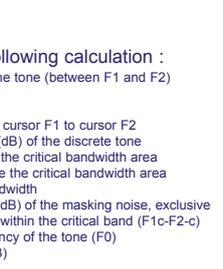
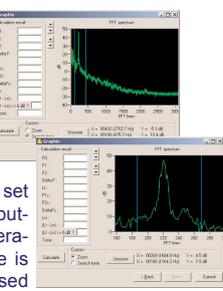
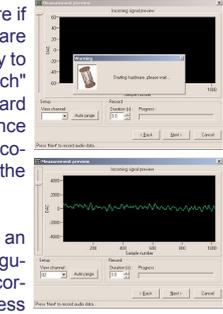
All dataset might consist of wav files (raw signal), MS Access files, txt, etc. and any kind of post processing can actually be applied, like: audio analysis (FFT, 1/n octaves, filtering), measurements statistics, etc.

Reporting

The easiest way for professional reporting it is to use MS Office automation to include data files within an MS Word template or MS Excel table.

Security

The access to the program can be restricted to users and one administrator, the restriction applies mainly to the internal data base, only the administrator can actually modify acquired or calculated data in the MS Access environment. Users can perform measurement and consult (read only) the internal database.



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Rappresentante - Sede locale:



SCS 8400 Software series has applications for almost every kind of machinery subjected to Noise certification and Sound Power labeling. Some common examples are:
ISO 639x for earth moving machines (CNH, Hyundai, Daewoo, John Deer, Backhoe Loaders Mini Excavators, Samsung, Fiore,);
ISO 11094 for gardening machines (Castelgarden,);
ISO 374x and 7779 for Office machines (Seagate, Panasonic,);
ISO 374x for Air conditioners (Apen group, Galletti,);
ISO 374x for Household appliances (Electrolux, Whirlpool,).