

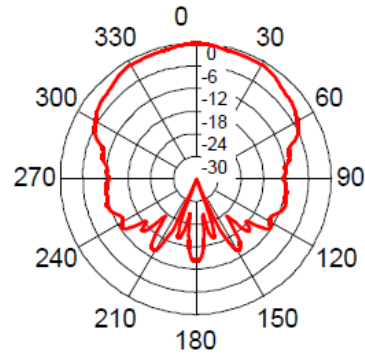
## End-user Agreement

This a legal agreement between Avisoft Bioacoustics and the buyer. By operating this device and the accompanying software, the buyer accepts the terms of this agreement.

- 1.The Device is warranted to perform substantially in accordance with the operating manual for a period of 24 months from the date of shipment.
- 2.EXCEPT AS SET FORTH IN THE EXPRESS WARRANTY ABOVE, THE DEVICE IS PROVIDED WITH NO OTHER WARRANTIES, EXPRESS OR IMPLIED. THE VENDOR EXCLUDES ALL IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.
- 3.The Vendor's entire liability and the Buyer's exclusive remedy shall be, at the Vendor's SOLE DISCRETION, either (1) return of the device and refund of purchase price or (2) repair or replacement of the device.
4. THE VENDOR WILL NOT BE LIABLE FOR ANY SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES HEREUNDER, INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFITS, LOSS OF USE, OR LOSS OF DATA OR INFORMATION OF ANY KIND, ARISING OUT OF THE USE OF OR INABILITY TO USE THE DEVICE IN NO EVENT SHALL THE VENDOR BE LIABLE FOR ANY AMOUNT IN EXCESS OF THE PURCHASE PRICE.
5. This agreement is the complete and exclusive agreement between the Vendor and the Buyer concerning the device.

## Specifications

Signal frequency	40.0 +- 3 kHz
Sound level at a distance of 25 cm	70 ... 85 dB SPL (see the label on the unit for the exact value)
Total Beam Angle ( -6 dB)	125°
Diameter of the active element	8.2 mm
Power supply voltage	4.0 ... 5.5 V (USB power) supply voltage)
Power supply connector	XLR-4 plug / USB type A plug
Current draw	1.4 mA
Diameter	20 mm
Length	47 mm (120 mm including cable)
Weight	40 g (120 g with USB power supply cable)



Polar diagram

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part #60105



Calibrated 40 kHz  
Reference Signal Generator

User's Guide



**Avisoft** ULTRASOUNDGATE

## Introduction

The Calibrated 40 kHz Reference Signal Generator allows calibrating ultrasonic recording chains in order to enable absolute sound level measurements or to realize standardized trigger levels in quantitative acoustic monitoring applications.



## Operation

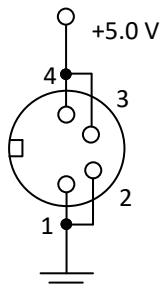
The generator must be connected to an external 5V (USB) supply voltage using the supplied adapter cable. This can be either an USB port of a computer, a USB charge adapter or a USB battery power back .

The calibrated sound level printed on the unit is valid for a (on-axis) distance of 25 cm from the surface of the sound emitter. So, the microphone to be calibrated must be positioned at that distance from the generator.

Precisely calibrating equipment at ultrasonic frequencies is always a challenge due to the unavoidable reflections off nearby structures. Reflections can lead to both higher and lower sound levels at the microphone position. At the worst case it can even happen that the signal cancels completely out at the microphone position (when the reflected sound has the same amplitude as the direct sound and when there is a phase shift of 180° (a delay of about 12.5 μs, which corresponds to a displacement of about 4 mm) .

In order to reduce potential errors, the microphone to be calibrated and the generator should therefore be arranged in such a way that unwanted reflections off nearby structures (such as walls, table surface, ...) are minimized.

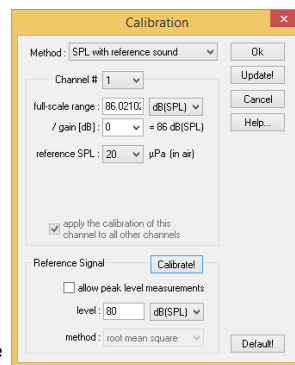
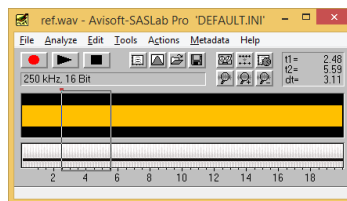
## XLR-4 Connector scheme



XLR Pin	Funktion
1	Ground
2	Ground
3	Enable input (normally connected to pin 4)
4	+5.0 V supply voltage

## Calibration procedure in combination with the Avisoft-SASLab Pro software

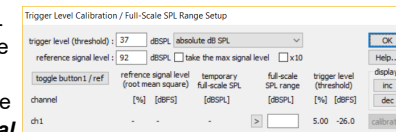
- Record the reference signal using the recording system (e.g. a field recorder, Avisoft-UltraSoundGate or USB audio interface) at the gain setting that will be used for the subsequent measurements.
- Launch the SASLab Pro software and open the .wav file containing the recorded reference signal.
- Mark a subsection of the reference signal using the marker cursor.
- Go to the menu **Tools/Calibration...** and select the **Method "SPL with reference sound"**. Enter the dB SPL sound level value printed on the generator into the **level** field at the bottom of the dialog box (using the default "dB (SPL)" option) and then click at the **Calibrate!** button. The resulting **full-scale range** of the .wav file will then be appear in the corresponding edit field at the top of the box.
- Finally click at OK to close the dialog box. All subsequent amplitude measurements will from now on be referenced to the reference signal.



See also the SASLab Pro manual on how to use the command **Tools/Calibration...**

## Trigger level / Full-scale calibration procedure in combination with the Avisoft-RECORDER software

- Launch the Avisoft-RECORDER / RECORDER USGH software and set it up according your requirements.
- Launch the command **Monitoring > Trigger level calibration / Full-scale SPL range...**
- Enter the dB SPL sound level value printed on the generator into the **"reference signal level"** field.
- Enter the desired **trigger level threshold** in dB SPL (for instance 37 dB SPL) into the corresponding edit field at the top of the dialog box. You can skip this step if you only want to calibrate the full-scale range for measurement purposes.
- Position the generator at a distance of 25 cm in front of the microphone. The currently registered signal strength (expressed both in % and dBFS) will be show on the bottom of the box.
- Click at the **calibrate!** button once the signal is detected properly. If necessary, repeat that for all other active channels. This will adjust the trigger thresholds accordingly. Optionally click at the ">" button(s) in order to save the full-scale range(s) for subsequent calibrated measurements (In order to use this calibration, select the spectrogram real-time display option and go to the drop-down menu **Options > Spectrogram settings...** Check here the option "Show spectrum (dBFS/dB SPL vs frequency)" and select the "level meter mode" option "rms level" at the bottom of the window).
- Finally click at **OK** in order to leave the Trigger Level Calibration mode. The trigger level(s) will now be referenced to the reference signal.



In case there are nearby reflective structures, it may be useful to activate the option **"take the max signal level"** and slightly move the signal generator around in order to reduce potential wave superposition effects that could otherwise lead to heavily underestimated sound pressure levels at the microphone position. If necessary, use the **"x"** button(s) to reset the maximum.

See also the RECORDER manual on how to use the command **Monitoring > Trigger level calibration/Full-scale SPL range...**