IEC-60942:2003 class 1 (BAC1)
IEC-60942:2003 class 2 (BAC2)

Bedrock BAC1 / BAC2 acoustic calibrators

Operating manual

BEDROCK

Document version 1.0

Contact information and support

The Bedrock BACx (BAC1 and BAC2) acoustic calibratrors are manufactured under the responsibility of Embedded Acoustics BV.

The manufacturer can be contacted at the following address:

Embedded Acoustics BV
Ampèreweg 18
2627 BG DELFT
The Netherlands
www.embeddedacoustics.com
www.bedrock-audio.com
Phone: +31 88 8770700
Fax: +31 88 8770799
Email: support@bedrock-audio.com

Updates of this manual and other product documentation are released online :

www.bedrock-audio.com/support

Where this manual refers generically to the Bedrock BACx, the corresponding text applies to all device models starting with the letters "BAC" (i.e. BAC1, BAC2).

Guarantee

Embedded Acoustics BV offers a 12 month guarantee on all of their units. This covers all parts and labour excepting only damage caused by the user. Because of the unique fragility of microphones, only internal short or open circuits are accepted as faults and not accident damage. The guarantee requires the user to return the unit to their nearest authorised Bedrock Audio Agent. This guarantee is in addition to any statutory rights in your country.

Document version 1.0 release date August 2018. Applies to models: BAC1, BAC2

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1. Introduction

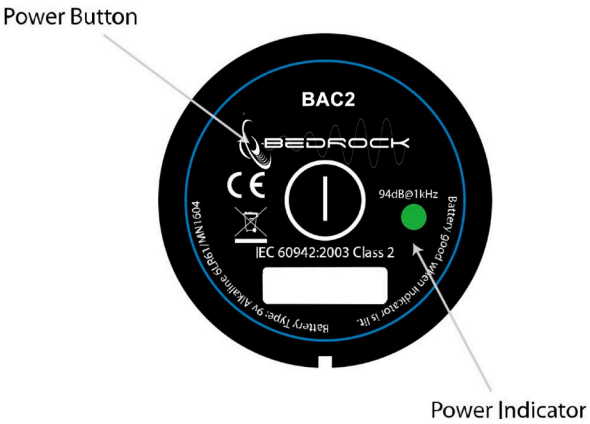
Congratulations on purchasing a Bedrock BACx acoustic calibrator. The BACx is the ideal instrument to verify that your Bedrock acoustic measuring instrument (such as the Bedrock SM50 or SM90) is accurately calibrated. We recommend to check your acoustic measuring instrument with the BACx calibrator before and after each measuring session.

Note that the use of the BACx does not take away the need for periodic testing of your measuring instrument as described in IEC-61672-3. We recommend to have your Bedrock SMxx tested by the manufacturer or an accredited laboratory at least once every two years.

2. Operation

Switching on the calibrator

Press the Power Button on the end of the Calibrator to switch the unit on. The Indicator will illuminate to show that the unit is operating.



The calibrator will automatically switch off after 5 minutes to preserve battery power.

To switch off the calibrator manually, press the power button again and the indicator will extinguish to show that the unit is switched off.

Permanent on mode

For some applications there may be a need to have the calibrator switched on continuously. To allow for this, the calibrator can be turned on by pressing and holding the power button for three seconds.

Release the button and the indicator will flash to show that the unit is in permanent-on mode. Press the power button to switch off the calibrator.

Calibrating an acoustic measuring instrument

Push the microphone of the instrument into the cavity at the end of the calibrator. The cavity in the instrument is designed for 1/2" microphones. An adapter is provided to fit 1/4" microphones, such as the BAMT2.

The BACx is usually shipped with the 1/4" adapter inserted into the cavity,. The adapter is a small plastic part that is easily misplaced. If you need to calibrate a 1/2" microphone (such as the BAMT1), gently remove the adapter and stow it carefully for future use.

Ensure the microphone is fully inserted into the cavity and is past the 'O' ring seals. The microphone should be parallel to the body of the calibrator. Also ensure that the small bleed-hole next to the microphone cavity is not blocked as this could cause damage to the microphone.

Adjust the acoustic instrument to the correct level where applicable. On the Bedrock SMxx, choose "calibrate" from the main menu to activate calibration mode. Please refer to the SMxx manual for details on the operation of the calibration mode. When correcting the value generated by the calibrator a correction for the type of microphone capsule may need to be applied (see Appendix B)

Background noise

In order for the calibrator to operate as intended, the ambient acoustic noise level should be no greater than 80 dBA.

Stabilisation

In order for the sound pressure level and frequency to stabilise after switching the calibrator on when coupled to a microphone, a period of at least 3 seconds should be allowed before performing a calibration.

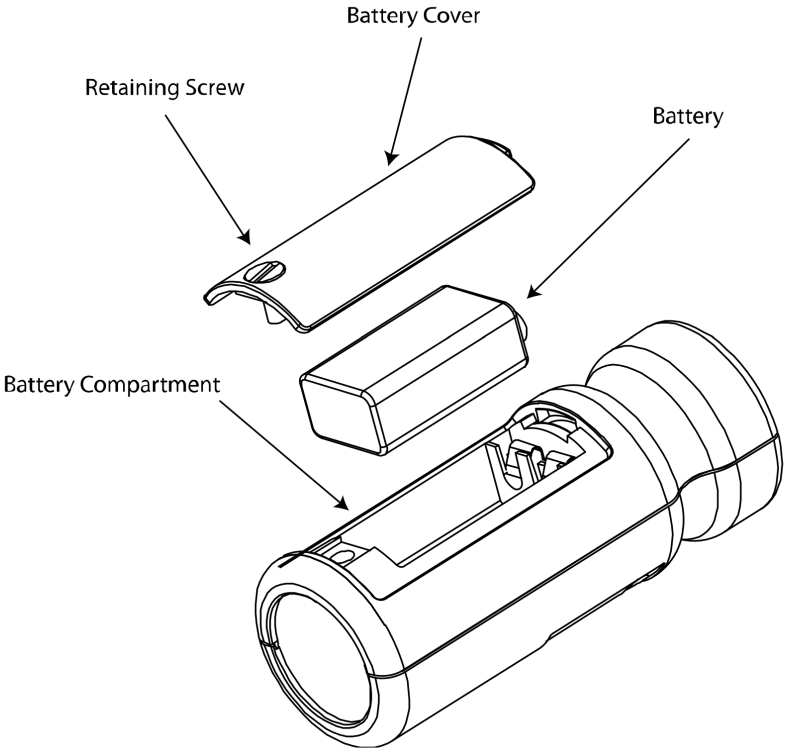
3. Changing the battery

The BACx acoustic calibrators use a single 9v alkaline battery. This type of battery is known as 6F22 or NEDA 1604. It is also commonly known as PP3.

To replace the battery:

1. Unscrew the screw holding the battery cover on, using a coin.
2. The battery, type 6F22 (PP3) can now be eased out of its holder and replaced.

The battery should be eased out terminal side first by pushing against the spring at the other end. Ensure that the battery is inserted with the correct polarity with the negative terminal at the contact with the larger cutout.



Battery type

The battery should be an alkaline battery, not an ordinary dry cell. The battery is 9 volts when new and will operate the calibrator down to 6.4 volts. When the battery voltage is below 6.6 volts but above 6.4 volts, the power LED will flash to indicate that the battery voltage is low. When the battery voltage is below 6.4 volts the calibrator will not turn on. A discharged battery may allow switch-on but will soon drop in voltage and indicate low battery or switch off.

4. Technical specifications

Frequency	1 kHz ± 1%
Sound level	94dB re 20µPa
Standards compliance	BAC1 - IEC 60942:2003 Class 1 BAC2 - IEC 60942:2003 Class 2
Distortion	Less than 2%
Operating humidity	25 to 90% Relative Humidity
Operating static presssure	65 kPa to 108kPa
Operating Temperature	-10^{O}C to +50^{O}C
Storing Temperature	-20^{O}C to +60^{O}C
Effective Volume	6.19 cm3 ± 0.2 cm3
Cavity Diameter (without adapter)	0.525 inch
Battery	1 x 9v 6F22 (Neda 1604)
Battery Life	Approx 15 Hours Continuous Use
Battery Voltage	9v Nominal (10v Maximum, 6.4v Minimum)
Weight with Battery	185g
Dimensions	135mm x Ø48mm

Appendix A. Technical information

The normal mode of operation of the calibrator is with the unit switched on.

When the LED indicates the unit is switched on this produces the greatest radio frequency emissions.

The calibrator continues to function after exposure to contact discharges up to 4kV and air discharges up to 8kV, for both positive and negative voltages relative to earth ground.

The calibrator conforms to IEC 60942:2003 for a modulated root-mean-square electromagnetic field strength of 10 V/m.

The maximum susceptibility to power and radio frequency fields is with the cavity facing away from the emitter with the battery compartment facing the table, the antenna polarisation horizontal and the calibrator switched on.

Appendix B. Free field correction

When calibrating a microphone which is to be used for free field measurements, a small correction may be necessary to compensate for the difference between the microphone's free field response at 'zero degrees' or 'head-on' incidence and the pressure level generated by the calibrator.

The correction is typically -0.3dB for ½ inch microphones (making the effective calibration level 93.7dB).

The table below shows the correction values for the standard microphones of Bedrock Audio, as well as three capsules commonly used in calibration laboratories.

Microphone type	Calibration correction	Effective calibration level
BAMT1-M201	-0.1 dB	93.9 dB
BAMT1-M309	-0.1 dB	93.9 dB
BAMT2 (with adapter)	-0.3 dB	93.7 dB
B&K 4134	0 dB	94.0 dB
B&K 4180	0 dB	94.0 dB
B&K 4192	0 dB	94.0 dB

Example

An example of the procedure used to calculate the value for a BAMT2 microphone is shown below :

Level = 94.0dB + Microphone Correction

Level = 94.0dB + (-0.3dB)

Level = 93.7dB

Different microphones will have different correction values. Please check the operation manual for the Sound Level Meter or microphone concerned for details.

Appendix C. CE declaration of conformity

Embedded Acoustics BV
CE declaration of conformity

Manufacturer:

Embedded Acoustics BV
Ampèreweg 18
2627 BG DELFT
The Netherlands

Equipment Description

The following equipment manufactured after 1st January 2013:

BAC1 Acoustic Calibrator
BAC2 Acoustic Calibrator

Along with their standard accessories
According to EMC Directives 89/336/EEC and 93/98/EEC
meet the following standards

EN 61000-6-3 (2001)

EMC : Generic emission standard for residential, commercial and light industrial environments.

EN 61000-6-1 (2001)

EMC : Generic immunity standard for residential, commercial and light industrial environments.

Signed

Dated 1st August 2018

S.J. van Wijngaarden