



Ultrasonic Calibrator for SM2BAT+ and SMX-US/UT Microphones



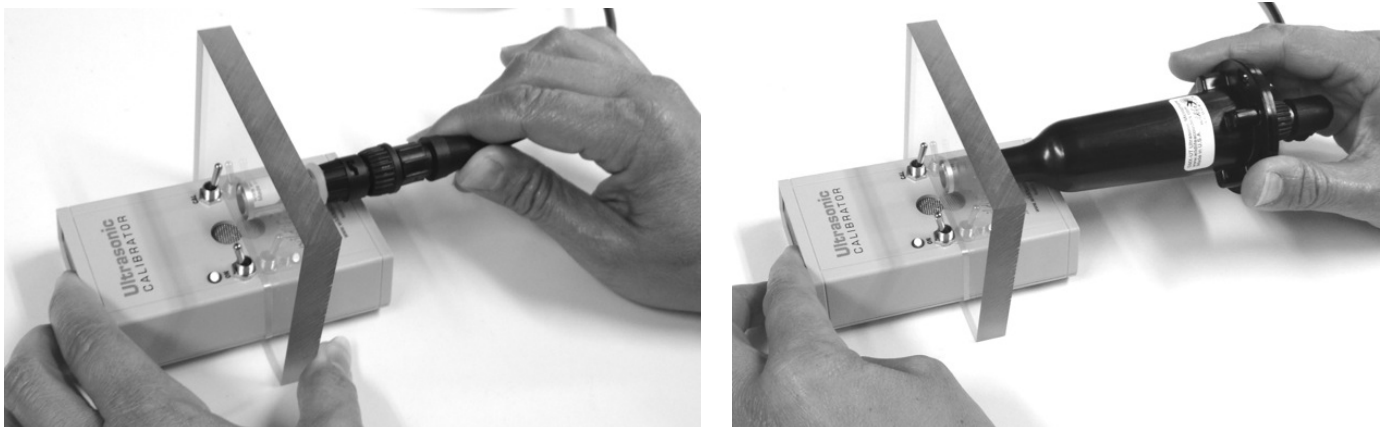
Since ultrasound is beyond the range of human hearing, verifying proper system and microphone performance can be a challenge. The Ultrasonic Calibrator allows testing of both the microphone performance and the full SM2BAT+ recorder system performance.

The Calibrator has two modes of operation, “CALIBRATION” and “CHIRP”. Calibration mode is used to test the microphone unit itself at close range and the chirp mode is used to test the entire system at a greater distance.

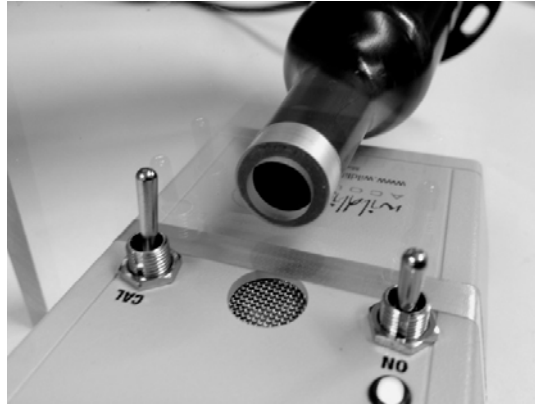
Calibrator mode:

To test the system, the Calibrator generates a calibrated 40kHz tone. The microphone is placed in the calibrator fixture and a special mode is available on the SM2BAT+ to display the received signal level. This can be easily compared to the microphone specification.

Install the microphone adapter by sliding it onto the base of the Calibrator. The adapter should be installed such that the smaller diameter of the hole is nearer the toggle switches and ultrasonic transducer. The adapter will work with the SMX-US or SMX-UT as shown below.



Insert the microphone until it rests against the smaller diameter of the adapter hole as shown below.



To access the receive levels of the signal on the SM2BAT+ several audio settings must be changed. The triggers under the advanced audio menu should be turned off (to 0dB) to allow a longer recording to be made. In addition, be sure that the high pass and low pass filters in the advanced settings menu are not set at levels that would filter the 40kHz calibration signal.

The calibrated levels shown below are predicated on our recommended gain settings of 48dB for the SMX-US and 36dB for the SMX-UT. This is the gain set on the jumpers/switches.

With the microphone held in the adapter and the toggle switch set to “CALIBRATE”, initiate an instant recording by simultaneously pressing the “up” and “down” buttons on the SM2BAT+. Now press the “select” button and a dB value will be shown for each channel. This is a value relative to a full-scale signal in the recording in dBs. The microphones sensitivity is affected by orientation so the microphone should be rotated 360 degrees and the largest (least negative number) dB value noted. The microphones can vary in sensitivity from one to the next by up to 8dB, this is normal variation of the microphone element. The max value shown on the LCD should fall into the following range:

Microphone	Accepted Range of Max read Value
SMX-US	-10dB to -18dB
SMX-UT	-24dB to -32dB

A higher (less negative) number indicates a more sensitive microphone, a lower number indicates some loss of sensitivity. Again the microphone should be fully rotated and the maximum value seen compared to the above range.

Remember to set the unit back to your preferred settings when done! A “Calibrate” mode is under development to allow quick access to calibration data on the SM2BAT+ LCD without having to change settings or make a recording. Coming soon!

Chirp mode:

For a test of the full SM2BAT+ system, the Ultrasonic Calibrator can emit loud ultrasonic signals to the SM2BAT+ while it is recording from some distance. These recordings can be analyzed to verify that the SM2BAT+ settings are appropriate and the system is functioning as expected. Switch the toggle switch to “CHIRP” and the unit will emit a 40kHz signal pulsed signal at very high amplitude. The signal can be picked up by the SMX-US or SMX-UT microphone and seen in the recording out to about 20m. The sound can also be monitored from the SM2BAT+ using the Real Time Expansion (RTE) monitoring feature. This feature is accessed by plugging headphones into the headphone jack under the circuit board under SD slot A. During a

recording the RTE mode can be turned on by pressing the select button. You will hear the signal only when the unit is triggered so this can be very useful for checking the efficacy of your trigger settings. You can hear the signal using RTE from about 10m away.

If convenient the microphone adapter can be removed from the Calibrator by sliding it off.



WARNING: In “Chirp” mode, the Ultrasonic Calibrator emits a 40kHz signal at over 100dB SPL. Prolonged exposure to high intensity ultrasonic signals may cause permanent hearing loss at audible frequencies. Please do not place the Calibrator close to your ears!

Battery:

The Calibrator requires a 9V alkaline battery (1.5V cell) and one is included with the unit. The battery is accessed behind the hinged door at the top of the unit. As the battery is depleted the LED light will dim and when the battery can no longer power the device the LED will not illuminate and no sound will be emitted. The volume of the emitted sounds will not decrease as the battery is depleted, if the LED is lighted at all then the Calibrator is operating fully and when the LED no longer lights then no sound is emitted.