

Song Meter SM2BAT+ Passive Digital Audio/ Ultrasonic Recorder

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The Song Meter SM2+ series from Wildlife Acoustics are compact and affordable digital audio/ ultrasonic recorders specifically designed for the automated recording of wildlife vocalizations. They are robust and weatherproof, suited to long term and unattended deployment in harsh outdoor environments.

This document is specific to the SM2BAT+ Terrestrial Ultrasonic Package.

This Song Meter version is able to monitor and record the ultrasonic calls of bats and insects, in essence combining a real-time bat detector and recorder with facility to record birds, frogs and fish, either at the same or at other times. For information on the non-ultrasonic SM2+ Terrestrial Acoustic Package, please refer to a separate information document from the Faunatech website.

The SM2BAT+ The SM2BAT+ is equipped with a broadband SMX-US weatherproof ultrasonic microphone and a two-channel 384 kHz 16-bit sample card, enabling sampling of bats calls up to 192 kHz. Unlike other bat detectors, the SM2BAT+ monitors continuously, ensuring critical events are not missed. Importantly, with SM2BAT+, recordings are in full spectrum, hence all amplitude and harmonic information from the original signal is retained for subsequent analysis.

Ten sampling rates are available on the SM2BAT+, ranging from 4 through 192 kHz in either mono or stereo, plus a 384 kHz sampling rate in mono only. Sampling rates can be adjusted to suit the animal group under investigation - lower frequency calls can be recorded at lower sampling rates, hence reducing storage demands and increasing deployment times. The user also has the option to adjust gain settings or enable a number of band pass filters to further increase efficiency and quality of data collection. For example, extraneous background sounds can be eliminated at the time of recording.

The Song Meter is very power efficient. With 4 D-size batteries, SM2BAT+ can record audio for 150 hours plus, or ultrasound for up to 95 hours in mono, or 70 hours in stereo. This can be on a programmed schedule spread over several months at a time. Even longer deployments are possible with an external battery or solar power plant.



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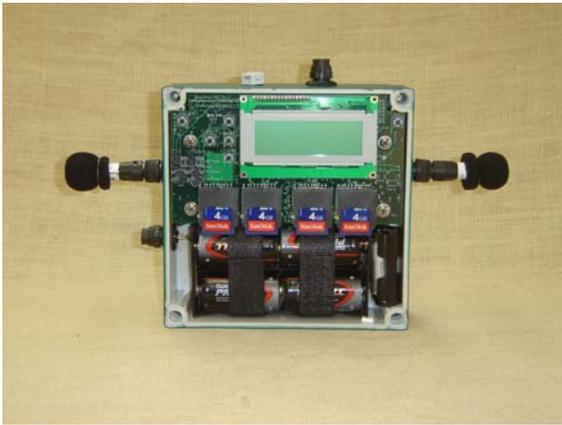
PO Box 1655 Bairnsdale 3875 Victoria Australia

Tel: +61 3 51579001 Fax: +61 3 51579002

goodgear@faunatech.com.au

www.faunatech.com





Storage capacity is also exceptional. For example, 92 continuous uncompressed hours of ultrasonic bat activity can be stored on the four 32 GB SD memory cards (single channel, 192 kHz, 16 bit). Depending on conditions, the application of compression and adaptive triggering can increase the total recording time to over 250 nights (at 0.5GB/night).

The SMX-US microphone is omni-directional, thus enabling a vastly increased sampling volume while reducing the biasing of data. It is also weatherproof, an important characteristic of any field device. The microphone can be attached either directly to the SM2 housing, or can be run on a 100 metre extension cable.

An optional second mic and lead on the other channel allows the monitoring of adjacent habitats simultaneously. Other optional microphones include the SMX-NFC Night Flight Call mic, or the submersible HTI-96-MIN hydrophone. Note that the left and right channels can be fitted with different microphones and can be programmed to record at either the same or different times, even with different sampling rates and gain settings.

The Song Meter SM2BAT+ has provision for stereo headphones, allowing bat researchers to listen to live bats with Real Time Expansion (RTE). Division ratios of 4, 8, 12, 16 and 24 are available, configurable in the advanced settings. RTE shifts bat sounds to audible frequencies using a sophisticated algorithm that preserves both temporal and spectral information.

Files are saved to full spectrum .WAC or .WAV format. The free *WAC to WAV* utility allows easy conversion between *these* formats and also allows users to easily down-convert to Zero Crossing Analysis files, for processing by those preferring the latter format.

SM2 includes a powerful and flexible program schedule capability. Record protocols can be very quick and simple, through to complex conditional and looped record schedules. Programming is set via the free PC based *Configuration Utility* then copied to any number of SM2s via SD card. Alternatively programming can be done directly on the SM2 in the field. The system can automatically adjust record schedules relative to sunrise and sunset times as these change through the year.

Song Meter features a built in internal temperature sensor. In addition an integrated data logger and watertight sensor socket is standard. By connecting the appropriate and approved external sensor, environmental variables such as temperature or rain fall can be captured and correlated to recorded audio data.

SONG SCOPE

Song Scope allows a visual representation, or spectrogram of your recordings. Through Song Scope the researcher has the potential to develop "*Recognizers*" or specific vocalization patterns, related to a species of interest. This process can be applied to automatically scan through thousands of hours of audio recordings to find the most likely occurrences of these patterns of interest. The results can then be quickly reviewed and confirmed.

