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Online User Guide

You can download the guide for printing at
www.wildlifeacoustics.com/resources/user-guides

Contacting Support

For issues or questions not addressed in this guide, contact the Wildlife Acoustics Support Team:

- Email: support2020@wildlifeacoustics.com
- North America (toll-free): 1-888-733-0200
- Outside North America: US+1 978-369-5225 (Toll charges may apply)

Introduction

Our smallest, lightest and most affordable wildlife audio recorder, the Wildlife Acoustics Song Meter Mini recorders provides researchers a simple, yet innovative tool for recording bats, birds, frogs and other vocal wildlife.

Song Meter Mini Models

This manual covers both the Song Meter Mini and the Song Meter Mini Bat models. Throughout this user guide, when features of the two models are in common, the recorder will be referred to as the Song Meter Mini. When there are differences between the two models, the Song Meter Mini and Song Meter Mini Bat will be described separately.

When mentioning frequency range this user guide will use the word “acoustic” to describe frequencies generally considered to be within the range of human hearing – generally up to around 20,000 Hz. “Bat” or “Ultrasonic” will be used to describe frequency ranges generally above 20,000 Hz.

Song Meter Mini



- The Song Meter Mini captures audio up to 48,000 Hz frequency with its built-in acoustic microphone.

- The Song Meter Mini has the option to connect a second acoustic microphone.
- When a second microphone is connected, the Song Meter Mini can record in single channel or stereo mode.
- The Song Meter Mini records continuously according to its recording schedule.

Song Meter Mini Bat



- The Song Meter Mini Bat records up to 250 kHz frequency audio with its built-in ultrasonic microphone.
- An optional acoustic microphone can be connected. Both microphones cannot be used at the same time, however it is possible to have a recording schedule that alternates between acoustic and ultrasonic recording.
- The Song Meter Mini Bat uses triggered recording within its ultrasonic recording schedule and continuous recording for a second acoustic microphone if implemented.

Recorder & Configurator App Setup

Follow these instructions to use the Song Meter Mini for the first time.

Installing Batteries

The Song Meter Mini can be powered by four AA batteries or the optional lithium-ion battery lid.

- For use with the optional lithium-ion battery lid, please refer to the installation instructions in this user guide.
- Follow these instructions for AA battery use.

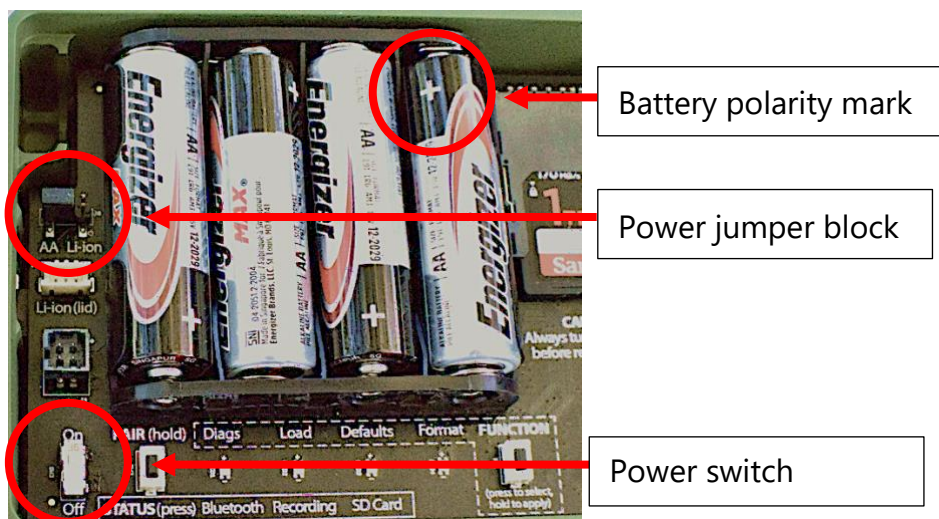
NOTE: Energizer brand of alkaline batteries are recommended for their superior performance.

1. Open the recorder.
2. Insert batteries with their polarity (+/-) orientation as shown on the battery bay markings. The recorder uses four size AA alkaline or NiMH batteries.

TIP: Prior to installation, we recommend that all batteries are tested with a high-quality pulse load battery tester such as the ZTS MINI-MBT.

WARNING! Do not mix batteries of different types, and do not mix old and new batteries. Remove batteries before storing the recorder for an extended time.

3. Make sure the power jumper is connected to the AA pin on the left.
4. Set the power switch to On.



When not in use, set the power switch to Off to conserve battery power.

The Song Meter Mini enters a low-power sleep state between scheduled recordings to conserve energy and maximize efficiency for long deployments.

TIP: Use the Song Meter Mini Configurator app to estimate the recording requirements for your schedules including battery life and memory storage.

Installing the SD Memory Card

The Song Meter Mini saves recordings to an SD memory card installed in the memory card slot.

NOTE: Be sure the card's write-protection switch is "off". The Song Meter Mini will not record to a write-protected card.

1. Insert the SD memory card into the slot. Push the card straight in until it clicks into place.
2. To remove a card, push it in and release it. The spring-loaded slot ejects the card so it is released from the slot.

NOTE: Do not remove the SD memory card while the Song Meter Mini is powered on. Power the recorder off before removing the SD memory card

Installing the App

- The Song Meter Mini is programmed via the Song Meter Mini Configurator app.
- The Song Meter Mini Configurator app is available for Android and iOS.
- Download and install the Android version from Google Play.
- Download and install the iOS version from the Apple App Store.
- The Song Meter Mini Configurator app requires a minimum iOS version of 10.0.
- The Song Meter Mini Configurator app requires a minimum Android version of 5.0.
- The Song Meter Mini Configurator app requires that the host mobile device has a minimum Bluetooth chipset version of 4.0.

Bluetooth Connection

- The Song Meter Mini recorder uses Bluetooth protocol to communicate with the Song Meter Mini Configurator app on an iOS or Android device.
- In factory default mode if the Song Meter Mini is powered on and within Bluetooth range of the iOS/Android device, the Configurator app will automatically detect the recorder and display it in the Recorders screen.
- Once detected, the Song Meter Mini will upload its current status to the Configurator app. Tap the Status icon to display the current status of the recorder.

Pair the Song Meter Mini with the Configurator app

- In order for the Configurator app to edit the schedule and settings currently stored in the recorder, the recorder must be paired with the app.
- Only one Song Meter Mini recorder can be paired with the Configurator app at a time.

- If multiple recorders are within Bluetooth range, they will each be listed in the Recorders screen.
 - Pressing and holding the PAIR button on Song Meter Mini recorder will make the recorder available for pairing in the Configurator app.
1. Make sure Bluetooth is enabled on the iOS or Android device
 2. Launch the Song Meter Mini Configurator app and display the Recorders screen.
 3. Remove the cover from the Song Meter Mini.
 4. Turn the Power switch to On.
 - If the recorder is powered on and in Bluetooth range, and the Send Bluetooth Beacons? function is not disabled, the Song Meter Mini will automatically appear as a detected device in the Recorders screen of the Configurator app.
 - Initially the recorder will not be paired with the app. Pairing must be done manually.

NOTE: The first time the Song Meter Mini is configured, or if the batteries have been removed for an extended period of time, the internal clock will not be set. This will result in the Bluetooth LED flashing red. The clock must be set before the Song Meter Mini can be used for recording. To set the internal clock, pair the Song Meter Mini with the Configurator app.

5. Press and hold the PAIR button on the Song Meter Mini recorder for three seconds. The Bluetooth LED on the recorder will blink green, indicating the recorder is ready to pair.
6. The Song Meter Mini recorder will now be available to pair with the Configurator app. The Pair icon for the Song Meter Mini will now be available in the Recorders screen.
7. Tap the Pair icon in the Recorders screen.
8. The Song Meter Mini will now be in full paired communication with the Configurator app.

9. The programmed date and time of the Song Meter Mini recorder will automatically be synchronized with the mobile device.
- If the location and time zone of the Song Meter Mini recorder do not match the location and time zone of the mobile device, a window will open asking if those parameters should be updated on the recorder to match the mobile device.
 - This allows pre-programmed remote location and time zone to be preserved while editing other settings within the Song Meter Mini recorder.

Select a Recording Schedule

1. Tap the Configure icon for the paired Song Meter Mini in the Recorders screen.
2. The Paired Configuration Editor screen will open.
3. Select a preset recording schedule.
4. The preset recording schedule will be uploaded to the Song Meter Mini recorder.
5. The Song Meter Mini is now ready to record!

Note: To create a custom recording schedule please reference the **Schedule Editor** section of this user guide.

Song Meter Mini Recorder

The Song Meter Mini is a system that utilizes two components - a hardware recording device and a software app. This section will describe the hardware recording device.

External Features

- The Song Meter Mini recorder is designed for long-term, outdoor deployment.
- The Song Meter Mini is made from durable polycarbonate plastic and is UV resistant and weatherproof.
- The recorder features mounting brackets on top and bottom. Typical methods to mount the Song Meter Mini include bungee cords or a cable lock. The cable lock must be under 0.3 inches (7.6mm)
- A second acoustic microphone is an available option for both the Song Meter Mini and Song Meter Mini Bat
- An optional Lithium-ion battery lid is available for extended deployment times.
- A lockable security strap is available.
- The Song Meter Mini recorder consists of a main enclosure and a snap-on cover. To remove the cover, grasp the main enclosure and pull up on the sides of the cover. This will expose the interior of the recorder.

Internal Features

The Song Meter Mini has many features and functions which can be accessed directly from the hardware.

The following information is printed inside the lid cover:

To Get Started

- How to download and install the Song Meter Mini Configurator app

- Instructions to install batteries
- Instructions to pair the Song Meter Mini with the Configurator app

Button Definitions

- On/Off Switch
- Pair/Status Button
- Function Button

Status LED Definitions

- Bluetooth
- Recording
- SD Card



User accessible features of the Song Meter Mini recorder



Power source jumper



Power source jumper
(currently set to AA)

Lithium-ion battery lid connector

- The power source jumper is a block of plastic which connects two points on the circuit board.
- The power source jumper can be moved between two positions to connect either AA or Lithium-ion batteries.

- The Song Meter Mini can be powered by internal AA batteries or Lithium-ion batteries in the optional Lithium-ion battery lid.
- The power source jumper determines which source will be used.
- The jumper block connects the center pin to either the left pin for AA battery use, or the right pin for lithium-ion battery use.

NOTE: If the jumper is disconnected or in the wrong position the Song Meter Mini will not receive power and will be disabled.

Lithium-ion battery lid connector

When the lithium-ion battery lid is used, connect the cable from the lithium-ion lid to the recorder. For additional details regarding the lithium-ion battery lid please see the **Lithium-Ion Battery Lid** section of this user guide.

Battery holder



Polarity label

The recorder uses four size AA alkaline or NiMH batteries. Make sure the positive/negative polarity of the batteries are correctly oriented.

NOTE: Energizer brand of alkaline batteries are recommended for their superior performance.

On/Off Switch



On: Battery power is enabled. Schedule is started.

Off: Schedule is stopped. Battery power is disabled.

NOTE: When the Song Meter Mini is powered off, it goes through a routine to end and save any current recording. This can take a few seconds.

PAIR/STATUS button

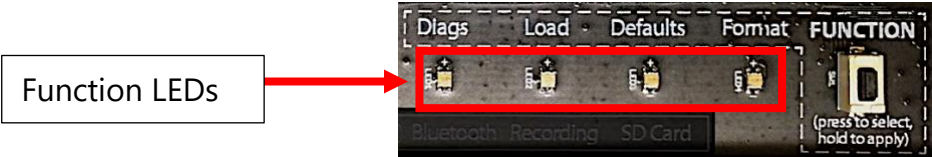


- This is a dual function button. When the Song Meter Mini is first powered on, the Status LEDs will show Bluetooth, Recording, and SD Card status. If one minute passes with no further activity, the Status LEDs will be disabled.
- Press the PAIR/STATUS button once to re-activate the Status LEDs.
- Press and hold the PAIR/STATUS button for three seconds to make the Song Meter Mini available for pairing with the Configurator app.
- The Bluetooth Status LED will show the pairing state between the Song Meter Mini and Configurator app.
- Pairing does not happen automatically. Pairing must be manually confirmed from the Configurator app.
- The Status LEDs will remain active as long as the Song Meter Mini is paired with the Configurator app.

Status LED definitions:

Bluetooth:	Off	Not paired
	Green Blinking	Pairing
	Green Solid	Paired
	Red Blinking	Clock needs to be set
	Red Solid	Pair failed
Recording:	Green Blinking	Recording (*Triggered)
	Green Slow	*Armed & waiting for trigger
	Green Solid	Waiting next recording period
	Red Solid	Can't record
SD Card:	Off	No card detected
	Green Blinking	Card is active: do not eject
	Green Solid	No activity: can be ejected
	Red Blinking	SD card full
	Red Solid	SD card issue
* Song Meter Mini Bat in Bat Mode only.		

Function button and LEDs



- Press the FUNCTION button multiple times to cycle through the functions.
- When the desired function LED is lit, press and hold the FUNCTION button for 3 seconds to commence the function.
- The selected LED will blink green while the function is in progress.
- When the function is completed all four LEDs will blink green three times if the function is successful.
- If the function fails all four LEDs will blink red six times.

There are four available Functions:

Diags

Run diagnostics

- A diagnostic file describing the functions of the Song Meter Mini will be written to the SD memory card.
- The file will have a file name of *Prefix_YYYYMMDD_HHMMSS.minidiags*
- This function will also create a configuration file on the SD card.
- The configuration file will have a file name of *Prefix.miniconfig*
- The configuration file on the SD can be used to load the configuration onto other Song Meter Mini recorders

Load

Load configuration file and/or firmware file, if present, from the SD card.

Defaults

Reset to factory defaults.

- Resetting factory defaults will clear all internal settings with the exception of current date and time.
- Default values for all parameters are listed in the Song Meter Mini Configurator app section of this user guide.

Format

Format SD card.

- This will erase all data on the SD card.
- In some cases, a corrupted SD memory card can be reformatted to make it work again.
- If an SD card is reformatted and continues to have problems, the card may be defective.

SD memory card slot



- The Song Meter Mini recorder saves recording files to an SD memory card installed in the memory card slot.
- The SD card can be connected to a computer to transfer recording files to the computer for analysis.
- To insert an SD card, slide it into the slot until it clicks into place.
- To remove the SD card, gently press the card further into the slot and then slide the card out.
- Only remove the SD card when the recorder is powered off.
- To check the available recording space on the SD card, check the status of the recorder in the Configurator app.
- The number of recordings that can be stored on an SD memory card is variable based on card size, sample rate of the recording and whether the recording is mono or stereo (stereo recording available only with the Song Meter Mini and second optional microphone connected).

NOTE: Wildlife Acoustics recommends the SanDisk brand of memory cards for their superior performance.

NOTE: Be sure the card's write protection switch is "off". The Song Meter Mini will not record to a write-protected card

Right microphone connector



If a second acoustic microphone is connected to the Song Meter Mini or Song Meter Mini Bat, this is the connection point for the optional microphone.

Adding a Second Microphone

Song Meter Mini

- The Song Meter Mini in stock format features a single built-in acoustic microphone.
- A second acoustic microphone can be connected. This allows for single channel or stereo recording.
- The built-in microphone is referred to as the Left Channel. The optional second microphone is referred to as the Right Channel. It is not possible to connect a second ultrasonic microphone to the Song Meter Mini or Song Meter Mini Bat.

Song Meter Mini Bat

- The Song Meter Mini Bat in stock format features a single built-in ultrasonic microphone.
- An optional acoustic microphone can be connected. This allows for a recording schedule that alternates between ultrasonic and acoustic recording
- The ultrasonic microphone and acoustic microphone cannot be used at the same time.
- The ultrasonic microphone will create triggered recordings within a schedule.

- The acoustic microphone will create continuous recordings within a schedule.

Connect an optional second acoustic microphone to the Song Meter Mini or Song Meter Mini Bat:

1. Open the cover to reveal the inside of the recorder. In the upper right corner is a removable black plastic bolt. The bolt threads through a black plastic nut.



2. Use a $\frac{3}{4}$ " wrench or an adjustable wrench to gently unscrew the bolt from the nut. When the bolt is removed the internal nut will stay in place.



3. Thread the wire connector for the second microphone through the hole. Do not connect the wire to the circuit board yet.



4. Turn the second microphone clockwise to screw it into the internal nut. Make sure the thread is not crossed. Tighten with fingers or lightly with pliers. Do not over-tighten.
5. Now connect the wire from the second microphone to the jack labelled "Right Mic" on the circuit board. Route the wires to the right of the SD card to avoid physical interference or electrical noise from the SD card.



Lithium-ion Battery Lid

An optional lithium-ion battery lid is available that can hold up to six 18650 lithium-ion rechargeable batteries. This provides approximately 5 times the battery life of 4 alkaline AA batteries. It is possible to use 2, 4, or 6 lithium-ion batteries to power the Song Meter Mini.

WARNING! Lithium-ion batteries can cause fires if not implemented correctly. Please carefully read the following specifications and instructions. Wildlife Acoustics sells high-quality lithium-ion batteries that have been tested and approved for use in the Song Meter Mini. It is HIGHLY recommended that you use these batteries.

- The cell must be between 68mm and 69mm to make proper contact. These dimensions include any tab at the top. Some have a tab and some are flatter.
- The cell must be "protected" as opposed to "unprotected". This is an additional circuit at the end of the battery, internal to the packaging, which protects the cell from "over charge", heat or "over discharge", over current and short circuit. Use ONLY protected 18650 batteries.
- All batteries must be fully and equally charged. A standard battery charger that is specifically designed to charge 3.6/3.7V lithium-ion batteries can be used. Wildlife Acoustics sells a high-quality battery charger.
- Do not mix batteries of different types.
- Do not mix old and new batteries.
- Remove batteries before storing the recorder for an extended time.

Follow these instructions for lithium-ion battery use:

1. Make sure the AA/Li-ion jumper is all the way to the right on the center pin and right most pin.
2. Install 2, 4 or 6 lithium 18650 batteries
3. Connect the battery lid to the recorder.

Song Meter Mini Configurator App

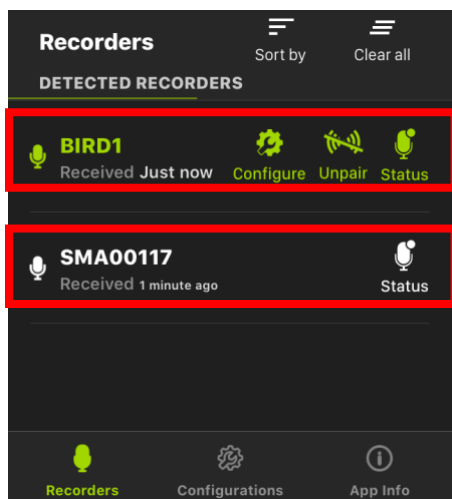
All internal settings and schedules for the Song Meter Mini are configured on an iOS or Android device via the Configurator app.

- A Song Meter Mini recorder that is detected by the Configurator app will automatically upload its current status to the app.
- The Configurator app communicates with the Song Meter Mini recorder via Bluetooth connection.
- The Configurator app can be used to program the recorder in real time. It can also be used to create and save configuration files, which can be stored and uploaded to the recorder at a later time.
- The Configurator app can be used to manage multiple recorders.
- The Configurator app can save, open, and share configuration files. Configuration files can be transferred to an SD memory card. The SD memory card can then be used to transfer the configuration directly to the Song Meter Mini recorder.

Recorders Screen

The first screen that is displayed when the Configurator app is launched is the Recorders screen.

- The Recorders screen can also be accessed by tapping the icon at the bottom of the Recorders/Configurations/App Info screen.
- The Recorders screen lists each Song Meter Mini recorder that has been detected by the Configurator App.



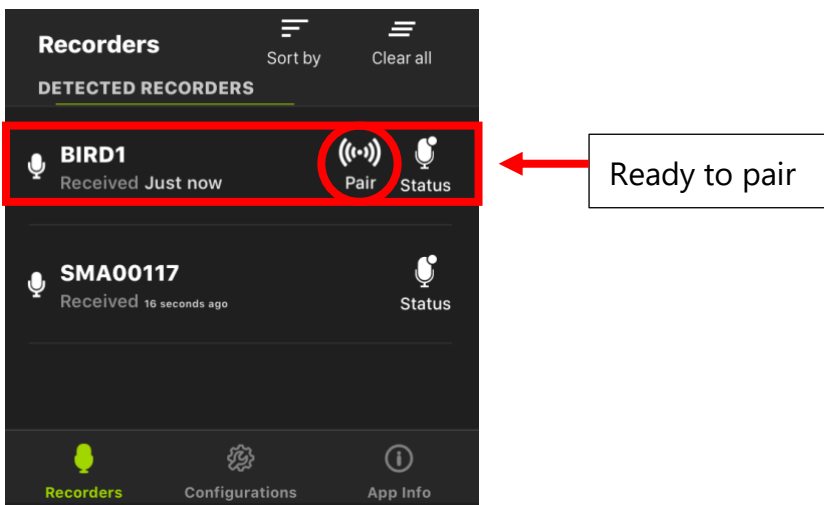
Detected and paired

Detected but not paired

Detected Recorders

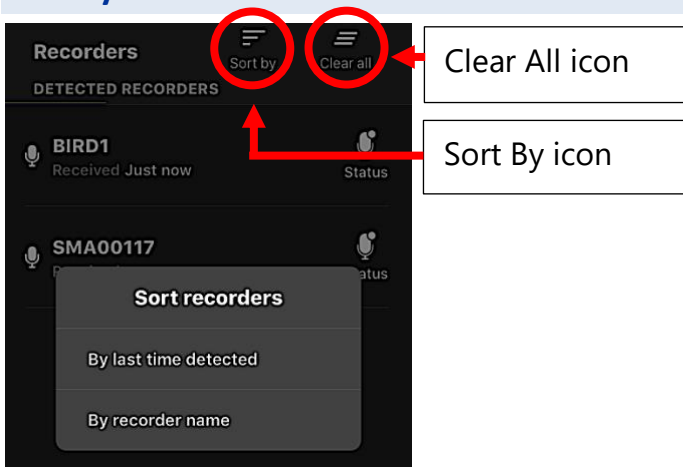
Any recorder that has been detected via Bluetooth by the Configurator app will be listed in this screen.

- Recorders that have been previously detected but are out of Bluetooth range or powered off will remain in the list.
- Recorders can be deleted from the Recorders screen, but will reappear in the list if redetected.
- A recorder must be paired with the Configurator app in order for it to be configured from the app. Pairing does not happen automatically.
- Only one recorder at a time can be paired with the Configurator app.
- To pair a Song Meter Mini recorder with the Configurator app, press and hold the PAIR button on the recorder for 3 seconds. The detected recorder will show that it is available for pairing.



Tap the Pair icon for the recorder in the app. The detected recorder will now be displayed as paired and will be available for programming.

Sort by

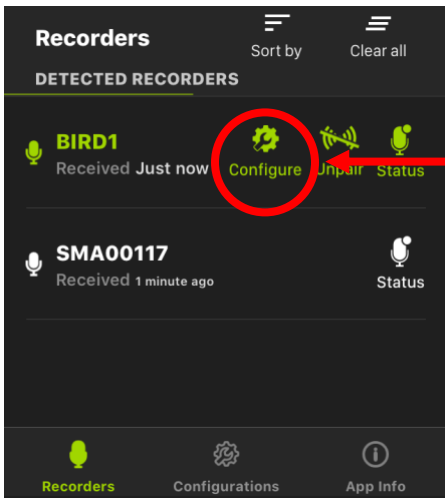


Tap the Sort By icon to sort the recorder list by time last detected or recorder name.

Clear all

Tap this icon to delete all recorders from the list. If a recorder is redetected it will reappear in the list.

Configure



Configure icon

When a recorder is paired to the Configurator app this option becomes available.

- When the Song Meter Mini recorder pairs with the Configurator app, It automatically uploads its current configuration to the app.
- Tap Configure to display the current configuration and settings for the paired recorder in the Paired Configuration Editor screen.
- Any changes made in the Paired Configuration Editor and Bat/Acoustic Settings Editor screens will immediately update the currently paired recorder.

Pair/Unpair

If a recorder is powered on and within Bluetooth range of the iOS or Android device, it can be paired or unpaired from the Configurator app.

- Initially a detected recorder will not be paired with the Configurator app.
- Pairing does not happen automatically.

To pair a recorder with the Configurator app:

1. Open the lid of the Song Meter Mini recorder.
2. Make sure the recorder is powered on

3. Press and hold the PAIR button on the recorder for three seconds.
4. On the recorder, the Bluetooth LED will go steady green.
5. The Pair icon will become available in the Recorders screen in the Configurator app.
6. Tap the Pair icon for the detected recorder.
7. Tap Unpair to un-pair the recorder and the Configurator app.

NOTE: Pairing does not affect the schedule of recordings nor interrupt a recording in progress. The Song Meter Mini will not go to sleep while paired. If the recorder finishes a schedule and is ready to go to sleep, it will not go to sleep until it is unpaired.

NOTE: Making a configuration change stops any recording in progress and pauses the schedule for 10 seconds. This allows changes to be made to the configuration without constantly starting and stopping a record schedule. Each change of the configuration change resets the 10 second pause. 10 seconds after no further changes have been made, the recorder will resume its schedule which may mean that it starts recording again if scheduled to do so.

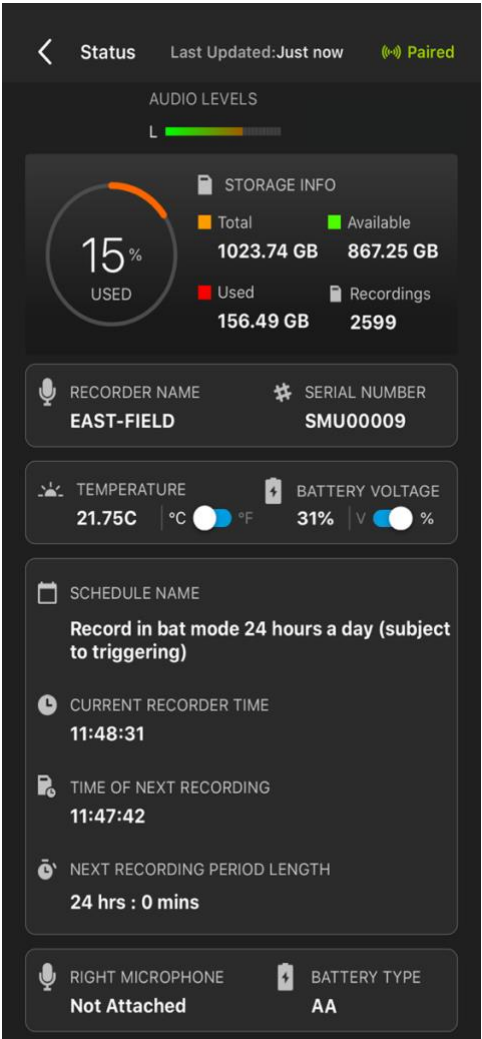
The Configurator app can pair with a single Song Meter Mini at a time. If there are multiple Song Meter Minis within detection distance of the Configurator app, it is possible to change which recorder is currently paired with the Configurator app.

To switch from one paired recorder to another:

1. Check that the next Song Meter Mini to be configured is currently detected in the Recorders screen. If the next recorder to be programmed is not detected in the Recorders screen:
 - Check the recorder to make sure it is powered on.
 - If Send Bluetooth Beacons? Has been disabled, that will prevent the recorder from being automatically detected. Press and hold the PAIR button on the recorder to send a Bluetooth beacon.

- 2. Unpair any currently paired recorder. Do this by tapping the Unpair icon in the Recorders screen.
- 3. Press and hold the PAIR button of the next recorder to be programmed. That recorder will now become available for pairing in the Configurator app.
- 4. Press the Pair icon for the new recorder. That recorder is now paired with the Configurator app.

Status Screen



- When a Song Meter Mini is within Bluetooth range and has been detected by the Configurator app, its status is automatically uploaded to the app.
- Tap the Status icon for any recorder listed in the Recorders screen to see the most recently uploaded Status information for the selected Song Meter Mini.
- The latest uploaded Status information is retained by the app even if the app is quit or the iOS/Android device is powered off or moved out of Bluetooth range of the recorder.
- The Song Meter Mini does not need to be paired with the Configurator app in order to upload its current Status.

The Status screen displays the following information:

Last Updated

Last Updated: **Just now**

If the Song Meter Mini recorder is currently being detected by the Configurator app, the Status screen will be updated in real time.

- If the Song Meter Mini recorder is not currently being detected by the Configurator app, the Status screen will display the settings that were last detected from the recorder.
- The Last Updated parameter will show how long since the Song Meter Mini recorder was last detected by the Configurator app.

Paired/Unpaired

 **Paired**

This parameter displays whether the Song Meter Mini recorder is currently paired with Configurator app.

Audio Levels

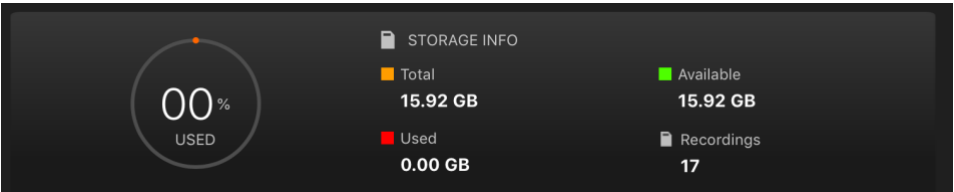
AUDIO LEVELS

L 

If the Song Meter Mini recorder is currently paired with the Configurator app, and is in record mode, the Audio Level meters

will show any audio activity present at the built-in and optional microphones (If installed).
If the recorder is not paired, or is paired but not in record mode, the Audio Level meters will not be visible.

Storage Info



The Status screen displays the current or last detected available space on the SD memory card.

Used (Percentage)

Percentage of SD memory card that has been used for file storage

Total

Total amount of storage space on the SD memory card.

Available

Remaining available storage space on the SD memory card.

Used (In Gigabytes)

Actual amount of SD memory card that has been used for file storage.

Recordings

Number of separate recording files made since the last power-up.

Recorder Name

By default, this will display the serial number of the Song Meter Mini recorder.
If the Song Meter Mini recorder name has been edited, the edited name will be displayed.

Serial Number

The serial number for the Song Meter Mini recorder is displayed.

The serial number cannot be edited.

Temperature

The internal temperature of the Song Meter Mini is displayed. Temperature can be displayed in Celsius or Fahrenheit.

Battery Level

The current total voltage of the AA or lithium-ion batteries is displayed. Battery voltage can be displayed as a percentage or actual voltage.

Note: If the battery voltage drops below a specified level, the recorder will automatically turn off to avoid damaging the batteries. Minimum voltage for AA batteries is 3.7V (.9V per cell). Minimum voltage for lithium-ion batteries is 5V per pair (2.5V per cell).

Schedule Name

The currently programmed schedule name is displayed. If a preset schedule is programmed, that name will be displayed. If the schedule has been edited it will be displayed as "Custom Schedule".

Current Recorder Time

The currently programmed time of the Song Meter Mini is displayed.

If the Song Meter Mini recorder is currently not detected by the Configurator app, the time when the recorder was last detected will be displayed.

Start Time Of Current Recording

The start of the current or next scheduled recording is displayed.

Next Recording Period Length

The length of the current or next scheduled recording is displayed.

Right Microphone

This will show Attached or Not Attached depending on if there is a second acoustic microphone connected to the recorder.

Battery Type

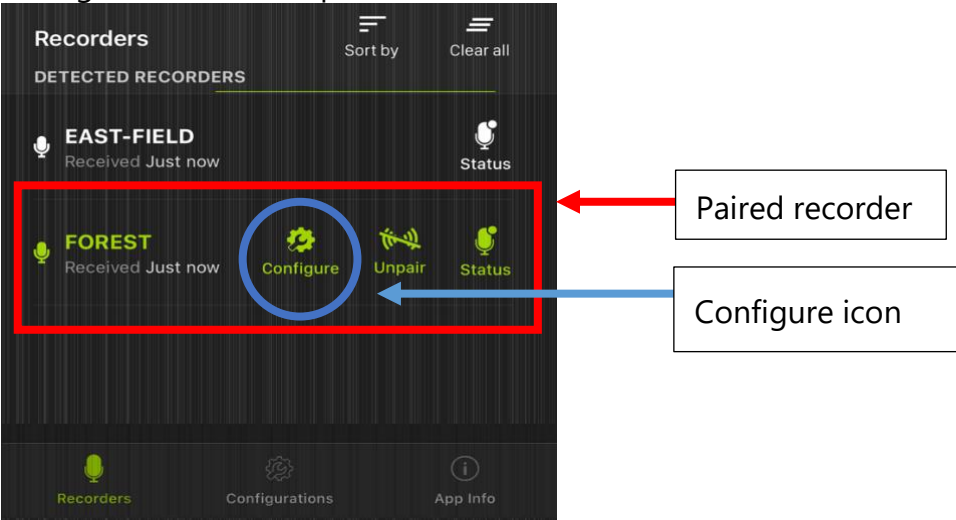
This displays AA or Lithium, depending on which type of battery is in use.

Firmware version

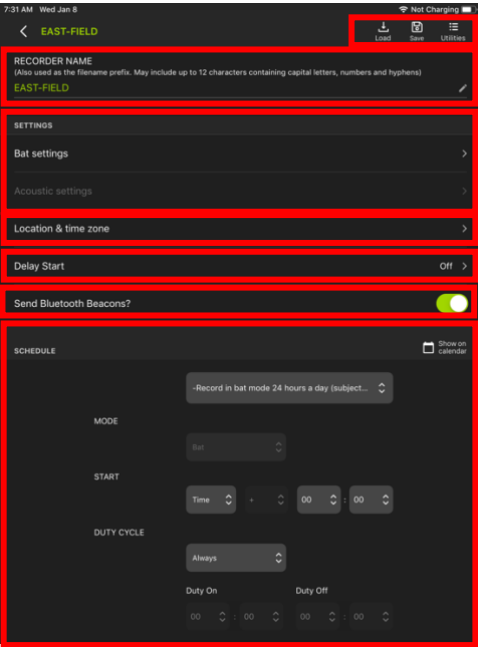
The current firmware of the detected recorder is displayed.

Configure a Paired Recorder

When a Song Meter Mini recorder is paired with the Configurator app, it's internal configuration and settings can be edited in real time. Changes made in the Configurator app are immediately uploaded and programmed into the paired recorder. To edit the configuration and settings of a paired recorder, tap the Configure icon for the paired recorder in the Recorders screen.



Paired Recorder Configuration screen



Load, Save, and Utilities

Edit Recorder Name

Ultrasonic and Acoustic Settings

Location and Time Zone

Delay Start

Send Bluetooth Beacons?

Record Schedule Editor

Load

1. Tap this icon to display a list of any saved configuration files.
2. Select the saved configuration file and tap OK.

The saved configuration and settings will be loaded to the paired Song Meter Mini recorder.

Save

Tap this icon to name and save the current configuration and settings to the Configurations screen as a configuration file.

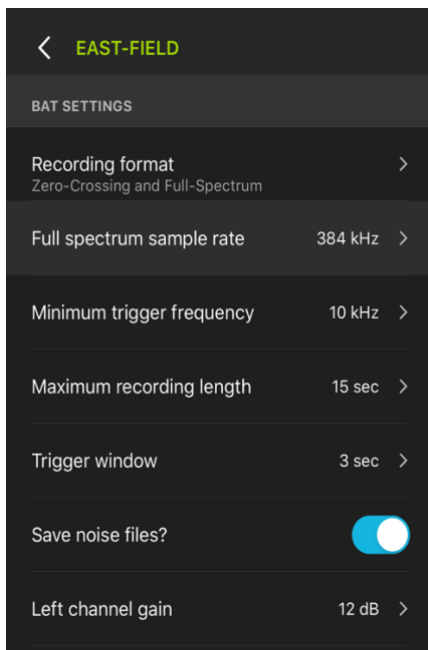
Recorder Name

- Tap the pencil icon to rename the currently paired recorder.
- The Recorder Name is added as a prefix to the file name of all recordings made by the Song Meter Mini.
- The Recorder Name will not be over-written when loading a saved configuration file.

Ultrasonic Settings Screen

The parameters on the Ultrasonic Settings screen describe how audio is recorded by a Song Meter Mini Bat recorder.

- If the paired recorder is a Song Meter Mini Bat model, this option will be available.
- If the paired recorder is a Song Meter Mini model, this option will not be available.



Recording format

The Song Meter Mini Bat can record full spectrum or zero crossing format files. It can also record both formats at the same time.

Values: Full-Spectrum, Zero-Crossing, Zero-Crossing and Full-Spectrum

Default: Full-Spectrum

Full spectrum sample rate

The sample rate can be set to 256 kHz, 384 kHz, or 500 kHz.

- 256 kHz sample rate will record up to 128 kHz audio, which is sufficient for most North American and European bats.
- 384k sample rate will record up to 192 kHz audio but will use proportionately more storage for recordings.
- 500 kHz sample rate will record up to 250 kHz audio and will use maximum storage space.

If Zero-Crossing (only) is the selected recording format, Full spectrum sample rate will be disabled.

Values: 256 kHz, 384 kHz, 500 kHz

Default: 256 kHz

Minimum Trigger Frequency

A signal must be above the minimum trigger frequency in order to trigger an actual recording. Any signal below the minimum trigger frequency will not trigger a recording. This is useful for preventing triggered recordings of unwanted lower frequency sounds.

Values: 6 kHz to 60 kHz in 1Khz increments

Default: 16 kHz

Maximum Recording Length

It is possible to specify the maximum length (time duration) of recordings to comply with file size restrictions of analysis software or to fulfill a specific recording protocol or definition of a bat pass.

Values: 3 second to 60 seconds in 1-second increments

Default: 15 seconds

Trigger Window

The recording continues for this amount of time after the last signal that satisfies the trigger. (The recording is also truncated when it reaches the maximum recording duration set by Maximum Recording Length). Set the trigger windows setting long enough to avoid a recording that ends after one echolocation call. For example, if bat echolocation calls occur every 0.5 seconds and trigger screen is 0.1 seconds, there would be a new trigger with every single echolocation call.

Values: 1 to 15 seconds in 1 second increments

Default: 3 seconds

Save noise files?

If a triggered recording does not appear to contain any bats, it will be marked as noise. This is called “scrubbing”, and the scrub parameters are set automatically. This option sets whether files marked as noise will be automatically discarded, or stored along with the rest of the recordings.

Values: On or Off

Default: Off

Left channel gain/Right channel gain

Gain can be added to the microphone signal. Gain will increase the amplitude of the recorded signal. If a second acoustic microphone is connected to the Song Meter Mini Bat there are separate gain settings for each microphone.

Test recordings should be made to make sure desired signals are being recorded with enough gain, but not so much as to cause clipping distortion. If a test recording shows clipping distortion, lower the gain setting. If a test recording shows a faint signal, raise the gain setting.

Values: (ultrasonic (left) microphone) 0, 6, 12 dB

Default: 12dB

Values: (acoustic (right) microphone) 0, 6, 12, 18, 24 dB

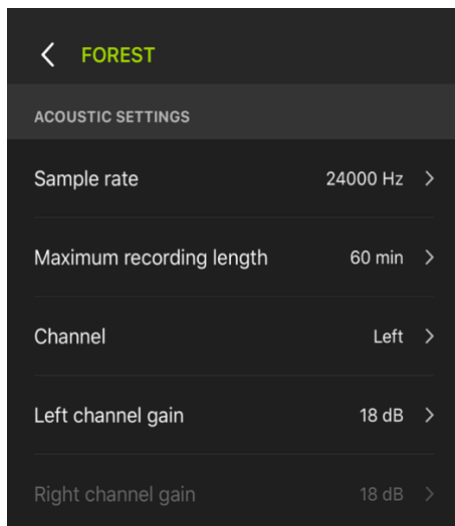
Default: 18dB

Acoustic Settings screen

The parameters on the Acoustic Setting screen describe how audio is recorded by a Song Meter Mini recorder, or the acoustic microphone of a Song Meter Mini Bat that is equipped with a second acoustic microphone.

- If the paired recorder is a Song Meter Mini or a Song Meter Mini Bat with a second acoustic microphone connected, this option will be available.

- If the paired recorder is a Song Meter Mini Bat model that does not have the second acoustic microphone connected, this option will not be available.



Sample rate

This setting determines the number of samples per second used to make a recording during a recording period. Higher sample rates provide the ability to record higher frequencies. Choose a sample rate that is at least double the highest frequency to be recorded. For example, a sample rate of 24,000 Hz will capture sounds up to 12,000 Hz in frequency.

Values: 8,000, 12,000, 16,000, 22,050, 24,000, 32,000, 44,100, 48,000, 96,000 Hz

Default: 24,000 Hz

Maximum Recording Length

It is possible to specify the maximum length (time duration) of recordings within a schedule. For example, if a recording schedule is set to record always and the maximum record length is set to 60 minutes, the Song Meter Mini will create 24 60-minute files per day.

Values: 1 second to 60 minutes in 1-minute increments

Default: 15 minutes

Channel

If a second microphone is connected to the Song Meter Mini, there is an option to record one or two channels of audio simultaneously. For single channel recording either microphone can be selected. If the Song Meter Mini only has a single microphone this option is not available.

Values: Left, Right, Stereo

Default: Stereo

Left channel gain/Right channel gain

Gain can be added to the microphone signal. Gain will increase the amplitude of the recorded signal. If there are two microphones connected to the Song Meter Mini there are separate gain controls for each microphone.

The default setting of 12 allows for lower or higher gain settings. Test recordings should be made to make sure desired signals are being recorded with enough gain, but not so much as to cause clipping distortion. If a test recording shows clipping distortion, lower the gain setting. If a test recording shows a faint signal, raise the gain setting.

Values: 0, 6, 12, 18, 24

Default: 18dB

Location and Time Zone

Time zone and location information will be embedded in the metadata of files recorded by the Song Meter Mini.

- Accurate time zone and location information is required if sunrise/sunset times are to be used in a recording schedule.
- When the Song Meter Mini recorder is paired with the Configurator app, a window opens asking if the location and time zone should be set based on the location and time zone of the device.
- If the Song Meter Mini already has a remote location programmed, it may be desirable to not reset the location and time zone based on the current location of the device.

- It is also possible to manually program a remote location and time zone for the recorder from the Configurator app.

Set Location screen

To manually program a remote location for the paired Song Meter Mini recorder, tap Set location and the Set Location screen will open.

Location can be entered by address, latitude and longitude, or manually dropping a pin on the map.

The screenshot shows the 'Set Location' screen in the Configurator app. The screen is divided into several sections: 'SET LOCATION' (with instructions), 'SET LOCATION TO ADDRESS' (with a search bar), 'LATITUDE' and 'LONGITUDE' (with input fields), 'TAP ON MAP TO SET' (with a map), 'TIME ZONE' (with instructions), and a 'Select time zone' section at the bottom. Red arrows point from text labels to specific elements on the screen: 'Address' points to the search bar, 'Latitude/Longitude' points to the input fields, 'Set' points to the 'Set' button, 'Map' points to the map area, 'Pin' points to a red pin on the map, and 'Select time zone' points to the 'Select time zone' section.

Address

Latitude/Longitude

Set

Map

Pin

Select time zone

Set Location to Address

Specify a location based on address.

LATITUDE

Manually enter latitude information.

LONGITUDE

Manually enter longitude information.

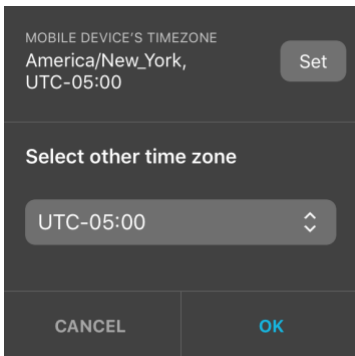
Set

Tap this icon to scroll the map view to the manually entered address or latitude/longitude. This will also program the new address into the Song Meter Mini recorder.

Map

The map view displays the manually entered location. It is also possible to tap on the map to create a “pinned” location. The address and longitude/latitude for the pinned location are then displayed above.

Select time zone



By default, time zone is based on the mobile device. When manually programming a location for the Song Meter Mini, it is also possible to manually set a time zone.

Delay Start

It is possible to program a paired Song Meter Mini recorder so that it's recording schedule will not be started until a specified date.

- The Song Meter Mini will sleep until the Delay Start date and will then wake up to commence its programmed recording schedule.
- Tap this icon to open a calendar screen. Select the date to determine when to start the recording schedule.

Send Bluetooth Beacons?

By default, a Song Meter Mini that is powered on will send continuous Bluetooth beacons. This enables the Configurator app

to detect the Song Meter Mini recorder and upload its current status.

- In some circumstances it may be desirable to disable the function of sending continuous Bluetooth beacons.
- If Send Bluetooth Beacons? Is disabled, the recorder will not automatically be detected by the Configurator app, and the current status will not be automatically updated.
- If Send Bluetooth Beacons? Is disabled, the recorder must be manually paired with the Configurator app in order for the current status to be updated.
- Disabling Send Bluetooth Beacons? will not affect the recording functions of the Song Meter Mini.

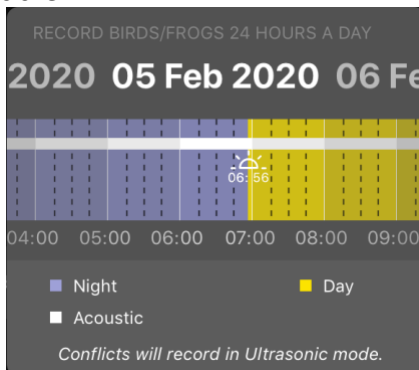
Schedule

A schedule determines when the Song Meter Mini is in record mode.

For details on how to create or modify a custom recording schedule, please see the **Schedule Editor** section of this user guide.

Show on Calendar

Tap this icon to show a calendar which displays the currently programmed schedule



Schedule Editor

A schedule determines when the Song Meter Mini recorder is in record mode.

- When the Song Meter Mini is not in record mode it goes to sleep, which conserves battery power.
- When the Song Meter Mini Bat is in schedule record mode it will only actually record when there is an ultrasonic trigger.
- A schedule repeats every 24 hours.
- A schedule is made up of one or more schedule blocks. Multiple schedule blocks can be used to create complex schedules.
- The recording schedule can be edited directly on a paired recorder or for a saved configuration.

Preset schedules

- The Configurator app includes preset schedules for ultrasonic and acoustic recording schedules.
- A preset schedule may be selected and then further edited

MODE

This setting determines whether the recording schedule block will use the ultrasonic microphone or acoustic microphone.

- It is possible to create a schedule that uses only the ultrasonic or acoustic mode schedule blocks.
- A schedule that uses only ultrasonic schedule blocks can be loaded onto a Song Meter Mini Bat recorder.
- A schedule that uses only acoustic schedule blocks can be loaded onto a Song Meter Mini, or a Song Meter Mini Bat that has the second optional acoustic microphone installed.
- A schedule can be created that uses multiple schedule blocks. Each schedule block can be set to use either the ultrasonic microphone or the acoustic microphone.
- A schedule that uses both ultrasonic and acoustic schedule blocks can be loaded only onto a Song Meter Mini Bat that has the second optional acoustic microphone installed.

- On a Song Meter Mini Bat which is equipped with the optional acoustic microphone, the ultrasonic and acoustic microphones cannot record simultaneously.
- If a configuration file that contains incompatible schedule blocks is loaded to a Song Meter Mini, there will be an error message and the configuration file will not be loaded.
- Changing the mode determines whether the schedule is using the Acoustic audio settings or Ultrasonic audio settings.

START

START

Rise + 01 : 00

This determines the start time of the recording schedule block.

- Start time can be based on actual Time, Sunrise, or Sunset. Sunrise and sunset times are calculated based on the time and location currently programmed in the Song Meter Mini.
- If Time is selected, the start time of the schedule block is entered in hours and minutes.
- If Sunrise or Sunset is chosen, the available parameters include plus or minus, hours, and minutes. For example, Sunrise + 1:00 would mean the schedule block starts one hour after sunrise.

DUTY CYCLE

Duty On Duty Off

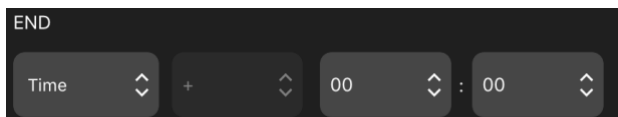
00 : 05 00 : 55

This determines the duty cycle between the Start and End times of the schedule block.

- The choices are Cycle and Always.
- Always means the Song Meter Mini will be in record mode continuously between the Start and End times.
- Cycle provides hour and minute settings for Duty On and Duty Off. For example, if Cycle is the selected Duty Cycle mode, and Duty On is set to 00:05 and Duty Off is set to

00:55, that would mean the Song Meter is in record mode for five minutes per hour within the Start and End Times.

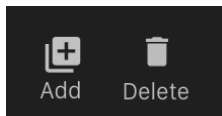
END



This determines the end time of the schedule block.

- End time can be based on actual Time, Sunrise, or Sunset.
- Sunrise and sunset time is calculated based on the set date and location of the Song Meter Mini.
- If Time is selected, the end time of the schedule block is entered in hours and minutes.
- If sunrise or sunset is chosen, the available parameters include plus or minus, hours, and minutes. For example, Sunrise + 1:00 would mean the schedule block ends one hour after sunrise.

Add/Delete



There must always be at least one schedule block in a recording schedule.

- It is possible to add or delete additional schedule blocks. This allows creation of complex schedules within a 24-hour cycle.
- For example, schedule block 1 could be programmed to record from one hour before sunrise to one hour after sunrise. A second schedule block could be created to record from one hour before sunset to one hour after sunset.
- If a Song Meter Mini Bat is equipped with a second acoustic microphone, separate schedule blocks can be used to record with either the built-in ultrasonic microphone or the acoustic microphone. For example, the ultrasonic microphone could be scheduled to record at night and the acoustic microphone could be scheduled to record during the day.

Note: It is possible to create a schedule that contains overlapping schedule blocks. If this is done with a Song Meter Mini Bat, an ultrasonic schedule block will always take priority over an acoustic schedule block

Schedule Block Examples

This section provides recording schedule examples that demonstrate how schedule blocks work. Most of these are built in to the app and can be selected as starting points for customized schedules. A schedule specifies when the Song Meter Mini records but does not necessarily result in a single file for the entire period. If you are making triggered recordings on the Mini Bat, then the number of recordings for a given schedule will be determined by the trigger settings and by bat activity. If you are making acoustic recordings on the Mini or Mini Bat, then the number of recordings for a given schedule will be determined by the **Max Length** setting.

Record Continuously All Hours of Every Day

The following schedule records continuously all day and night, 24 hours per day:

The screenshot shows the configuration interface for a recording schedule on a dark background. It includes the following sections and controls:

- START**: A time selection interface with a 'Time' label, a dropdown arrow, a '+' button, another dropdown arrow, and two time input fields (each with a dropdown arrow) showing '00' and '00' separated by a colon.
- DUTY CYCLE**: A dropdown menu currently set to 'Always' with a dropdown arrow.
- Duty On** and **Duty Off**: Two identical time selection interfaces. Each has a label, a dropdown arrow, a '+' button, another dropdown arrow, and two time input fields (each with a dropdown arrow) showing '00' and '00' separated by a colon.
- END**: A time selection interface identical to the 'START' section, with a 'Time' label, a dropdown arrow, a '+' button, another dropdown arrow, and two time input fields (each with a dropdown arrow) showing '00' and '00' separated by a colon.

Whenever the start and end times are identical and **DUTY** is set to **always**, your schedule will record continuously.

Record Continuously for a Portion of Each Day

The following schedule records continuously for the same six (6) hours daily:

START

Time

+

04

:

00

DUTY CYCLE

Always

Duty On

00

:

00

Duty Off

00

:

00

END

Time

+

10

:

00

Record in 5-Minute Segments Every Hour

The following schedule records for 5 minutes at the beginning of each hour all day and continues indefinitely:

START

Time

+

00

:

00

DUTY CYCLE

Cycle

Duty On

00

:

05

Duty Off

00

:

55

END

Time

+

00

:

00

Record Continuously from Sunset to Sunrise

The following schedule starts every day at sunset and records continuously until sunrise on the following day:

START

Set

+

00

:

00

DUTY CYCLE

Always

Duty On

Duty Off

00

:

00

00

:

00

END

Rise

+

00

:

00

Record in Multiple Blocks Relative to Sunset and Sunrise

The following schedule uses two blocks:

START

Rise

-

01

:

00

DUTY CYCLE

Always

Duty On

Duty Off

00

:

00

00

:

00

END

Rise

+

01

:

00

The screenshot shows a dark-themed configuration interface for the Song Meter Mini. It is divided into four sections: 'START', 'DUTY CYCLE', 'Duty On', and 'END'. The 'START' section has a 'Set' button, a minus sign, and two time pickers set to '01' and '00'. The 'DUTY CYCLE' section has a dropdown menu set to 'Always'. The 'Duty On' section has two time pickers set to '00' and '00'. The 'Duty Off' section has two time pickers set to '00' and '00'. The 'END' section has a 'Set' button, a plus sign, and two time pickers set to '01' and '00'. All time pickers have up and down arrow buttons.

The first block defines a period relative to sunrise and the second block defines a period relative to sunset. The combined result records for two hours centered at sunrise and two hours centered at sunset.

Utilities Menu

Access the Utilities menu at the top right of the configuration screen.

Format SD card

Reformats the SD memory card in the Song Meter Mini.

Test microphone

This will display any signal present at the ultrasonic or acoustic microphone in dB. This information is used to check the function and calibration of the microphone.

The measurement is expressed in dB down from a full-scale input.

How to test the Ultrasonic microphone

The ultrasonic microphone calibration is bandpass filtered at 40kHz and designed to work with the ultrasonic calibrator available from Wildlife Acoustics. Use the available Ultrasonic Calibrator to calibrate The Song Meter Mini microphone. Since ultrasound is

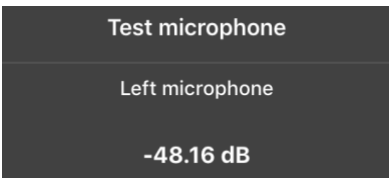
beyond the range of human hearing, verifying performance requires special equipment. The Ultrasonic Calibrator helps you test both the microphone and the full recorder system. The calibrator uses a 9V alkaline battery (included with the calibrator). When the battery is depleted, the calibrator can no longer provide a tone and its LED no longer illuminates. While the calibrator may still emit sound at this point, it cannot be used with accuracy until the battery is replaced.

The calibrator offers two modes of operation:

- **CAL:** Calibration mode is used to test the microphone at close range.
- **CHIRP:** Chirp mode is used to test the entire system at a greater distance.

Calibration Mode Microphone Testing

1. Navigate the Test microphone window under the Utilities menu.



2. Turn the calibrator ON and set the mode toggle switch to CAL.
3. The calibrator generates a 40 kHz tone.
4. Place the Song Meter Mini Bat so its edge touches the on/off and cal/chirp switches.



5. Observe the dB level in the Test microphone window. If the value is higher (less negative) than -32 dB the microphone has passed and is ready to use. If the value is lower (more negative), the microphone has lost some or all of its sensitivity and should be replaced.

Chirp Mode System Testing

To test the system, use the Ultrasonic Calibrator to emit loud ultrasonic signals that can be picked up by the recorder from some distance. Analyze the recording files later to verify that the SM4BAT FS settings are appropriate and the system is functioning as expected.

1. Prepare the Song Meter Mini Bat for recording and place it no more than 20 meters away from the calibrator.
2. Set the toggle switch to **CHIRP**.
3. The calibrator emits a 100ms long 40kHz (+/- 10Hz) tone every 500ms. The amplitude of the tone is 104dB SPL (+/- 3dB) at 10cm. The signal can be picked up by the Song Meter Mini Bat recorder at distances up to 20 meters.
4. Make a recording and then analyze the recording file to verify the system is operating as expected.

WARNING! Do not place the Ultrasonic Calibrator near your ears. In **CHIRP** mode, the calibrator emits a 40 kHz signal at over 100 dB SPL. Prolonged exposure to high intensity ultrasonic signals may cause permanent hearing loss at audible frequencies.

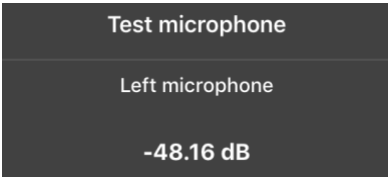
How to test the acoustic microphone

The sensitivity of the acoustic microphone can be measured to test its functionality. The acoustic microphone calibration is bandpass filtered at 1kHz and is designed to be used with a standard microphone calibrator.

A standard microphone calibrator will produce a 94dB SPL (1 Pa) 1kHz tone at the microphone.

Note: This procedure is only valid for third-party microphone calibrators that emit a calibrated 1.0 kHz signal.

1. Navigate the Test microphone window under the Utilities menu.



2. Remove the windscreen from the acoustic microphone



3. Connect the calibrator to the acoustic microphone
4. Turn the calibrator ON.



5. The calibrator generates a 1 kHz tone.
6. Observe the dB level in the Test microphone window. If the value is higher (less negative) than -16 dB the microphone has passed and is ready to use. If the value is lower (more negative), the microphone has lost some or all of its sensitivity and should be replaced.

Restore recorder to factory defaults

Restores the Song Meter Mini to its factory default configuration.

- Restoring factory defaults will not change the date and time of the recorder.
- Refer to the **Acoustic/Ultrasonic Settings** sections of this user guide for default settings values.

Email diagnostics to Wildlife Acoustics

Tap this icon to generate a diagnostic file can then be sent to Wildlife Acoustics technical support for further analysis.

Create/Edit/Share a Configuration File

A configuration file is a stored combination of configuration, settings, and schedule for the Song Meter Mini recorder.

- The Song Meter Mini recorder has internal memory to retain a single configuration and settings.
- The Configurator app can store multiple configuration files.
- Configuration files can be stored in the Configurator app, shared, and backed up to a PC.
- When the Song Meter Mini is paired with the Configurator app, the app can download a saved configuration file to the recorder.
- A stored configuration file can be loaded to a paired Song Meter Mini recorder.
- When a Song Meter Mini recorder is paired with the Configurator app, the recorder will upload its current configuration and settings, which can then be saved as a configuration file.
- A configuration file can be exported and saved to an SD card and then transferred to the recorder (or multiple recorders, or a PC) via the SD card.

To create a configuration file, go to the Configurations screen and tap the Plus icon.

1. The Add Configuration window will open.

2. Choose whether the configuration is intended for a Song Meter Mini or Mini Bat.
 3. Tap Configuration Name to open a keyboard.
 4. Name the Configuration.
 5. Choose a starting schedule.
 6. Choose to set location and time zone to match the mobile device or to set them manually. Choosing manually will take you directly to the location setting page when you choose OK.
 7. Press OK.
 8. The Saved Configuration Edit screen will open.
- To return to the Configurations window tap the back arrow at the top left of the screen.**

Delete a saved configuration file

Select one or more saved configurations. Tap delete to delete the selected configurations.

Share a saved configuration file

A configuration file can be shared to other iOS/Android devices or a computer. The configuration file has the file name suffix ".miniconfig".

1. Go to the Configurations screen and tap the Edit icon.
2. Check the configuration files to be shared.
3. Tap the Share icon.

Edit a saved configuration file

- When a new configuration and settings are created in the Configurations screen, the Saved Configuration Editor screen opens automatically.
- To open the Saved Configuration Editor, tap on the Song Meter Mini recorder icon in the Configurations screen.
- Changes made to a saved configuration file are saved and updated immediately.

Rename

Tap this icon to rename a configuration file.

1. A keyboard will open.
2. Type a new name.
3. Tap Cancel or OK.

Ultrasonic Settings

- The parameters on the Ultrasonic Settings screen describe how ultrasonic audio is recorded by a Song Meter Mini Bat recorder.
- If the paired recorder is a Song Meter Mini Bat model, this option will be available.
- If the paired recorder is a Song Meter Mini model, this option will not be available.
- For further details please see the **Ultrasonic Settings** section of this user guide.

Acoustic settings

- The parameters on the Acoustic Setting screen describe how audio is recorded by a Song Meter Mini recorder, or the acoustic microphone of a Song Meter Mini Bat that is equipped with a second acoustic microphone
- If the paired recorder is a Song Meter Mini or a Song Meter Mini Bat with a second acoustic microphone connected, this option will be available.
- If the paired recorder is a Song Meter Mini Bat model that does not have the second acoustic microphone connected, this option will not be available.
- For further details please see the **Acoustic Settings** section of this user guide.

Location and time zone

- A saved configuration file can have a specific location and time zone as part of its settings. The saved location and time zone will over-ride the currently programmed location and

time zone of a Song Meter Mini recorder when the saved configuration file is loaded, either to a paired recorder or via an SD card.

- Tapping Location and time zone will open the Set Location screen.
- For additional details please see the **Set Location** section of this user guide.

Delay Start

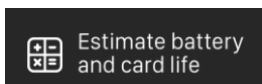
It is possible to program a paired Song Meter Mini recorder so that it's recording schedule will not be started until a specified date.

- The Song Meter Mini will sleep until the Delay Start date and will then wake up to commence its programmed recording schedule.
- Tap this icon to open a calendar screen. Select the date to determine when to start the recording schedule.

Schedule

For details regarding creating or modifying a recording schedule, please see the **Schedule Editor** section of this user guide

Estimated battery and card life



Tap this icon to open the Estimate battery and card life window.

Estimate battery and card life

Deployment start date

Feb 01, 2020

SD card size

128

Battery type

alkaline

Card will be full on:

Mar 02, 2020

Battery life depleted on:

Feb 20, 2020

Done

- By entering the required information, the Song Meter Mini app can calculate how long batteries and SD memory card space will last.
- This calculation takes into account the recording schedule and all ultrasonic/acoustic settings.
- The calculation is based on high quality batteries that are fully charged and a high-quality SD memory card that has been reformatted and is completely empty.

Deployment start date

Enter the start date of the deployment.

SD card size

Specify the size of the SD memory card in the recorder. Calculations are based on the assumption that the SD memory card is completely empty.

Battery type

- Choose alkaline or lithium-ion battery type.
- Select whether 2, 4, or 6 lithium-ion batteries are in use.
- Calculations are based on the assumption that the batteries are high-quality and have a full charge.

Recording Files

The purpose of the Song Meter Mini is to create audio files that are embedded with metadata. The files are initially written to the SD Memory card, and then transferred to a computer for analysis.

- To transfer the recordings from the Song Meter Mini to a computer, remove the SD Memory card from the recorder and insert it to an SD card slot or SD card adapter connected to a computer. The SD card will appear as a standard storage device. Copy the files to the internal drive of the computer.
- Once the files have been transferred to the computer the SD card can be erased or reformatted and used again to make more recordings. Before reformatting the SD card make sure the files are readable on the computer. It's also a good idea to back the files up for long-term storage.

WAV Files

The Song Meter Mini and Song Meter Mini Bat create standard .wav audio files.

- A .wav file is a full-spectrum recording.
- .WAV is a digital audio file standard. A .wav file can be played back by most music playback software as long as the software supports the sample rate of the file.
- A .wav file can contain embedded metadata.

Zero-Crossing Files

The Song Meter Mini Bat can create both .wav and .zc (zero-crossing) files.

- .ZC files are much smaller than .wav files, allowing for a greater number of recordings to be stored to a memory card.
- A .zc file represents an audio signal by counting and displaying the points where a waveform crosses the zero-amplitude point.

- A .zc file can only represent a single frequency at a time. A .zc file does not contain any amplitude information.
- .ZC files are typically used to record bat calls.
- .ZC files can contain embedded metadata.

Metadata

Metadata is additional information embedded in the recording file. The Song Meter Mini embeds metadata according to the GUANO standard. Software that is capable of reading GUANO format metadata can access the information within the files.

When the Song Meter Mini creates a recording file it embeds the following metadata:

- Firmware Version
- Length
- Loc Position
- Make
- Model
- Original Filename
- Samplerate
- Serial
- Temperature Int
- Timestamp
- WA|Song Meter|Audio settings
- WA|Song Meter|Prefix

Analysis Software

Kaleidoscope Pro

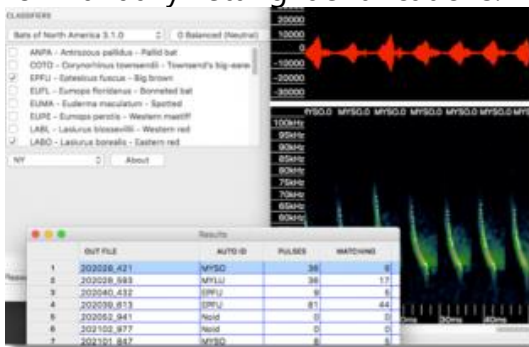
Kaleidoscope software is developed by Wildlife Acoustics and can be downloaded from www.wildlifeacoustics.com. Kaleidoscope is compatible with Mac, Windows, and Linux.



Kaleidoscope Pro includes:

Automatic Species Identification

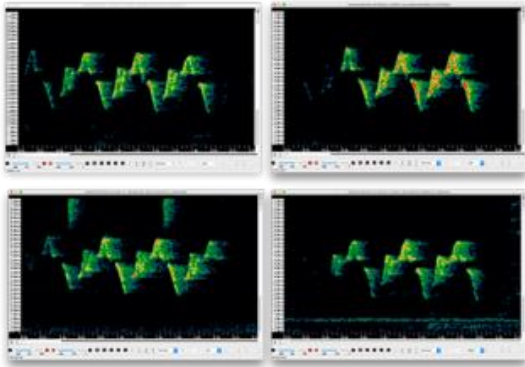
Kaleidoscope Pro's Auto-ID feature suggests the most likely bat species found in the recordings and provides an efficient workflow for manually vetting identifications.



Cluster Analysis

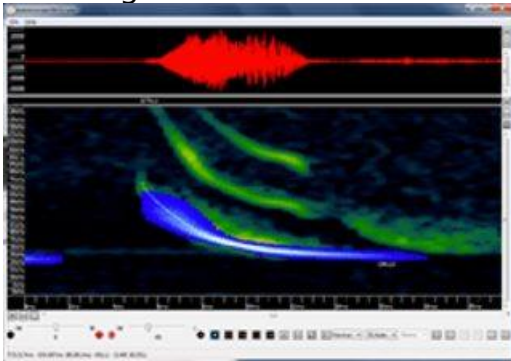
Kaleidoscope Pro's Cluster Analysis uses sophisticated pattern recognition software to automatically scan hundreds of gigabytes per hour, detecting similar vocalizations and quickly sorting them

into groups of similar sounds called “clusters.” Users can label clusters and create classifiers to quantify vocalizations of interest.



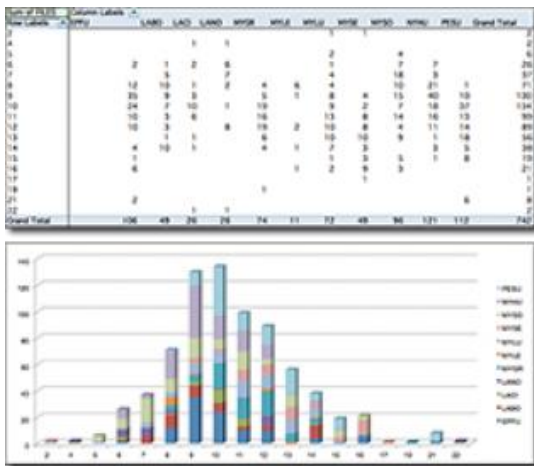
Kaleidoscope Viewer

For examining ultrasonic and acoustic sound files visually, Kaleidoscope includes an easy-to-use viewer that displays the details of each recording. Listen to recordings, apply bandpass filters, and adjust playback speed and amplitude. For bat work, the Viewer works with full-spectrum, time-expansion or zero-crossing recordings.



Easy Report Generation

Kaleidoscope Pro presents the cluster or classifier results in a table that's easily exported into Excel and other applications for pivot table and chart creation.



15-Day Free Trial

Sign up for Kaleidoscope Pro FREE for 15 days! (You will need to create and log in to an account on our website). After your Kaleidoscope Pro Trial expires, you can continue to use Kaleidoscope Viewer and Kaleidoscope File Converter, free-of-charge

Third-Party Software

The Song Meter Mini creates standard .wav files that can be opened with most audio applications. The audio application must be able to support the sample rate of the recorded file.

The Song Meter Mini Bat creates standard .wav files and/or zero crossing files. The audio application must be able to support the sample rate of the recorded file, and/or zero-crossing (.zc) format files.

Specifications

Physical

	Song Meter Mini	Song Meter Mini Bat
Length:	4.9 inches(124.4 mm)	
Width:	6.6 inches (167.6 mm)	5.3 inches (134.6 mm)
Depth:	1.4 inches (35.5 mm)	
Weight no batteries:	0.42 lb (190.5 g)	
Weight with 4 AA batteries	.64 lb (290 g)	
Power options	4 AA-size alkaline or NiHM batteries 2, 4 or 6 18650 rechargeable lithium-ion batteries using the optional lithium lid	
Storage type	1 SDHC/SDXC flash card slot (Class 4 or greater)	
Storage capacity	Up to 2 TB	
Material:	Polycarbonate	
Environmental:	Fully weatherproof	
Operating Temp	-4°F to +185°F or -20°C to 85°C	
Warranty	2 Years recorder and ultrasonic microphone	

Audio

	Song Meter Mini	Song Meter Mini Bat
Recording Format:	16-bit PCM .WAV	16-bit PCM .WAV and/or Zero-Crossing (.zc)
Sample Rate:	8,000 – 96,000 Hz	192, 256, 384, 500 kHz
Record channels (with optional mic)	Left, right, stereo	Ultrasonic or Acoustic
High Pass Filter	2-pole 100 Hz	2-pole 8 kHz

Microphone

Acoustic microphone:

- Directional Characteristic: Omni-Directional
- Sensitivity: -11.0 ± 4 dBfs/pa @ 1kHz, 0dB gain
- Signal to Noise Ratio: 80 dB Typ. at 1kHz (1 Pa, A weighted network)
- Max Input Sound Level: 105 dB SPL Typical.

Battery Life and Current Consumption

Battery life can vary based on how the recorder is used, quality, charge, and type of battery and other conditions such as operating temperature. All estimations of battery life for deployment are based on fully charged, high quality batteries. Energizer brand of AA alkaline batteries or Wildlife Acoustic brand lithium-ion batteries are recommended.

Song Meter Mini:

4 Alkaline AA: up to 240 hours

6 Lithium-Ion 18650: up to 1200 hours

(Based on mono recording at 24,000 sample rate)

Song Meter Mini Bat:

For ultrasonic recording:

4 Alkaline AA: up to 30 ten-hour nights

6 Lithium-Ion 18650: up to 150 ten-hour nights

(Based on 10% triggering at 256 kHz sample rate)

If recording at acoustic sample rates with the optional acoustic microphone, battery life is the same as the Song Meter Mini

Current Consumption

Acoustic recording: 60 – 80 mW typical

Ultrasonic recording (triggered): 135 – 155 mW typical

Ultrasonic recording (armed): 40 – 50 mW typical

Sleeping between scheduled recording periods: 3 mW typical

Warranty and Disclosures

Except as specifically provided herein, Wildlife Acoustics makes no warranty of any kind, express or implied, with respect to this product.

Hardware Limited Warranty

Product	Components	Warranty Period
Song Meter Mini	All components (excluding microphones and accessories)	2 Years
Song Meter Mini Bat	All components including built-in ultrasonic microphone	2 Years

Wildlife Acoustics, Inc. Limited Warranty

HARDWARE: Wildlife Acoustics, Inc. (“WAI”) warrants to the original end user (“Customer”) that new WAI branded products will be free from defects in workmanship and materials, under normal use. Refer to the Hardware Limited Warranty table at the top of this page for the applicable warranty period from the original date of purchase.

WAI warrants refurbished WAI products, marked and sold as such, for ninety (90) days from the original purchase date.

SOFTWARE: WAI warrants to Customer that any WAI branded software will perform in substantial conformance to their schedule specifications for a period of ninety (90) days from the date of original purchase. WAI warrants the media containing software against failure during the warranty period. WAI makes no warranty or representation that the operation of the software products will be uninterrupted or error free, or that all defects in the software products will be corrected.

EXCLUSIONS: This warranty excludes (1) physical damage to the surface of the product, including cracks or scratches on the outside casing; (2) damage caused by misuse, neglect, improper installation or testing, unauthorized attempts to open, repair, or modify the product, or any other cause beyond the range of the intended use; (3) damage caused by accident, fire, power changes, other hazards, or acts of God; or (4) use of the product with any non-WAI device or service if such device or service causes the problem.

Any third party products, including software, included with WAI products are not covered by this WAI warranty and WAI makes no representations or warranties on behalf of such third parties. Any warranty on such products is from the supplier or licensor of the product.

No warranty is provided by WAI unless the product was purchased from an authorized distributor or authorized reseller.

EXCLUSIVE REMEDIES: Should a covered defect occur during the warranty period and you notify WAI, your sole and exclusive remedy shall be, at sole option and expense of WAI, to repair or replace the product or software. If WAI cannot reasonably repair nor replace then WAI may, in its sole discretion, refund the purchase price paid for the product. Replacement products or parts may be new or reconditioned or comparable versions of the defective item. WAI warrants any replaced or repaired product, part, or software for a period of ninety (90) days from shipment, or through the end of the original warranty, whichever is longer.

OBTAINING WARRANTY SERVICE: Customer should refer to the WAI website at www.wildlifeacoustics.com/support/contact-support for information on obtaining warranty service authorization. Methods for obtaining warranty service may vary depending on whether purchases were made from an authorized provider of WAI products or from WAI directly. All requests for warranty service authorization must be made within the applicable warranty period. Dated proof of original purchase will be required. Products or parts shipped by Customer to WAI must be sent postage-paid and packaged appropriately for safe shipment. WAI is not responsible for Customer products received without a warranty service authorization and may be rejected. Repaired or replacement products will be shipped to Customer at WAI expense. All products or parts that are replaced become the property of WAI. WAI shall not be responsible for Customer software, firmware, information, or memory data contained in, stored on, or integrated with any products returned to WAI for repair, whether under warranty or not. The repair and replacement process for products or parts in locations outside of the United States will vary depending on Customer’s location.

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GOVERNING LAW: This Limited Warranty shall be governed by the laws of the Commonwealth of Massachusetts, and by the laws of the United States, excluding their conflicts of laws principles. The United Nations Convention on Contracts for the International Sale of Goods is hereby excluded in its entirety from application to this Limited Warranty.

DECLARATION OF CONFORMITY (EN 45014)

Manufacturer:

Wildlife Acoustics, Inc.
3 Mill and Main Place, Suite 210
Maynard, MA 01754
United States of America



Declares that the following product:

Product Name: Song Meter Mini and Mini Bat

Product Type: Bioacoustics Recorder

Conforms to the appropriate country standards and governing regulations listed below. As the manufacturer, we are fully responsible for the design and production of the above-mentioned equipment.

- Federal Communications Commission Rules Part 15, Class B
- AS CISPR 11, 2017, Industrial, scientific and medical (ISM) radio-frequency equipment – electromagnetic disturbance characteristics – limits and methods of measurement, Class B
- EN 55011, 2016, Industrial, scientific and medical (ISM) radio-frequency equipment – Electromagnetic disturbance characteristics – Limits and methods of measurement, Class B
- ICES-003, 2012, Industry Canada, Interference-Causing Equipment Standard, Digital Apparatus, Class B
- EN61326, 2013 Electrical Equipment for Measurement, Control and Laboratory use EMC Requirements
- EN61000-4-2 Electrostatic Discharge
- EN61000-4-3 Radiated Electromagnetic Fields

This product was tested in a typical configuration.

Ian Agranat, President

A handwritten signature in black ink, appearing to read 'Ian Agranat'.

Wildlife Acoustics, Inc.

February, 8, 2020

ELECTROMAGNETIC INTERFERENCE

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Changes or modifications not expressly approved by Wildlife Acoustics, Inc. could void the user's authority to operate the equipment.

PRODUCT DOCUMENTATION

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