ACOUSTIC SENSING DEVICES

Table A. Acoustic Sensing Devices (with associated Audio and Metadata Information)

DEVICE	TARGET SPECIES	SAMPLE RATES	RECORD CHANNELS	RECORDING FORMAT	MICROPHONE/S	FILTERS	CONFIGURATION SOFTWARE (SCHEDULE, CLOCK, GPS)	RECORDING METADATA	RECORDING SUMMARY	COMPATIBLE ANALYSIS SOFTWARE
Song Meter 4 (Wildlife Acoustics)	Birds, frogs and other vocal animals in the wild	8, 12, 16, 22.05, 24, 32, 44.1, 48, 96kHz	Single or dual channel	16-bit PCM .wav Or 16-bit PCM .w4v	Two microphones built in **Adjustable gain** **Option for cabled microphone or hydrophone attachments*	-High-pass -Anti-alias	SM4 Configurator software (PC) Or device buttons *Configures settings and schedules from a computer.* *Option for GPS antenna attachment (automatic setting of date, time and location)	**Metadata embedded in recordings (GUANO standard):** -Device model -Device serial number -Firmware version -Prefix -Timestamp -Temperature -GPS coordinates -Schedule and Settings	**Summary (.txt) file, lines appended once per minute, file in .csv format, including:** -Date and time -Latitude and longitude -Power (V) -Temperature (C) -#files -MIC0TYPE and MIC1TYPE	Kaleidoscope Light Kaleidoscope Pro
Song Meter SM4Bat FS (Wildlife Acoustics)	Recording and detecting bat vocalisations. Advanced recorder triggering (when bats present).	192, 256, 384, 500 kHz	Single channel	16-bit PCM .wav or 16-bit PCM .w4v	One ultrasonic microphone mounted on recording device. Can record ultrasonic and non-ultrasonic, but not scheduled at the same time.	-Optional high-pass -Optional noise scrubbing to delete false triggers.	SM4 Configurator Software (PC) Or device buttons *Configures settings and schedules.*	**Metadata embedded in recordings (GUANO standard):** -Device model -Device serial number -Firmware version -Prefix -Timestamp -GPS coordinates (manually entered as well as from GPS accessory if attached) -Schedule and settings **Some of the metadata information is visible in Kaleidoscope computer software.*	**Summary (.txt) file, lines appended once per minute, file in .csv format, including:** -Date and time (time zone set in location settings) -Latitude and longitude (from GPS accessory or manually entered) -Power (V) -Temperature (C) -#files -#scrubbed -MIC_TYPE	Kaleidoscope Light Kaleidoscope Pro
Song Meter Mini (Wildlife Acoustics)	Birds, vocal wildlife	8, 12, 16, 22.05, 24, 32, 44.1, 48 and 96 kHz	Single channel, option for dual	16-bit PCM .wav	One microphone built in **Option for second, externally attached microphone*	-High-pass -Anti-alias -Low-pass	Mini Configurator App (bluetooth connection: smartphones or tablets) *Clock of recorder se to match mobile device.*	**Metadata embedded in .wav files (GUANO standard):** -Firmware version -Length (of the file in seconds) -Loc Position (latitude and longitude) -Make -Model -Original File Name	**Summary (.txt) file saved to microSD card:** -Date -Time -Latitude -Longitude -Power (V)	Kaleidoscope Light Kaleidoscope Pro

								-Sample rate -Serial number -Timestamp -WA|Song Meter|Audio settings -WA|Song Meter|Prefix **Software that is capable of reading GUANO format metadata can access the information within the files.*		
Song Meter Mini Bat (Wildlife Acoustics)	Bats Ability to trigger recording based on incoming ultrasound.	192, 256, 384, 500 kHz	Single channel, option for dual	16-bit PCM .wav and/or 16-bit PCM .zc	One ultrasonic microphone built in **Option for second, acoustic microphone to be attached (to record birds, frogs, other wildlife)*	-High-pass -Low-pass -Optional noise scrubbing to delete false triggers	Mini Configurator App (Bluetooth connection: smartphones or tablets) *Harnesses processing power of modern smart phones for remote scheduling and status checking.* **Internal clock, location and time zone set during pairing with mobile device.** *mini.config file available to copy to computer, SD card and recorder.	**Metadata embedded in .wav files (GUANO standard):** -Firmware version -Length (of the file in seconds) -Loc Position (latitude and longitude) -Make -Model -Original File Name -Sample rate -Serial number -Timestamp -WA|Song Meter|Audio settings -WA|Song Meter|Prefix **for .zc files** (same minus sample rate): -Firmware version -Length (of the file in seconds) -Loc Position (latitude and longitude) -Make -Model -Original File Name -Serial number -Timestamp -WA|Song Meter|Audio settings -WA|Song Meter|Prefix **Software that is capable of reading GUANO format metadata can access the information within the files.*	**Summary (.txt) file saved to SD card:** -Date -Time -Latitude -Longitude -Power (V) -#FS files -#ZC files -#Scrubbed noise files	Kaleidoscope Light Kaleidoscope Pro

Song Meter Micro (Wildlife Acoustics)	Continuous recordings of frequencies up to 20 kHz (not suitable for most bat species)	8, 12, 22.05, 24, 32, 44.1, 48, 96kHz	Single channel	16-bit PCM .wav	One microphone built in	-High-pass -Low-pass	Micro Configurator App (bluetooth connection: smartphones or tablets) *Harnesses processing power of modern smart phones for remote scheduling and status checking.* **Internal clock, location and time zone set during pairing with mobile device.**	**Metadata embedded in .wav files (GUANO standard):** -Firmware version -Length (of the file in seconds) -Loc Position (latitude and longitude) -Make -Model -Original File Name -Sample rate -Serial number -Timestamp -WA|Song Meter|Audio settings -WA|Song Meter|Prefix **Software that is capable of reading GUANO format metadata can access the information within the files.*	**Summary (.txt) file saved to microSD card:** -Data -Time -Latitude -Longitude -Power (V)	Kaleidoscope Light Kaleidoscope Pro
BAR v 1.4 (Frontier Labs)	Frogs and birds	8, 16, 22.05, 44.1 , 48 and 96 kHz	Single or dual channel (One channel underneath recorder, second channel on the side to connect an extension cable or second microphone / hydrophone)	16-bit .wav or 16-bit .FLAC	Can attach up to two microphones. Can connect either a standard, low frequency or hydrophone microphone **Adjustable gain**	-Anti-aliasing filters	Scheduler GUI Program (PC). *Create and edit recording schedules, view estimated battery life and when SD-card will be full.* **Clock updated by GPS time synchronisation.** **GPS position lock with 3+ satellites.**	**Metadata embedded in audio? Unknown.** .	**Detailed diagnostic log file is (created every time recorder is used, each action is logged with time and date stamp) includes:** -Gain used -Start and end time -GPS points (GPS lock 3 satellites or more OR position set in Scheduler GUI Program **Format? Unknown.**	N/A
Audio Moth (Open Acoustic Devices)	Frogs, birds and bats	8 – 384 kHz	Single channel	16- bit (PCM) .wav	One microphone built-in Audible and ultrasonic frequencies **Adjustable gain**	-Optional low-pass filter, high-pass filter and band-pass filter -Option for amplitude threshold recording	AudioMoth Configuration App *Schedule recording periods, customise recording gain and sample rates, calculate device lifespan given configuration, set recorder timezone,*	**Metadata embedded in .wav file:** -Recording date and time -Sample rate -Gain level recorded at -Timestamp -Unique ID of device -Battery level -Amplitude threshold (if chosen) -Temperature	Metadata stored in "comments" field of EXIF metadata. *Metadata software such as* exiftool *is required to view this information and can edit metadata information to comply*	Tools from Rainforest Connection (RFCx)

							save and load configurations, expand recordings (compressed using amplitude thresholding). **Timestamp and recording schedule set to local timezone of user or UTC/GMT.** **Acoustic chime (**from Configuration App or RFCx Companion, or AudioMoth Chime App for example) to commence recorder schedule. AudioMoth Time App *View information about connected devices firmware and battery, as well as set the clock.* AudioMoth Mobile App *Can be used to set the time of the device using a short acoustic chime.*		*with metadata standards.* **Format? Unknown.**	
µMoth, Micromoth, (Open Acoustic Devices)	Designed for animal-bourne monitoring (full spectrum)	Sample rates up to 384 kHz	Single	16- bit (PCM) .wav	One analogue MEMS microphone **Adjustable gain**	*Unknown	On board real-time clock (UTC) Configurable USB interface	*Unknown – same functionality as original AudioMoth?	*Unknown – same functionality as original AudioMoth?	Compatible with AudioMoth existing software
Swift (Cornell Lab)	Frogs and birds	8, 16, 32, 48 or 96 kHz	Single channel	16-bit (PCM) .wav	One microphone attached **Adjustable gain**	*Unknown	Configuration tool	*Unknown	*Unknown	Raven Light Raven Pro
Bugg (https://www.bugg.xyz)	*Unknown	20 Hz – 80 kHz	*Unknown	*Unknown	*Unknown	*Unknown	*Unknown	*Unknown	*Unknown	*Unknown