

Birdfox Recorder

Field recorder for bioacoustics • Android

Birdfox Recorder turns your phone into a **serious field recorder**. You see the spectrogram and the waveform while you record, it captures the audio **unprocessed**, it keeps recording with the screen off and it saves every file with its coordinates and its **GUANO** metadata, the standard in bioacoustics.

There are no accounts, no adverts and no servers. The recordings stay on your phone.

To record...	You need
Birds and audible sound	Nothing else. The phone's own microphone will do
Birds at longer range	An external field microphone, such as the Birdmic
Bats	The Batmic , which brings ultrasound down into the audible range

No phone microphone picks up ultrasound. Batmic mode opens without the device connected, but without a Batmic you are not going to hear or see bats, however far you turn the brightness up. It is not a fault in the app: it is physics.

Requirements: Android 7.0 or later. The app needs no internet connection for anything it does.

1. The screen

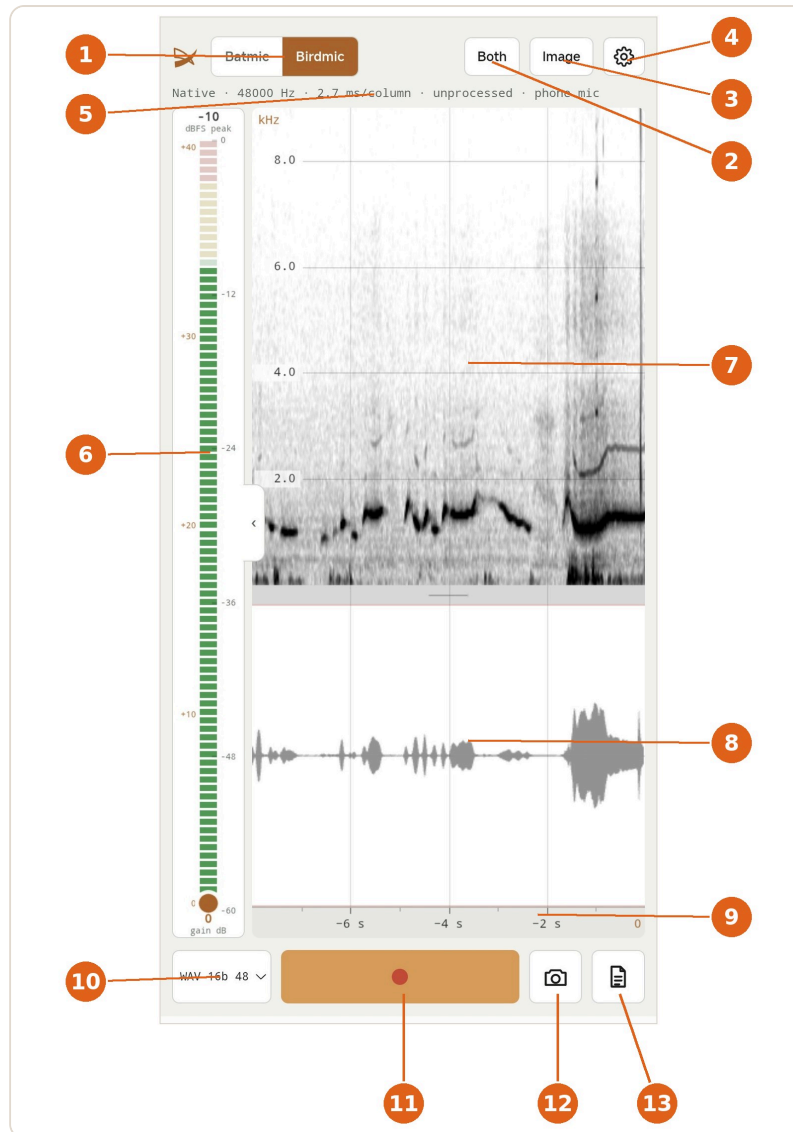


Figure A · The main screen, in Birdmic mode

1 Mode: Batmic or Birdmic · **2** What you see: spectrogram and waveform together, or just one · **3** Image controls: brightness, contrast and palette · **4** Settings · **5** Status line: sample rate, time resolution, unprocessed audio and sound source · **6** Level meter, with the gain on the left and the dBFS on the right · **7** Spectrogram · **8** Waveform · **9** Time axis · **10** Recording format · **11** Record · **12** Screenshot · **13** Library.

2 · The two modes

Top left you choose between **Batmic** and **Birdmic**. They are not two filters: they are two different ways of analysing sound, and each one is built for its own job.

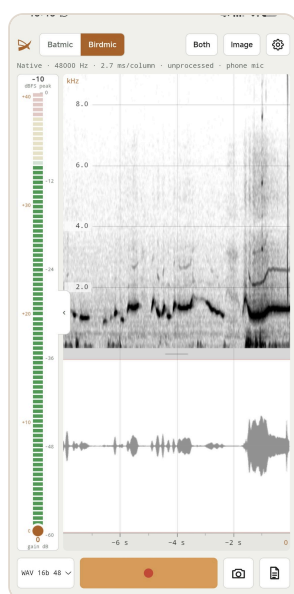
Each mode keeps its own settings for gain, brightness and contrast. When you switch from one to the other they come back on their own, so you don't have to set anything up again when you change microphone.

Birdmic · the audible range

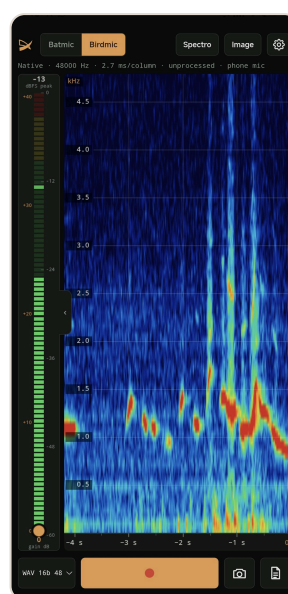
For the audible range: songs, calls and everything you already hear unaided.

You can choose between **four palettes**, in the **PALETTE** selector of the image controls (3): grey on white, white on black, sepia on cream and a colour scale on a dark background. The colour one separates more steps of intensity; the dark ones are easier on your eyes at night. **The palette selector only appears in Birdmic mode.**

This mode **has no live listening**, and there is a solid reason behind that. It is explained in section 4.



Grey on white palette



Colour on dark background palette

Batmic · ultrasound

For ultrasound, with a dark palette and the axis labelled in real frequencies.

The axis reads in real frequencies. The Batmic divides by ten, so the app multiplies the labels by ten and labels the axis "**kHz ×10**". What you read is the bat's frequency: you see 45 kHz, not 4.5 kHz. You don't have to work anything out.

The view goes up to **120 kHz**, above which there are no bats in Europe, and the brightness range is bounded from 0 to -60 dB, which is the stretch where something actually changes.

3 · Recording

The big button at the bottom **(11)** starts and stops the recording.

The format

It records in **16-bit WAV**, at full sample rate or at half if you want lighter files. There are no compressed formats, and that is deliberate: **a lossy codec smears the attack of a pulse**, which is exactly what you want to measure.

Pre-recording

It is one of the things you appreciate most out in the field. The app keeps **the seconds before** you press Record, because by the time you react to a song it has already happened. You set it up in Settings, and it needs the app to have been open for that long to have the buffer full.

With the screen off

You can switch the screen off or go to another app: the recording carries on, with a permanent notification to remind you. If you would rather the screen stayed on while you capture, there is a setting for that — it uses more battery.

The level meter

On the left **(6)**, with the gain scale on one side and the dBFS on the other, peak hold and a clipping warning. **If CLIP appears**, you are clipping: turn the gain down. The warning clears when you tap it.

Unprocessed audio. The app asks Android for the raw input, without the automatic gain control that phones apply by default. That AGC is meant for phone calls and in bioacoustics it is a disaster: it flattens the peaks and deforms exactly the faint, fast signals you care about. In the status line **(5)** you will see it as *unprocessed*.

If something interrupts the recording — a call, another app taking the microphone — the app detects it and **notes it in the metadata**, rather than leaving you a file that looks intact and isn't.

4 · Listening while you record

BATMIC MODE ONLY

In Batmic mode there is a **speaker icon in the bottom bar**. Tap it to turn live listening on: **it goes green when it is active**. As the detector brings ultrasound down into the audible range, here there really is something to hear.

Why only in Batmic

Between the sound going into the phone's microphone and coming out of the earphones, about **0.3 seconds** go by. That delay is put there by Android itself and can't be removed from the app.

With bats it makes no difference, because you can't hear the original: the only thing reaching your ears is the return, and you have nothing to compare it with.

With a bird it is unbearable. You would hear the song directly and then, three tenths of a second later, again on the earphones. That is why there is no live listening in Birdmic mode: it isn't that we forgot, it is that having it would be worse.

If you want to monitor audible sound, what you need is an **external audio interface**, like the Birdmic one. There the return comes out of the electronics itself without going through the phone, and the delay is practically zero.

If you can't hear anything, this is the first thing to check. The speaker icon only exists in Batmic mode, and if it isn't green there is no sound however much the spectrogram moves.

In Settings you decide **where that sound comes out**: on automatic it uses the earphones if they are plugged in, and the phone's speaker if not. When it plays through the speaker you can also **mute one channel**, which is how you stop the speaker feeding back into the microphone.

5. The spectrogram

Button (2) decides what you see: **spectrogram and waveform together**, or just one of the two. Drag the divider between them to give more room to one or the other.

Button (3) opens the **image controls** at the bottom: brightness, contrast and, in Birdmic mode, the palette.

- **Pinch zoom**: vertically you change the frequency range, horizontally the time range.
- **The image controls (3)** open and fold away, so they don't take up screen while you record.
- **Drag back with one finger** and the view freezes so you can go over what has just happened — **without stopping the capture**. A button takes you back to live.

Brightness and contrast

It is the setting that changes what you see the most, and it is worth understanding.

- **With too much brightness**, every pulse is drawn as a tall saturated column and you can no longer tell where the bulk of the signal sits.
- **With too little brightness**, the pulse disappears from the screen.

Adjust it until the marks show well defined and you can read their main frequency.

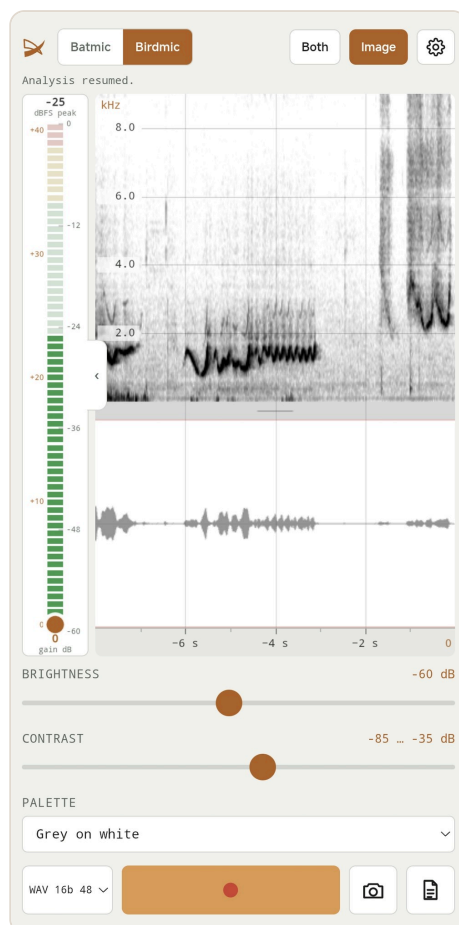


Figure B · The image controls open: brightness, contrast and palette

6 • The library

The icon on the right of the bottom bar (13) opens all your recordings and photos.

- **Search** by name or by note, and filters for Batmic, Birdmic or photos.
- **Multiple selection** for exporting or deleting in batches.
- For each file: open, share, see the data and notes panel, **see it on the map** or delete it.
- **Name and notes can be edited**, and are saved inside the file itself.
- **Import** WAV files recorded with other kit, to see them with the same spectrogram.

The files live in **Music/Birdfox** and **Pictures/Birdfox** on the phone, so you can get to them with any file explorer, without going through the app.

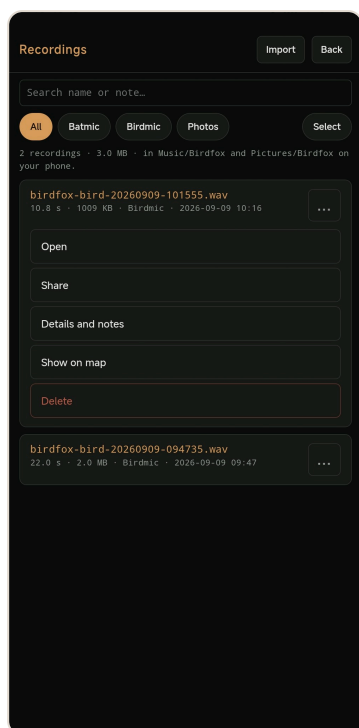


Figure C • The library

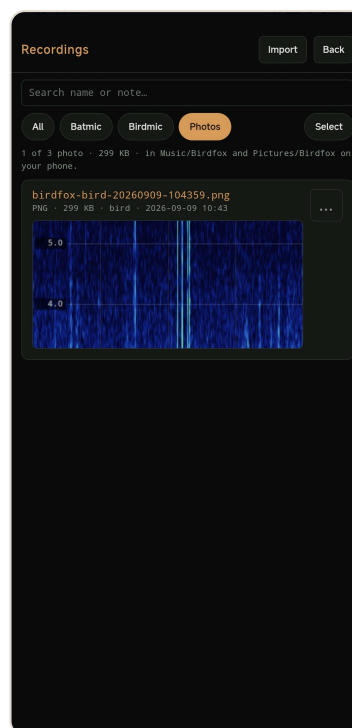


Figure D • The saved screenshots

7 • Playing back and trimming

When you open a recording you get the **spectrogram synchronised** with a position line. Tap anywhere to jump there.

The **A-B trim** lets you select a fragment and save it as a new recording, with its metadata and with a reference to the file it came from. You can also take a **screenshot** during playback, which is saved alongside the recordings as a field note.

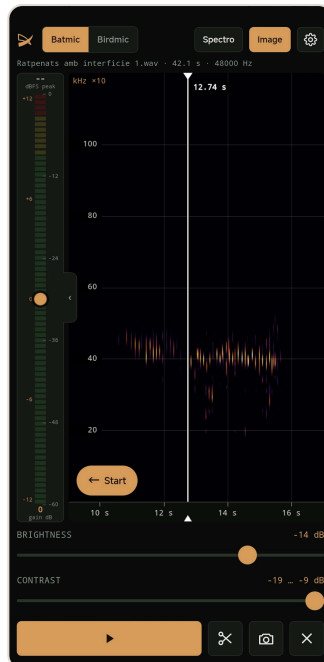


Figure G • Playing back a recording in Batmic mode

8 · Location and GUANO metadata

Every recording carries, embedded **inside the WAV file itself**, a **GUANO** block — the standard format in bioacoustics — with the timestamp, the **exact GPS coordinates**, the sample rate and the duration, the mode, the gain and the format used, your notes and any incident detected during the recording.

Without coordinates, a record is worth far less for science. That is why they go inside the file and not in a separate database: **the recording stays useful even when it leaves the app**.

Sharing a recording is sharing the exact place. The position travels inside the file. Think about it before you send recordings made at a roost, at a nest or from your own home.

Careful with WhatsApp. It renames audio files and recompresses them, and along the way **the GUANO metadata is lost**: the file is no longer any use for measuring. To share scientific recordings use email or Drive, or send them over WhatsApp **as a document**, not as audio.

Location is optional. In Settings there is a switch, *Save location in recordings*: turned off, the app records exactly the same but **without writing the coordinates into the file**. And if you simply don't give the phone the location permission, nothing breaks either: it carries on recording.

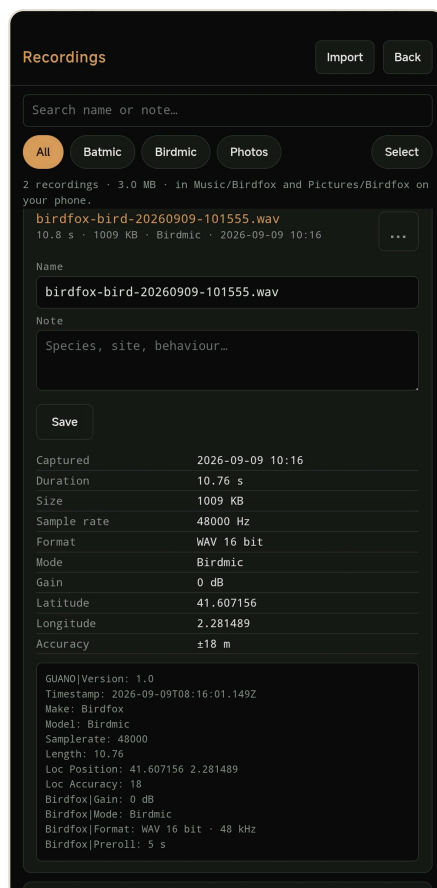


Figure E · The details of a recording, with its GUANO block

9 · Settings

From the gear icon (4):

- **Save the location** in the recordings.
- **Keep the screen on** while you capture. It uses more battery.

- **Pre-recording:** how many seconds before you press Record you want to keep.
- **Where to listen:** automatic (earphones if they are plugged in), or force one output.
- **Speaker channel:** only adjustable when you listen through the phone's speaker.
- **Full instructions** inside the app, and the page on what Batmic and Birdmic are.

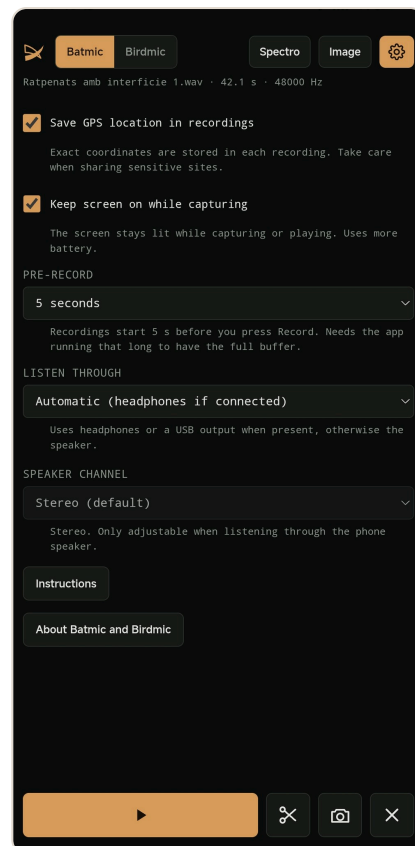


Figure F · Settings

10 · Privacy

For us this is not a legal formality, it is a design decision:

- **No account, no sign-up.** There are no users: there is an app that records.
- **No adverts, no tracking.** No analytics tools of any kind.
- **No servers.** The recordings are not uploaded anywhere, ours or anybody else's. They only leave your phone if you share them.

On the Google Play listing it shows as “**No data collected**”.

11 · If something doesn't work

What's happening	What to check
I'm in Batmic mode and I can't hear anything	The speaker icon in the bottom bar has to be green · then, where the sound comes out, in Settings
I can't see bats on the spectrogram	Have you got a Batmic connected? The phone's microphone doesn't pick up ultrasound, so without one nothing will appear
I see the pulses but I can't make out the frequency	Turn the brightness down, in the image controls (3)
CLIP appears	You are clipping. Turn the gain down with the control on the left
I want to listen live while recording birds	From the phone it can't be done: there is a 0.3 s delay and you would hear the bird twice. To monitor audible sound you need an external audio interface
The recording sounds flattened or has odd background noise	Check that the status line says <i>unprocessed</i> . If you are recording with another app, it is almost certainly applying noise reduction
Pre-recording doesn't keep as much as I expected	The app has to have been open for at least that long to have the buffer full
I sent a recording and it lost its data	WhatsApp recompressed it. Send it again as a document
I can't find the files	They are in Music/Birdfox and Pictures/Birdfox on the phone

If none of that fixes it, write to us at info@birdfox.tech. The people who make the app are the ones who answer.

12 · What's coming

- **Unattended night recording** for nocmig.
- **Compressed formats**, as soon as we have checked that GUANO metadata survives compression.

Technical details

PLATFORM

Android 7.0 or later. No internet connection.

RECORDING FORMAT

16-bit WAV, at full sample rate or at half. No lossy compression.

AUDIO INPUT

Unprocessed: no automatic gain control.

LIVE LISTENING

Batmic mode only. The phone introduces about 0.3 s of delay, workable with ultrasound and useless with audible sound.

MODES

Birdmic, for the audible range · Batmic, for ultrasound with the axis in real frequencies.

VIEW

Spectrogram and waveform, pinch zoom and freeze without stopping the capture.

METADATA

GUANO block inside the WAV itself: time, coordinates, mode, gain, format, notes and incidents.

FILES

Music/Birdfox and Pictures/Birdfox on the phone.

PRIVACY

No account, no adverts, no tracking and no servers. On Google Play: "No data collected".

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