

# Protocols for setting up and deploying Song Meter Mini and Micro 2s for detecting Lesser Spotted Woodpeckers

Ken & Linda Smith, Woodpecker Network,

[www.woodpecker-network.org.uk](http://www.woodpecker-network.org.uk)

January 2026

## Introduction

Over the last two years we have been deploying passive acoustic monitors (Wildlife Acoustics Song Meter Mini 2 and Micro 2s) to detect the calling and drumming of Lesser Spotted Woodpeckers (LSW). We outlined the effectiveness of the method in a paper recently published in *British Birds* (Smith *et al.* 2025).

The purpose of this note is to provide more of the practical details in using the method. We have focussed on using the Song Meter Mini and Micro with which we have most experience but other brands of recorders such as AudioMoth and Titled are likely to be equally effective.

We provide the set-up routine for the Wildlife Acoustic recorders as an appendix to this protocol.

It is not possible to check through all the recordings manually so it is important to have access to some automated software to identify LSW calls and drums. Many systems are now available including Chirpity, BirdNet and Perch. Over the last two years we have been working with the British Trust for Ornithology (BTO) to develop an automated woodpecker classifier on the BTO Acoustic Pipeline <https://app.bto.org/acoustic-pipeline/>. So far we have been working with a development version of this classifier but an updated version will be openly available on the BTO Acoustic Pipeline from this spring.

It is important that any LSW calls or drums identified by the classifier are checked manually. To do this we use the Audacity package which can be downloaded free of charge <https://www.audacityteam.org/>. This allows you to listen to all the clips which have been identified by the classifier and to look at the corresponding sound spectrograms.

## Selecting the recording site

The sites where you deploy song meters will largely be determined by your study design. You may be aiming to determine presence of LSWs at a particular site, be surveying a randomly selected sample of sites or 1-km squares or be looking at relative usage at locations within a site.

To maximise the chances of detecting a LSW within a site we always aim to find an area of their preferred habitat; broadleaved wet woodland, preferably with some standing dead wood of LSW friendly tree species like birch, willow, poplar or alder.

If no LSWs are detected after a first deployment at a location it could well be worth moving the recorder to another likely spot within the site and trying one more time.

In Sussex and Hampshire in 2026 we are planning county-wide surveys based on random selections of 1-km squares with likely LSW habitat based on the presence of wet, broadleaved woodlands. In the Kent survey in 2025, recorders we set on the 200m spacing within the sites to increase the chances of detecting LSWs and to collect data on relative usage.



## Installing the recorder

We find the simplest and least obtrusive way to install the recorder is to screw it to a tree in a secluded area out of vision from any passers-by at about shoulder height. Wood screws about 25mm long are needed to penetrate through the bark for a secure attachment.

Avoid installing the recorder too close to flowing water – the sound of a bubbling brook can completely dominate the recordings – and definitely avoid anywhere where there is traffic or aircraft noise. Any background noise like this will greatly reduce the ability of the software to detect any bird calls or song. If possible, avoid mounting the device such that the microphone is close to a smooth hard surface as this can induce echoes on the recordings, making accurate identification more challenging.

The recorders can also be swamped by noise in periods of high wind or persistent rain.

## When to record and for how long

The peak recording period for Lesser Spotted Woodpeckers is from mid-February through to late April (Smith *et al.* 2025). The birds are most likely to drum or call on fine, calm, sunny mornings. We normally deploy the recorders for periods of around five days per location. Bear in mind that early in the season good recording mornings are not as common as later on. If you find there has been a period of poor (wet or windy) weather consider extending the recording period at the location.

We usually set the recorder to record continuously from first light (30 minutes before sunrise) until sunset and the data are stored as a series of hour-long WAV files covering the whole day. Mornings are the most fruitful times for hearing LSWs but we record for the whole day on the off chance of hearing the birds in the afternoon which sometimes happens. In most deployments there is sufficient memory and battery capacity to allow this. If you are concerned about battery or memory capacity then set the timer to stop recording at about 13.00.

## Downloading and processing the data

On collecting the data from the recorder, the first step is to copy the contents of the memory card to a secure storage location such as an external hard drive. On the external hard drive create a new folder with the site name and recording dates as the folder name (e.g. Marsh Wood TQ3022 Mar 5-Mar 10) and copy all the files from the memory card – both the WAV files and the supporting log file into the new folder. With over 1GB of data stored per day this download can take a while. Song Meter Mini's use SD cards for storage and Micros use micro-SD cards. We usually use cards of at least 16GB capacity that can hold a couple of weeks of recordings. Cards are relatively inexpensive nowadays and if you want to store more data much higher capacities are available (CPC-Farnell carry a good range).

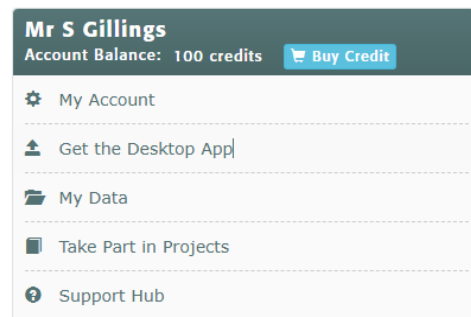
At this point you can either analyse the data yourself or store it to be passed on to be analysed by a third party.

We have been using the BTO Acoustic Pipeline to analyse the recorded files to locate LSW calls and drums. There are other options such as Chirpity, BirdNET and Perch which can be used.

## BTO Acoustic Pipeline

In preparation for using the Pipeline you will need to:

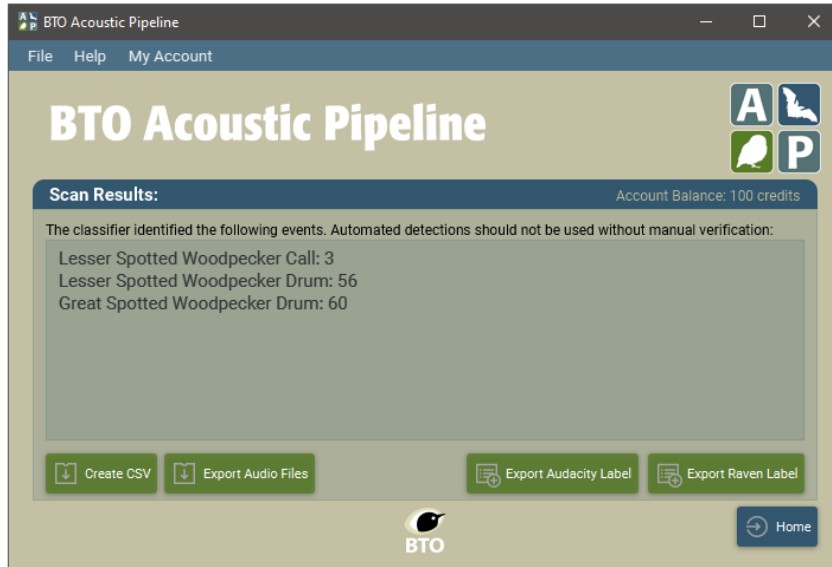
1. **Get a BTO Acoustic Pipeline account:** Visit <https://app.bto.org/acoustic-pipeline/data-home/data-home.jsp> Note, if you use any existing BTO online apps (WeBS, BBS, BirdTrack etc), use the same username and password to login, then agree to the Pipeline's terms and conditions.
2. **Join the LSW Project:** on the Pipeline web page, go to Take Part in Projects, then Available Projects. Find the Lesser Spotted Woodpecker monitoring project and click Register for Project. Until you complete this step the LSW classifier won't be available to you.
3. **Get the App:** on the Pipeline web page, click 'Get the Desktop App', and follow the instructions to install on your computer. The app handles the processing of the recordings on your computer.



## To process audio files:

- Open the Desktop App and login with your BTO username and password.
- Click start for 'Identify birds & mammals using audible-range recordings'.
- Select a sound folder - the folder of files you wish to process.
- Click 'Add location information'.
- This comes up with a map. If you have set the recorder GPS location correctly on deployment the pin should be at your recorder location. You can change the location by going to '...' at the right end of the first file details and add the pin to the map. This changes the first record. To change them all, select 'copy to all files'.
- Note some recorders have a bug and add a minus sign on the longitude. If the pin is in the wrong place, delete the minus sign.
- Batch name – add a short label to identify this batch, e.g. Marsh Wood point A.

- Project – select Lesser Spotted Woodpecker monitoring. If this is not listed, check you’ve registered for the Project (see point 2 above).
- On the next page highlight the woodpecker classifier.
- Select ‘Scan Folder’. This gives a progress bar. If there are large numbers of WAV files in your results folder this could take some time.
- Scan results will come back with a summary. Lesser Spotted Woodpecker drums XX etc. Remember, these are provisional totals prior to human checking.



- Select ‘Create CSV’ and select the folder you want to save to. Usually the same folder as all the WAV files.
- Also select ‘Export Audacity Labels’. This creates an audacity label file with all the ‘hits’ that allows the spectrographs to be labelled when you come to view them and listen to the sounds (see below).
- Optionally, you can select “Export Audio Files”. This will extract a 3 second sound clip for each detection and will organise clips into relevant species folders.

### Verifying the results

It is essential that all possible LSW calls and drums are checked manually. To do this open the CSV file which gives the details of all the detections. Each detection comes with a quality score between 0.9 and 1.00 and it may be useful to check the highest scores first. The original file name column tells you which file to look in.

Open Audacity and in ‘Open File’ select the first WAV file you want to review. This will bring up the sound spectrogram on the screen.

To add the labels go to ‘Import, Labels’ and select the matching label file. You will now have the spectrogram with labels of all the LSW and GSW detections along the bottom making it easy to look at and play all your possible hits.

**Help and Advice** We are happy to provide help and advice if you run into any issues. We are also happy to check any (within reason!) recordings where you are not certain of the identification. Sound classifiers are brilliant but not infallible so there are always likely to be a few recordings that remain uncertain.

You can contact us by email at [info@woodpecker-networ.org.uk](mailto:info@woodpecker-networ.org.uk)

### Reference

Smith K, Smith L, Addleton N, Clements R, Fisk S, Gillings S, Mallalieu M, Mathieson H & Robin A (2025). Bioacoustics as a tool for the detection and monitoring of a scarce woodland bird – the Lesser Spotted Woodpecker. *British Birds* **118**: December 2025: 658-667.

### APPENDIX 1 Setting up the Song Meter Mini 2 or Micro 2

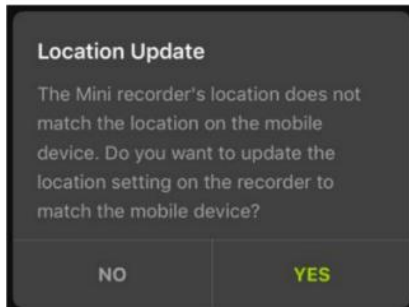
### APPENDIX 2 Setting up Audacity

## APPENDIX 1

### Setting up the Song Meter Mini 2 or Micro 2

Wildlife Acoustics provide plenty of product information and resources, including video tutorials, to support the use of their Song Meters. Each recorder comes with a set of QuickStart instructions which will get you started very easily.

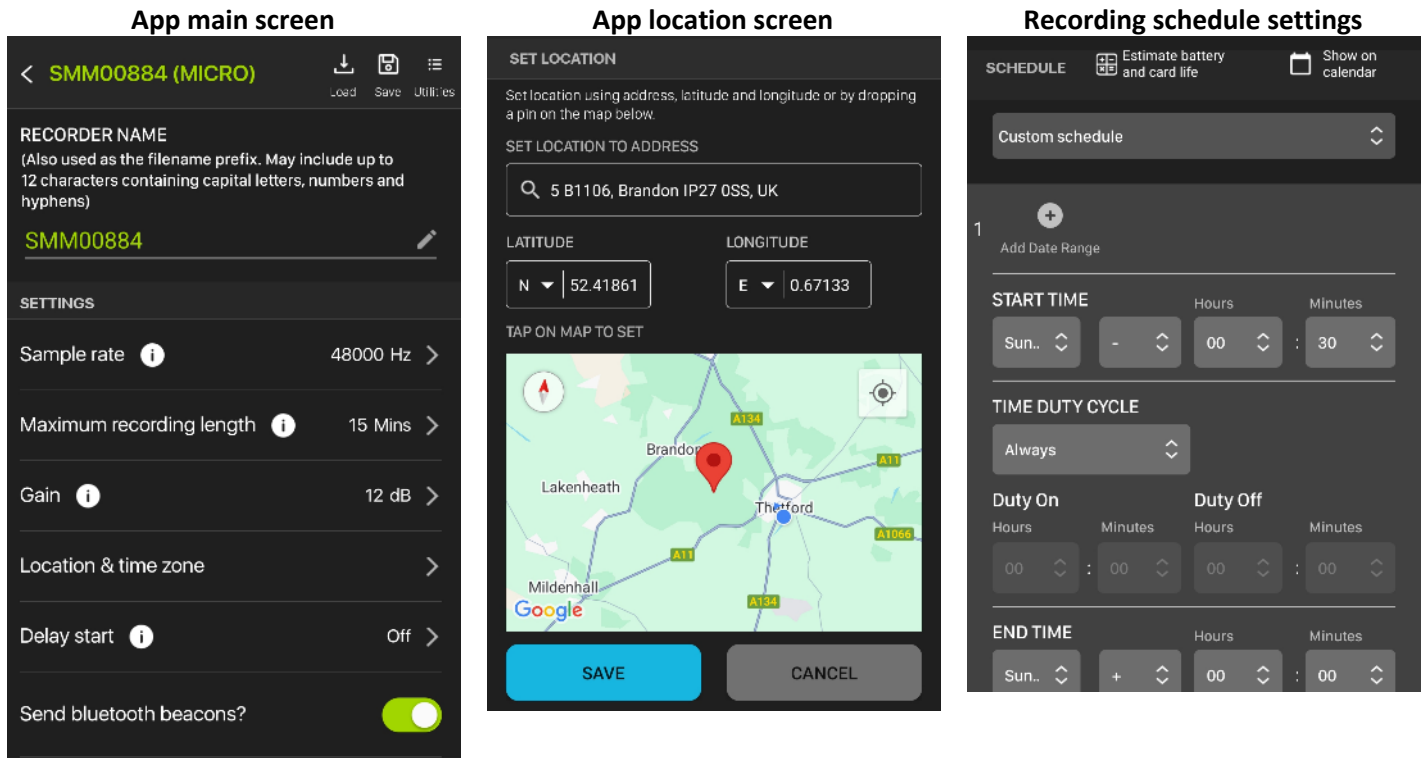
1. Whilst you have good internet/wifi access download the 'Song Meter Configurator App' to your mobile phone.
2. Open up the recorder.
3. Check that it is switched off – left hand switch on the Mini 2, right hand switch on the Micro 2.
4. Insert the AA batteries into the holder (On the Mini 2 four batteries for five or six days, eight for two weeks recording; on the Micro 2 four batteries). Be careful that you get the batteries in properly, it can be a bit tricky to get them to connect correctly. We use rechargeable NiMH batteries which are fine for five-day deployments (CPC-Farnell carry a good range).
5. Insert an SD/micro SD card and press it into place (the recorder stores about 1.2GB per day so 32GB card should be fine).
6. Go to the App on your phone. It will start searching for a Song Meter
7. Switch on the Song Meter and after a few seconds it will be detected by the App and the serial number will appear on your phone screen.
8. To set up your Song Meter you need to 'Pair' it with your mobile phone.
9. To do this press and hold the 'Pair' button on the recorder (next to the on/off switch), After a few seconds of flashing LEDs the pair symbol will appear on the App. Press this and the symbols go green.
10. At this point the App will attempt to synchronise the time and location on your recorder. This is important as it attaches the right coordinates to the recordings and picks up the right dawn and dusk times. So if it asks to update the location, click YES.



11. Now to check the settings press 'Configure'. Here you will see all the settings (see image below).
12. There are just two to check. Hit 'Location and time zone' and on the map hit the target in the bottom corner and it will take you to the current location of the phone. Hit the blue dot and then save. This sets the location of the recorder which is stored in all the files. If possible you should do this at the site where you are deploying the recorder. If you want to preconfigure the location prior to deployment, move the map around and tap the screen to add the red pin marker where you'll deploy the recorder. Press 'Save' to store this location (see image below).
13. Hit the back arrow at the top left to get back to the configure screen and then hit 'Utilities' (top right) and 'Format SD card'. This clears the card of any old recordings (be careful!).
14. Finally go back to the main screen and check status to make sure the memory card has been cleared.
15. To set or adjust the recording schedule we have found the simplest approach is with the recorder paired go to 'Configure' menu and in the SCHEDULE section, change 'Custom schedule' to 'Record birds and frogs from sunrise to sunset'. Scroll down to START TIME and change the + to a -, and set 'Minutes' to 30. This will start the recording 30 minutes before sunrise which is approximately first light. Leave the end time settings as Sunset, unless you want to assign a fixed stop time. Note that schedule will revert to 'Custom schedule' after making these adjustments but that is fine. (see image below).
16. Then back to main screen and hit 'Unpair' and you are ready to go.
17. Leave the recorder switched on, close the case and attach it to the tree.

18. As a double check that everything is working as planned select 'Status' on the App. It will tell you details of the Song Meter, how much memory is available on the SD/micro SD card whether the device is recording or the time of next recording.
19. When you come to collect the recorder check the status on the App to see how many GBytes it has stored. Switch off and remove the SD card and keep it secure.
20. BE VERY CAREFUL WITH MICRO SD CARDS – THEY ARE VERY SMALL AND WOULD BE EASY TO LOSE IN THE GRASS. ONLY REMOVE THEM OVER A FIRM, FLAT SURFACE.
21. For the next deployment put in charged batteries and a new memory card and go back to the top of this check.

**Example app screens, showing recommended settings:**

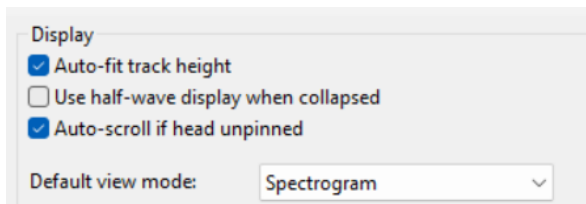


## APPENDIX 2

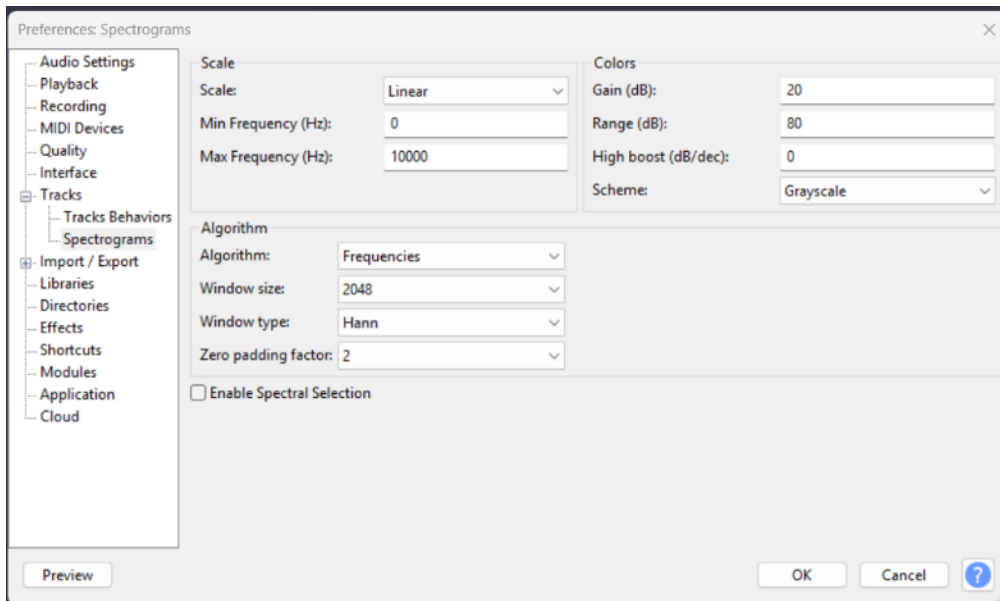
### Setting up Audacity

Audacity is usually used by musicians and podcasters but with a couple of tweaks to the preferences it will open audio files in a birder-friendly manner:

1. Open Audacity
2. Using the menus, select Edit then Preferences.
3. In the pop-up, select Tracks on the left, and then in the right panel, ensure Auto-fit track height is ticked, and set Default view mode to Spectrogram



4. Before you click OK, select Spectrograms on the left (just under Tracks) and then ensure:
  - a. Scale is set to Linear
  - b. Min Frequency is 0
  - c. Max Frequency is 10000
  - d. Window size is either 1024 or 2048 (you may need to toggle between these if your spectrogram looks fuzzy)



5. Now click OK