

Bat detector review: BatBox Baton XD

Time expansion (TE) bat detectors have long been the equipment of choice for capturing highly detailed recordings of bat calls for sound analysis, though nowadays their popularity is rivalled by direct sampling detectors. By capturing a short section of a call sequence (e.g. 1 second) and playing it back at a slower speed (e.g. 10x) the calls are converted to frequencies that are largely audible and easily recorded. The time expanded signal retains a high level of detail from the original ultrasonic signal which makes call structure very clear and enables precise measurements of different call parameters. The downside of most TE detectors is that when they are playing back the time expanded signal they are not detecting any new sounds, so they have long “deaf” periods (for example 10 seconds out of every 11 if 1 second samples are played back in full with a TE factor of 10). During these deaf periods call sequences from passing bats may be largely or entirely missed.

The BatBox Baton XD (current retail price £286.80) offers a new, more “intelligent” approach to TE designed to minimise the chance of missing bat passes. The optimum few calls of a bat pass are selected and played back ten times slower. In theory the shorter playback time of more carefully selected calls means that the majority of bat passes will be sampled. How the optimum calls are identified isn’t explained but I was impressed with the quality of the calls captured. This detector also provides a



Photo: www.batbox.com

frequency division (FD) output which enables continuous real-time sampling (though with the lower resolution inherent in FD systems) so you can check whether any species/call sequences appear to have been missed in TE mode. My limited comparisons of the TE and FD channels suggest that the TE mode seemed to succeed in capturing calls from all the sequences that were captured in FD mode, with at least four calls per pipistrelle call sequence captured in TE mode in the examples I looked at. For species which produce longer calls at slower repetition rates it’s possible that fewer calls per sequence will be captured in TE mode.

In order to make recordings for spectrogram analysis you will need to buy a separate recording device and audio lead. You can also record to a smartphone using the enclosed 4 pole jack lead and if you have a spectrogram app on your phone (there are a number of good free/low cost apps available) you can watch live spectrograms of calls from passing bats. To activate this you select one of the stereo channels to send to the app, which will then begin to display the live spectrograms, and send the other channel to the bat detector speaker. This means that if you are listening to the frequency division channel via the speaker then it will be the time expansion channel that is displayed on the spectrogram app, and vice versa. You can save audio recordings from the Baton XD on your smartphone but only in mono so you need to decide which channel to record for later analysis.

I made recordings from the Baton XD using a recording device set to record in .WAV format, 44.1 kHz 16 bit (the usual recommended settings for recording from a TE or FD bat detector). Viewed in a sound analysis program, the TE and FD channels both display a high signal to noise ratio and the overall clarity of the calls compares well with other detectors that use these systems, though recording quality may of course vary between different recording devices and settings (recording

level is another important factor). More precise frequency and call duration measurements can be taken from the TE recordings but some caution is needed with measuring interpulse interval (IPI) as it can sometimes be difficult to tell whether consecutive calls are from the same call sequence or two different call sequences that have been sampled in TE mode. Therefore it is safer to take your IPI measurements from the FD channel.

In enabling more continuous sampling in TE this detector does lack one handy feature of some conventional TE detectors which enable you to let a time expanded sequence loop continuously, giving you plenty of time to press record on your recording device and capture a sequence of interest. With the BatBox XD once a sequence of bat calls has finished playing back it's gone for good so you need to be quick on the record button to capture call sequences of interest, unless you choose to have your recording device running continuously. If you want to record more selectively then a good tip is to plug headphones into your recording device which enables you to hear the TE channel in one ear and the FD channel in the other. As the sounds in the FD channel are heard in real time and around a second before the sounds in the TE channel this can help alert you to press record on your recording device in time to capture most if not all of the TE sequence.

The ingenious new approach to time expansion recording makes this detector very satisfying to use. In locations with a lot of bat activity it's a real pleasure to listen to the continuous time expanded bat sounds that are produced. It is also very simple to operate, having just a single button which enables you to switch the detector on/off and control the speaker output, channel swapping and volume levels. Double-clicking the button will activate the speaker and you can click to toggle between hearing TE and FD from the speaker. It's recommended that you listen through headphones to get the full benefit of listening to both channels and also to get cleaner recordings for later analysis (if the speaker is activated then the detector will pick up its own signal which will show up as low frequency noise on the spectrographic display). The leaflet provided with the detector gives clear and concise operating instructions.

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