Baton XD Quick-start guide

A state of the art bat detector that is compact economical and very easy to operate

Frequency reduction of bat calls on the **Baton XD** is accomplished in two ways. Frequency division, which divides the ultrasonic sound spectrum by 10, in real time. Secondly, time expansion, where the **Baton XD**, having selected the optimum few calls of the bat pass, instantaneously creates a high speed digital recording and then immediately plays it back 10 times slower. The unit does not go 'deaf' at any time during this process so no bat pass will be missed. The output can be sent to any recording device, including iPhone and Android phones, for instant or later spectrum analysis.

To accurately identify bat species from calls, four of the essential measurement criteria required are bandwidth, repetition rate, call shape, and relative intensity. The **Baton XD** provides all of this information via its two simultaneous modes. Both modes retain amplitude information and frequency bandwidth. The call repetition rate is available from frequency division and a more detailed output of call shape is provided by time expansion.

When conducting night time surveys, it is important to keep as much of your attention as possible for watching the environment, both for personal safety reasons and for accurate judgement of bat activity, which can be just as important for identification and behavioural assessment as sound analysis alone. For this reason the **Baton XD** has just a single tactile button for accessing all of its functions.

The single button operation controls the speaker output, channel swapping and volume change. The auto-sensing output adjusts automatically for different devices which might be connected to it such as headphones, line-out devices, recorders and smart phones.

The **Baton XD** is packed with the very latest advanced circuitry in a very small device and yet it only consumes 20mA. Battery life, even with a standard alkaline battery, is above 20 hours (depending on use) but can be considerably extended by using a lithium type to around 60 hours.

Baton XD is available with built-in strong magnets which will enable the unit to be attached to the exterior of most cars for mobile transect road surveys.

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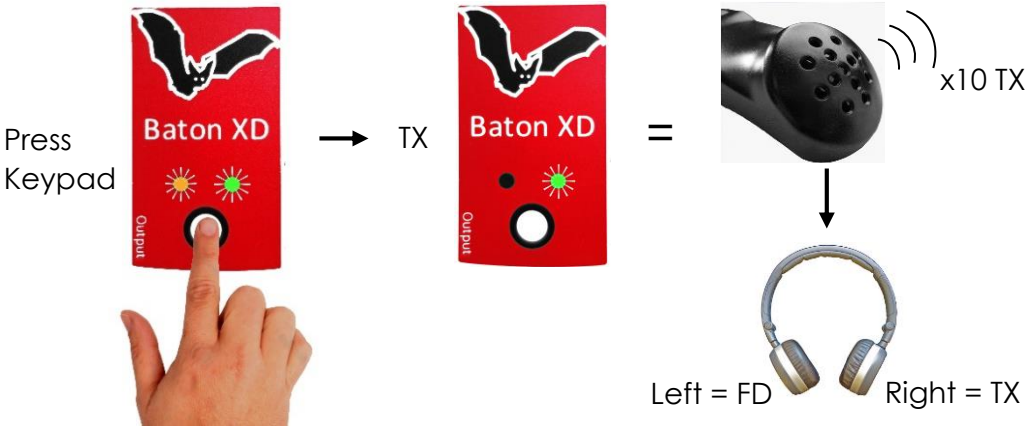

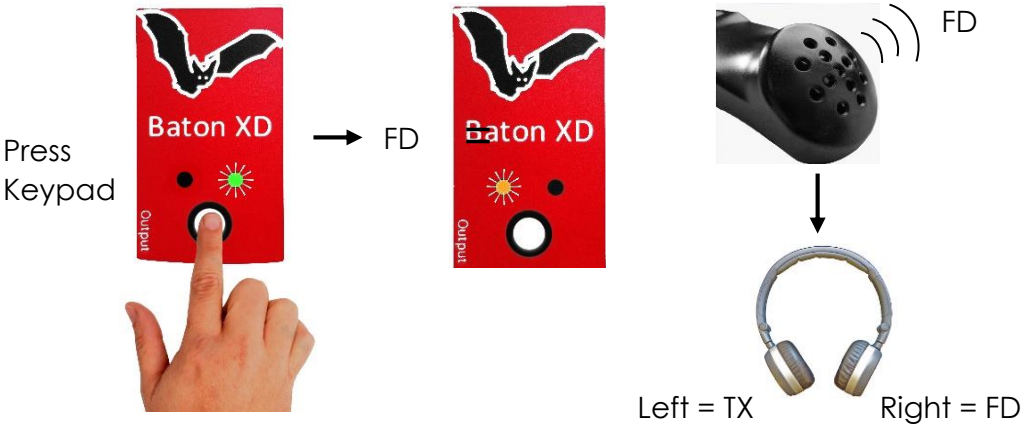

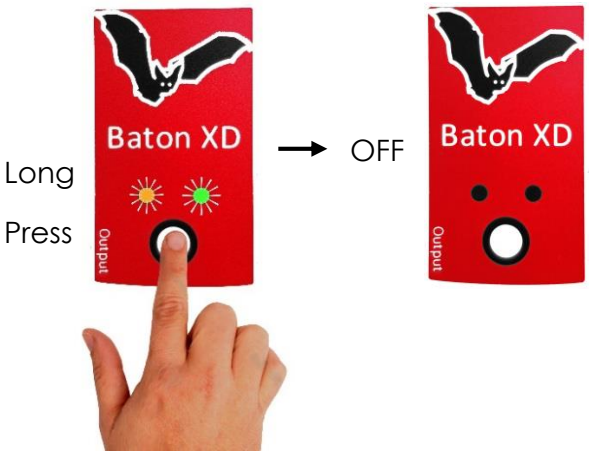

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Recorder

To connect **Baton XD** to a recorder use a standard 3-pole, 3.5mm jack connecting lead. The output from the **Baton XD** should be connected to the 'line-in' socket of the recorder. Follow your recorder's instructions for 'line-in' recording. Most sound analysis programs require WAV files, usually 16bit, 44.1kHz, so the settings on the chosen recorder should reflect this. There is no benefit from setting higher sample rates on the recorder.

It is best to record in stereo in order to retain both the time-expanded calls (TX) and the frequecy-division (FD) for detailed information about the pulse rate of a pass.

Smart phone

To connect to an iPhone or Android device, insert a 4-pole connector into the jack socket of the phone and the other end into the output socket on the **Baton XD**.

Both the phone and the **Baton XD** are auto sensing devices so with some phones there may be a preference for connecting one end of the lead before the other.

Turn on the **Baton XD** and open the chosen phone application. To record, playback, edit, etc, follow instructions for the app.

Android devices and iPhones can only record in mono so you need to decide which of the two modes you want to record. If you choose to record in one mode the speaker will output the alternative mode. So, if you are listening to frequency division from the speaker of the **Baton XD**, time–expansion will be recorded on your smart phone. A single press of the button will swap these around and you will be listening to time-expansion and recording frequency division. This feature means that either mode is available during a recording.

Changing the speaker volume

When switched on the volume of the **Baton XD** is at maximum. A double-press of the button will reduce the output by 6dB. Another double-press will return it to maximum output. This applies to the speaker, line-in, headphones and smartphone. Each time a double–press is actioned the LED that is not lit will flash to confirm the operation.

To prevent recording overload, during a very loud bat pass, there is an automatic gain reduction then after a very short period the sensitivity returns to maximum.

At maximum sensitivity there will be more background 'white' noise but the unit will pick up more distant bats.

When plugging a lead into the **Baton XD** (line-in, headphones and smartphone), the speaker output is muted. To hear sound from the speaker, simultaneously, double-press the keypad, repeatedly until sound is heard from the speaker.

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Headphones

You will get the most out of your **Baton XD** by using headphones. The quality of sound will be better than through the built-in speaker. You will hear, frequency division in one ear, providing real-time pulse rates and time-expanded calls in the other for a good perception of their frequency. When saving to a digital recorder it is better to monitor from the recorder's headphone socket allowing good control of the recording level.

Battery

To remove tilt the base of the battery upwards which will unclip the terminals and replace by firstly offering the terminals into the battery bay then pushing the other end down flush.

Transporting

Because the **Baton XD** weighs only 80 grams it can be carried easily in a pocket or bag. If transported with other goods, remove the battery first to prevent accidental switch-on which could drain the battery.

Specifications

Time expansion and frequency division (x10)

A-D convertor 441kHz sample rate (12 bit)

Output DAC 44.1kHz (12 bit)

Frequency response better than 18kHz to 120kHz

Intelligent output sensing of Line-out/headphone/smart phone

Power consumption 20mA

Battery 9v, PP3 (<60hrs with Lithium Polymer, <15 hrs with NiMH)

Weight (without battery) 80gm