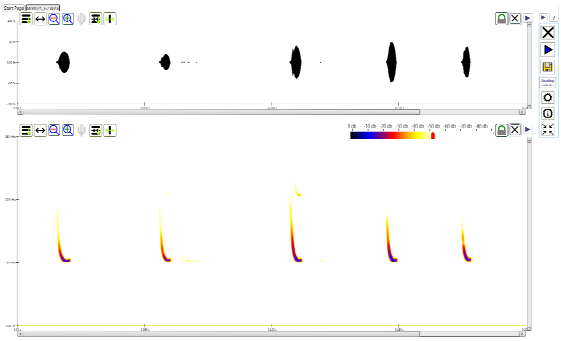
BatSound® Touch

Version 1.1
User Manual



www.batsound.com
Pettersson
Bat detectors and BatSound software

Pettersson Elektronik AB
Uppsala Science Park
75183 Uppsala, Sweden

www.batsound.com
info@batsound.com

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Introduction

BatSound Touch is a sound recording and analysis software which provides high-resolution real-time spectrograms and is very easy to use with touch screen tablet PCs. It has resizable text and buttons to facilitate operation on devices with virtually any screen size. BatSound Touch can of course also be used on computers without a touch screen.

In the default mode, the waveform (oscillogram) and spectrogram are shown on the screen, but it is also possible to show only the spectrogram or waveform, if desired. The program can be used to examine existing sound files as well as to show the waveform/spectrogram in real time (e.g. while recording). In both cases, it is possible to scroll back and forth in the diagrams as well as to pinch-zoom in and out.

When ultrasonic signals are recorded (this assumes that a recording device with high sampling frequency is used), an ultrasound conversion feature is available, which transforms the ultrasound into audible sound in real time, making it possible to hear the ultrasonic signal (e.g. bat calls) at the same time it is being recorded.

BatSound Touch supports the Pettersson M500 USB ultrasound microphone and together with a tablet PC, a small and powerful ultrasound recording device is obtained. In addition to the M500, any standard Windows sound device can be used with BatSound Touch.

If a GPS receiver (with reception) is available in the computer/tablet, the GPS coordinates will be stored in the recorded files. If a GPS receiver is not available, GPS coordinates can also be entered manually.

Several different color schemes ("themes") are available in BatSound Touch. The examples in this manual are made with the Classic theme. For nocturnal use, one of the themes with black background is more suitable.

Tapping the question mark symbol  will give a brief, on-screen explanation of the various buttons. This is a good starting point to explore the program and its features.

BatSound Touch is also available in a 'Lite' version with limited functionality. This version is available free of charge to M500 owners. The limitations are listed at the end of this User Manual.

System requirements

BatSound Touch supports Windows 7, Windows 8/8.1 and Windows 10.

Recommended minimum system configuration:

- 1 GB RAM
- 30 MB free hard disk space and additional space for recorded files
- 1.33 GHz AMD/Intel processor
- Microsoft Visual C++ Redistributable Package for Visual Studio 2013*
- Microsoft .NET Framework 4.5 (included in Windows 8/8.1/10)
- Internet access during installation (only for .NET Framework 4.5)

* Included in the BatSound Touch installation package

Installing the software

1. a) For a 32-bit Windows version, locate and double click the file "BatSoundTouchInstaller32.exe".

   b) For a 64-bit Windows version, locate and double click the file "BatSoundTouchInstaller64.exe". It is also possible to use "BatSoundTouchInstaller32.exe", but the performance will generally be higher with the 64-bit version of BatSound Touch.

2. Accept the Security Warning and click "Run".

3. Read the license agreement and check the box "I agree to the license terms and conditions" to confirm that you agree and click Install.

4. If a User Account Control window appears, click Yes.

5. The installation now begins. If Microsoft Visual C++ 2013 Redistributable (x86) is not already installed on your system, a dialog box will open. Read the Microsoft Software License Terms and check the box "I agree to the license terms and conditions" to confirm that you agree and click Install. When it is completed, press Close to continue the installation of BatSound Touch.

6. Enter the installation code and press Continue. Please note that the installation code is case sensitive.

   The installation code is required if you need to re-install the software, so please make sure to keep it in a safe place.

Overview

The main window in BatSound Touch consists of:

- The file tabs
- The graphics area, where the oscillogram and spectrogram are drawn
- The toolbars
- Spectrogram amplitude threshold slider
- The status bar

The small arrow symbols  are used to hide the respective toolbar. When a toolbar is hidden, it can be made visible again by tapping  .

Tapping the question mark symbol  will give a brief, on-screen explanation of the various buttons.

Horizontal toolbar

Open command menu.

Toggle vertical or horizontal zoom.

Zoom out.

Zoom in.

Compressed view menu.

Activate compressed view.

Vertical toolbar

Close the active file.

Start playing sound from cursor position, or marked section.

Start recording.

Start triggered recording.

Stop playing or recording.

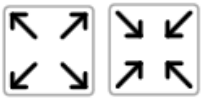
Real-time audio of ultrasonic signals.

Start circular recording. This icon is only visible when live view/sound is active.

Save file.

Open settings menu.

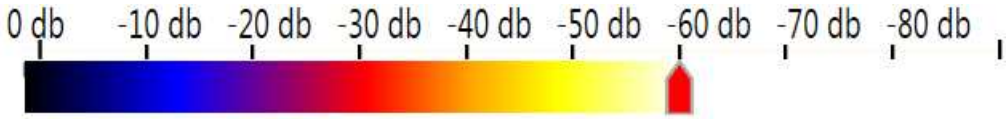
File information.



Enter/exit full screen mode.

Amplitude threshold slider

If the spectrogram is too weak (only visible where the signal is strongest) or if the noise shows too much, you may need to adjust the **amplitude threshold slider**.



Status bar

If a GPS unit is connected, the current latitude and longitude will automatically be displayed to the left in the status bar. The last action is displayed to the right (such as starting or stopping a recording, saving a file, starting real-time audio etc.).

Command menu

This will open a menu with the following choices.

When **Touch select mode** is active, it is possible to draw an area on the screen that can be used for zooming, playback etc. With this mode disabled (default), you are instead able to scroll in the diagrams with your finger/pen. With the Touch select mode disabled, it is also possible to pinch-zoom in (or out) in the diagrams.

The cursor type (Marking cursor, Measurement cursor etc.) and various zoom options can also be chosen in this menu

Using the Measurement Cursor enables you to select a “window” in the diagram to be zoomed (i.e. zoom along both axes). This is possible in both the oscillogram and the spectrogram.

Move to beginning and end of file commands are also available in this menu.

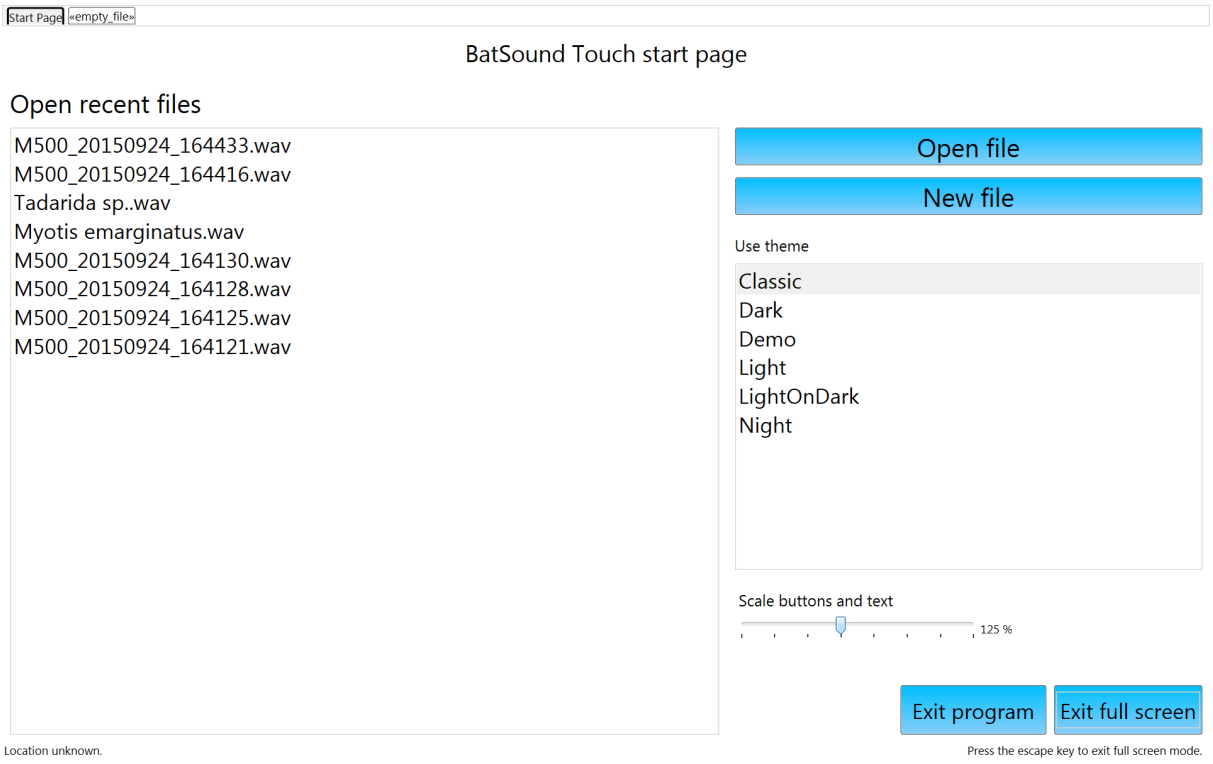
Start page

The start page is accessible from the tab in the top-left corner. The **Open recent files** list gives easy access to files recently used in BatSound Touch. Tapping on a file name will open that file.

Tapping on **Open file** allows the user to browse folders and select a file to open whereas **New file** creates a new, empty file.

A few different themes are available with different color schemes. The active theme is highlighted.

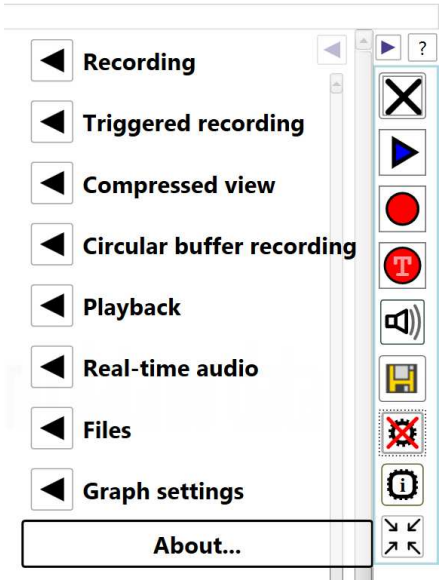
Scale buttons and text allows the users to resize buttons and text according to their preferences.



Functions and Settings

In order to change the system settings, tap the cog-wheel symbol in the vertical toolbar:

This will open a list of functions (recording and playback modes, etc.), for which the settings can be changed. These functions and the corresponding settings are explained below.



Recording Device

This is where the recording device, resolution (bits) and sampling frequency are selected. The M500 USB Ultrasound Microphone is designed for 16 bits resolution and a 500 kHz sampling frequency, so these are the only available alternatives when the M500 is selected.

If you connect a USB recording device, such as the M500, to your computer/tablet when the program is already running, you need to open a new file in order for the recording device list to update.

Recording

To start a manual recording, tap the Recording symbol. The spectrogram and/or oscillogram will be shown in real-time while recording. To stop the recording, tap the Stop symbol.

Triggered recording

In the triggered recording mode, the program starts recording automatically as soon as there is a sufficiently strong sound present.

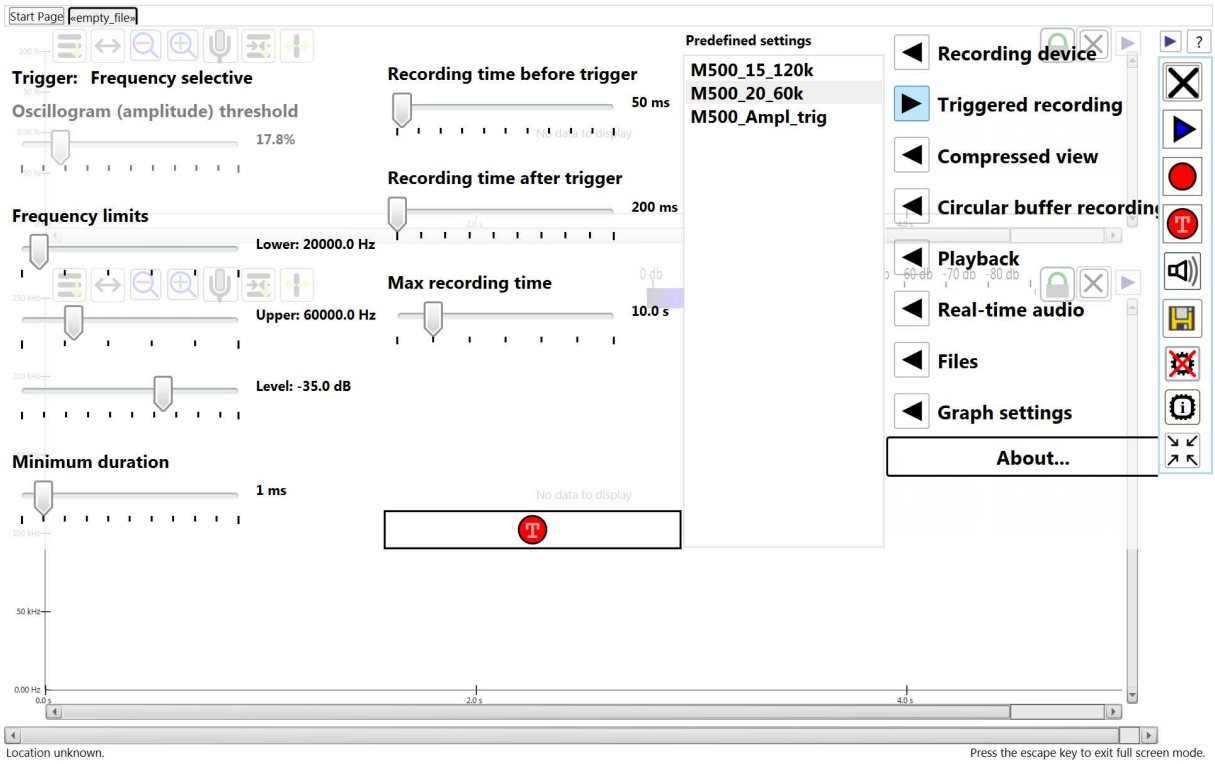
When the **Oscillogram (amplitude) trigger** is selected, the system is triggered when the sound level exceeds the level entered in the Oscillogram threshold box. This level is entered as a percentage of the full range (0 dB corresponds to 100%, -6 dB to 50%, -12 dB to 25% etc.).

When the **Frequency selective trigger** type is selected, power spectra are continuously calculated and evaluated. The system will be triggered when the power spectrum level exceeds the dB value entered in the Power spectrum threshold box at any frequency over the frequency range determined by the **Lower** and **Upper** frequency limits. That way, it is possible to stop the automatic recording system from being triggered by signals outside the 'interesting' frequency range.

The active trigger type is stated in the top left corner of the triggered recording menu and the inactive type is grayed out.

The **Recording time before trigger** determines how long before the trigger occurrence the recording should start. That way, cutting off the start of a sound pulse can be avoided. A memory buffer is used to make it possible to start recording before the trigger.

The **Minimum duration** determines the required length of a signal in order for a recording to start. That way, false triggering from single, short pulses can be avoided.



Live view

Live view is a mode where the spectrogram and/or waveform are displayed in real-time without being recorded. It is possible to scroll back and forth as well as to pinch-zoom in/out in the diagrams while in the Live view mode. The Live view memory buffer size is 60 MB (around one minute with the M500) for the 32-bit version of BatSound Touch and 240 MB for the 64-bit version.

Circular buffer recording

The Circular buffer recording mode uses a circular memory buffer with a size corresponding to the selected recording length. When Record is pressed, the last x seconds is saved in the file. This mode can only be used when Live view and/or Real-time audio is active. The maximum buffer size is 15 seconds. The circular buffering recording icon is only visible when Live view/Real-time audio is active.

Playback

Select which play speed to use for playback. In order to make ultrasonic signals audible, the play speed should be set to e.g. 0.1, which corresponds to 10x time expansion. Files with a sampling frequency higher than 192 kHz (such as recordings made with an M500 microphone) will automatically be adjusted to an appropriate play speed.

Real-time audio

BatSound Touch allows you to monitor the ultrasonic signals in real-time. The ultrasound is made audible through under-sampling, which converts the ultrasound into the audible frequency range.

If the monitoring volume is high, acoustic feedback is likely to occur. To avoid this, reduce the audio volume and/or use headphones. If you are using real-time audio with the tablet speaker active, checking the **Mute sound monitoring while recording** box in the settings dialog will temporarily mute the real-time audio while a recording is being made to ensure that the sound from the speaker will not be recorded.

To enable the monitoring function, press the real-time audio button in the toolbar.

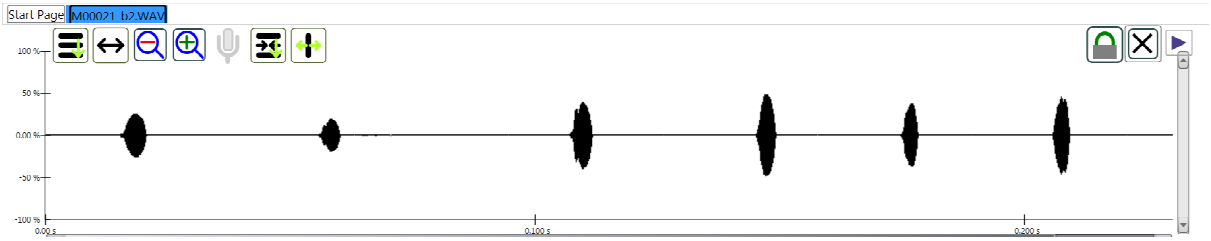
Compressed view

Compressed view is a display mode that removes the silent portions of the signal, making it possible to display more bat calls on the screen at the same time. It works similarly to the Triggered recording mode. When compressed view is active, the signal will only be displayed in the diagram when it meets certain criteria, e.g. it exceeds a selected sound level or contains frequencies between selected frequency limits.

Compressed view can be used both in Live view and with previously recorded files.

Each hidden portion of the signal will be displayed as a vertical line in the diagram. When Compressed view is used on an existing sound file, a hidden portion can be "unhidden" by clicking the + sign below the line.

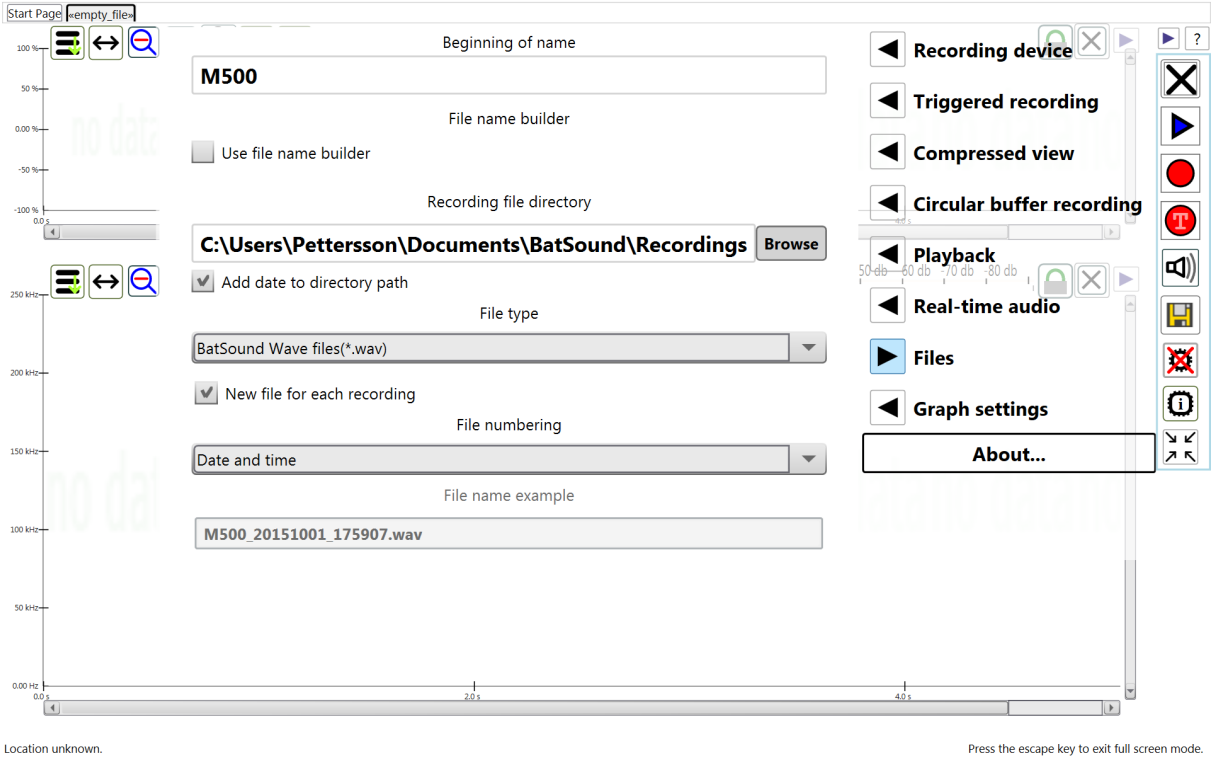
To compress previously recorded files, use the Compressed view menu. 



A signal consisting of six pulses emitted by a bat.

The same signal after it has been compressed. Most of the silence between the pulses is now hidden.

Files



The default save location is C:\Users\[Username]\Documents\BatSound\Recordings. If you wish to change this, click the Browse button and navigate to the desired folder. Check the **Add date to directory path** box to create a folder with the current date.

Checking the **New file for each recording** box will create a new file each time a recording is made. This applies to Triggered recording too, which can result in a large number of small files depending on the settings. Un-checking the box will cause all recordings to be made one after the other in a single file.

The file name beginning should be entered in the "Beginning of file name" field. In the box **File numbering** a file name ending is chosen:

Sequence number
Date and sequence number
Date and time
Time (hhmmss)
Time (hhmmss_mmm)

The **File name example** shows what a file name would look like with the current settings.

Save File As dialog box

The following options allow you to specify the name and location of the file you're about to save:

File Name
Type a new filename to save a document/sound file with a different name. BatSound adds the extension you specify in the Save File As Type box. The default extension is .wav.

File Format
The following file formats are available:

BatSound wave file - A wave format with embedded information used by BatSound, e.g. comments and certain display parameters ("metadata"). This is the default and recommended file format.

BatSound data file (*.bsnd) - A wave format with embedded information used by BatSound, e.g. comments and certain display parameters. The .bsnd file extension is associated with BatSound Touch.

Wave file – The standard wave format. BatSound can read this format as well, but no BatSound specific information will be stored in the file. Typically, this format should be used to create files to be read by other applications, not capable of reading the BatSound wave format.

Graph settings

Oscillogram: Lines between samples. Setting the value to True will cause lines to be drawn between successive samples (improves appearance of the oscillogram at high zoom levels).

Spectrogram: FFT size - the number of samples used for each FFT. You may select one of the following FFT sizes: 64, 128, 256, 512, 1024, 2048, 4096, 8192 or Automatic.

The frequency resolution will be higher (but the time resolution lower!), the larger number of samples you choose. If you choose "Automatic", the program will select an FFT size giving a resolution that approximately corresponds to the actual screen resolution with the current window size.

FFT overlap. Can be set to 95%, 90%, 75%, 50%, 25%, 10%, 5%, 1%, 0% or Automatic. The overlap in % of the FFT window between successive FFTs. An overlap of 50 % means that the "next" FFT will start in the middle of the interval used to calculate the "current" FFT. A large overlap increases the computation time for the spectrogram, but results in a smoother curve ("higher time resolution"). If "Automatic" is selected, the program will select a suitable overlap, corresponding to the present window size and time scale. If the time scale is such that a very long portion of the signal is displayed in the window, the program will adjust the overlap to avoid long calculation times. If short pulses are present in the window in this case, some of these may be lost in the spectrogram. *To avoid this situation, manually select a sufficient overlap in such cases.*

Various: Update rate recording indicates the diagram update rate. Lowering this can increase performance on lower-end computers.

The width of the scroll bars below the diagrams can be adjusted. Setting it to Auto on tablet PC's will result in no scroll bars at all. Instead the user can sweep the fingers in the diagrams to scroll.

The vertical and horizontal **grid lines** can be set to None, Sparse or Dense.

As a tool to assist in quickly recognizing the frequencies of a signal, **rulers** can be activated and positioned at desired frequencies in the diagram.

The **relative sizes between spectrograms and oscillograms** are set to 66%/34% by default but can be changed by moving the slider.

File information

Information about the recording site and the recording equipment can easily be stored as metadata in the file. BatSound Touch guides the user in this, through a set of dialogs where the desired information can be entered.

Parts of this information can optionally be included in the file names, by using the Filename Builder feature. This gives highly descriptive file names, e.g.:

ACT_M500_Location 1_Site 7_20150922_181651.wav

Where ACT means "active recording", M500 is the recording device, Location and Site are used to state where the recording was made. The date and time of the recording are also added to the file name.

Save as default will save the current settings as default for other files. **Save as favorite** will save and store the current settings in the favorite list for later use.

The following file information can be entered. The Location and Detector tabs are only available in the Extended template.

General
Title, Time Expansion, Date, User

Notes
Notes, Recorded by

Location
State, County, Town, Owner, Site Name, Project, Lat, Long, Date, Elevation, Clutter, Habitat (these Latitude and Longitude values are to be entered manually)

Detector
AGL Height, Orientation, Weatherproofing

Recording
Recorded, Latitude, Longitude, Comment, Ended (these Latitude and Longitude values are saved automatically if a GPS unit was connected when the file was recorded)

Format
Samples per sec, Channels, BitsPerSample, File Size

Filenames
Type, Detector, Location, Site, Example

BatSound Touch Lite

The following limitations apply to the 'Lite' version of Batsound Touch.

1. Only one file can be open at any given time
2. Only the M500 USB Ultrasound Microphone can be used for recording
3. Only one instance of the program can be running at a time
4. Only two themes are available: Dark and Classic
5. 'Compressed view' is unavailable
6. 'File information' is unavailable
7. Circular buffer save time is locked at 3 s
8. Locked/limited settings for Triggered recording:
   a) Freq. dB: Range limited to -40 dB ... -1 dB
   b) Recording time before trigger: 200 ms
   c) Recording time after trigger: 500 ms
   d) Minimum duration: 1 ms
   e) Maximum recording time: 15 s
9. Locked settings for Graph Settings - Various:
   a) Scroll bar width: Auto
   b) Vertical/Horizontal grid lines: None
   c) Show rulers: Off
   d) Spectrogram/oscillogram relative size: 66%/34%