

# SSF BAT3

## ultrasound detector



- **Grafical display of bat calls:**  
**Sonogram** with individual adjustable resolution, ideal for easy bat detection, HOLD function, 4 pictures may be saved in the internal memory.
- **Spectrogram** (persistant display)
- Frequency range **15 to 150 kHz** infinitely adjustable in steps of 1 kHz
- **BAT3Viewer** program for PC, Mac, Linux for saving and displaying **ScreenShots** of sono- and spectrograms (accessories)
- **Automatic tracking** of bats with strongest calls in AutoBat mode (detachable)
- **Bat list**, adjusted to the predefined maximum frequency, for easy determination of bats (DE/EN)
- **Bat database** with information (DE/EN)
- **MicroSD card reader** for expanded functions. The MicroSD card (accessories) will be recognized as a USB drive.
- **Easy to handle**, adjustments for two users will be saved.
- **Excellent sensibility**, due to high-quality ultrasonic electret microphone in combination with a low-noise and adjustable preamplifier stage
- **Big color display** with adjustable brightness, overview of all possible adjustments and the last bat calls.
- **Touch-screen** (resistive) with touch-pen
- **Clock and torch**
- **High quality of sound and volume**, brilliant clear and differentiated transfer of bat sounds through integrated 1.5 W speaker
- Two level **Boost modus** for higher volume on guided tours
- **Line-out and headphone output** (combined, automatic detection)
- **Firmware update** via USB interface and PC
- **Auto shut-off** for battery protection (adjustable from 1 min to  $\infty$ )
- **Handy size and low weight:** 104x57x15 mm (HxWxD), 125 g



Development and manufacturing of SSF BAT3:

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Many thanks to all the people who helped with time, input and testing (in alphabetical order): Ulrike Binkle, Dr. Wolfgang Fiedler (Max-Planck-Institut for Ornithology Radolfzell), Dirk Hautekiet (Betatest), Klaus Heck (University of Konstanz), Philipp Heller (Translation), Yvonne Huber (Design), Dr. Michael Klinger (BUND), Kyra von Lienen (Corrections), Christian Lichtenau (Translation), Clint Manning (Software), Dr. Hans-Peter Stutz (SSF) and all the helpers not mentioned...

Dipl.Ing. Karl Volkmann



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## Technical data

<b>Product name:</b>	SSF BAT3
<b>Ambient temperature:</b>	0°C to 40°C
<b>Battery:</b>	Li-Ion battery 1200mAh, 3.7V, 4.44Wh
<b>Operating time:</b>	according to screen brightness ca. 3–6 hours continuous operation
<b>Microphone:</b>	Ultrasonic Electret (FG-23629)
<b>Frequency range:</b>	15 kHz to 150 kHz
<b>Processor:</b>	DSP-Processor 140 MHz
<b>Signal processing:</b>	"High Speed-Low Noise"-operational amplifier separated for digital- and analog section, shielded microphone preamplifier for high signal-to-noise ratio, switchable filter for attenuation of frequencies below 30 kHz, low-pass 5 kHz
<b>Speaker:</b>	Rear speaker 1.5 W, additional front speaker
<b>Display:</b>	TFT color screen with 240 x 320 pixels
<b>Jack plug:</b>	Headphone (headset compatible), Lineout (automatic detection via impedance measuring)
<b>USB:</b>	Battery charge via USB power supply, Firmware update via PC (see page 29)
<b>MicroSD card reader:</b>	MicroSD card max. (FAT16 max. 4GB)
<b>Weight:</b>	125 g (incl. battery)
<b>Dimensions:</b>	104x57x15 mm (HxWxD)

## Scope of delivery

- SSF BAT3
  - Hand strap
  - Li-Ion rechargeable battery (only Germany)
  - USB power supply
  - USB cable
  - Description
  - Packaging
- Accessory also available:
- Carrier bag
  - Spare battery
  - MicroSD card (ready to use)
  - AddOn for saving ScreenShot pictures (MicroSD card is required)

### Available downloads:

- File for extension of bat database with pictures (free of charge)



# Disposal

Electronic devices often contain valuable material, as well as harmful substances. These can harm people and the environment, if incorrectly handled. Therefore electronic waste must not be disposed with normal household garbage. Electronic waste must be disposed at suitable collection point provided by public waste authorities or via the vendor. There is the possibility to send old SSF BAT3 devices via sufficient stamped mail back to us. Transport costs or travel expense will not be refunded. Return of the product shall be directed to:

BUND Naturschutzzentrum Westlicher Hegau  
Erwin-Dietrich-Str. 3  
D-78244 Gottmadingen

## EU countries

Do not throw electronic devices into the domestic waste! According to the European law on waste electrical and electronic equipment and its incorporation into national law electric products must be collected separately and treated in an environmentally compatible way for reuse.

## **WEEE-Reg.-Nr. DE 14408619**

We have registered with the Electrical and Electronic Equipment Register (EAR) in accordance with §6 Abs.2 ElektroG.



# Advice on battery

## Advice on battery disposal

In connection with the sale of devices that need batteries or rechargeable batteries, we are obliged to give you the following information:

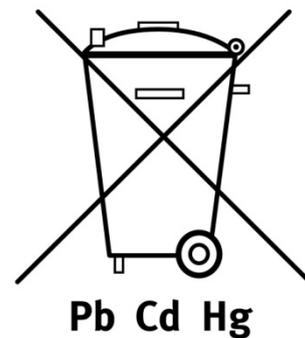
The consumer is obliged to give back used batteries. You may return any batteries and rechargeable batteries after use to the distributor or to any intended treatment facility (e.g. public waste management authorities or any distributors) free of charge.

You can also return batteries to the vendor by post. In any case the vendor will reimburse the postal charge for return of your used battery.

The symbols shown on the batteries have the following meaning:

Batteries must not be disposed of in the household waste.

- Pb = Battery contains more than 0.004 percent by weight of Lead
- Cd = Battery contains more than 0.002 percent by weight of Cadmium
- Hg = Battery contains more than 0.0005 percent by weight of Mercury



Please note the separate manual for rechargeable Lithium-Ion-batteries/Lithium-Polymer-batteries attached to the battery:

- Safety instructions
- Precautions for use
- Battery level at time of purchase
- Operating temperature
- Care and cleaning
- Battery life
- Transport and storage
- Battery recycling
- Specifications



# Startup

## First startup and hints:

- Remove the protective film from the display before using the device the first time.
- Do not expose your device or its accessories to high humidity or moisture.
- For your own safety, please only use the supplied battery and charger. When using a foreign charger there may be interferences if it is not decoupled enough.
- Do not store the device for a longer time with battery inserted. Fully charge the battery after a longer period of non-use. Please note the separate manual attached to the battery.
- At mains operation always operate with battery inserted.
- Insert the MicroSD card (available as accessory), maximum size 4 GB, FAT file system, only free from tension (USB cable removed).

## Insertion or change of battery:

1. Remove of battery cover:  
Slide the cover in the direction of the arrow.
2. Insert the battery.
3. Close the battery cover. Once has to pay attention that the touch-pen ③ (see picture page 11) has not accidentally turned in a way that the cover is blocked.
4. The battery pack is not fully charged when leaving the factory. It has to be charged completely after purchase. The battery pack also has to be charged after not using it for a long period of time (up to 8 hours when empty).

If changing the battery takes longer than 1 minute clock and date must be set new.

The battery is delivered with the device (only Germany).



## Attachment of the hand strap:

For threading the hand strap you need a 30–50 cm long dark sewing thread and a thin needle. Form the sewing thread into a loop and push it through one of the two openings at the bottom of the right side of the case, until it is visible at the second opening. Now pull up the loop with the needle. Tie the hand strap to the sewing thread and carefully pull it through the opening. After releasing the knot pull the larger end of the strap through the thinner one.



# MicroSD extension

## Insertion or replacement of the MicroSD card:

1. Remove the battery (see page 7) and remove the USB cable.
2. The MicroSD card holder has a flap mechanism, which must be opened before inserting the card. Slide the card holder carefully towards the edge of the device and fold it upwards (picture 1). Insert the MicroSD card (electrical contacts towards the device). Pay attention that the small nose on the card is placed in the slot designed for that purpose (picture 2). Close the card holder and slide it towards the center of the device (see arrows on the MicroSD card cover), so that it is locked (picture 3).



Picture 1: Open



Picture 2: Insert



Picture 3: Close

## Directory of the MicroSD card:

(when ordered via SSF BAT3 accessories)

 Dok	Manuals
 SCR00	ScreenShot files
 Utils	Program BAT3Viewer/Bootloader
 B3DIS	Memory expansion
 B3RESN	Bat database

### **Attention:**

Electronic components on the board can easily be damaged. Therefore be careful while inserting and removing the MicroSD card!

### **Hint:**

Please note that the MicroSD card must be formatted with FAT file system with a maximum size of 4GB . For formatting a MicroSD card under Windows, please use the setting **FAT/standard size**.



# MicroSD extension

## Copying of files:

For the data transfer between SSF BAT3 and a computer select in the USB menu the item "Storage Mode" (see page 17). In this mode the SSF BAT3 is identified as USB drive, so you can easily drag & drop files back and forth between the SSF BAT3 and your computer.

Example: Copying of file "B3RESN" (if not present):

1. Download the file "B3RESN" from [www.mekv.de/bat3](http://www.mekv.de/bat3)
2. Connect the computer and the SSF BAT3 using the USB cable.
3. Start the USB menu (automatically when starting the device or via the About menu).
4. Select "Storage Mode" in the USB menu (see page 17).
5. Copy the file "B3RESN" to the MicroSD card of the SSF BAT3.

## The MicroSD card is used for:

- Extension of the bat database with pictures. The necessary file "B3RESN" is already installed on MicroSD cards you receive from us. It can also be copied to the card (see example above).
- Extension of internal memory of the device for data preservation after switch off. This way up to 4 sonogram pictures, saved in HOLD modus, are available, even after switching off of the device (see page 19).
- Saving of ScreenShots from spectrogram and sonogram for viewing and storing with program **BAT3Viewer** (AddOn, see accessories on page 4 and description of the ScreenShot AddOn on page 15 and 19 ).

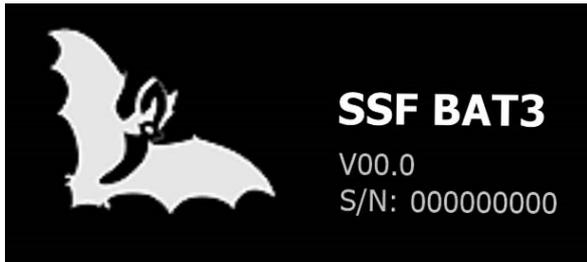


# Switch on/off

## Switch on:

The device will be switched on pressing the "Power on"-button  .

The message "Unlock: press F1" appears. To unlock the system press the button F1 within 2 seconds. This procedure serves to avoid an accidental switch on of the device. When switching on with connected USB port, the device automatically starts with the USB menu.



Start display  
with version and  
serial number

## **Hint:**

In order to save battery the brightness of the display is optimized to dark ambient light. For a walk at night there is an additional DIM mode available, to reduce the brightness even more (see page 27).

If there is not enough battery power left while switching on the device, there will be the information on the display to connect the device to the USB charger. The device then switches itself off.

## Switch off:

In the Home screen, press the button F1 "Off" twice to switch off the device.

If SSF BAT3 is switched on and not used, the device switches off automatically after a programmable time (see page 28: AutoOff) to save battery consumption.

Shortly before the expiry of that period the brightness of the display reduces (see page 27: Display/Dim settings).

## **Hint:**

If a computer is connected via the USB port, please unplug before switching off the device, using "Safely remove hardware" in the taskbar on your computer. Thereby you avoid the possible loss of data.



## Quick guide

After **Switching-on** by pressing the sequence button ▲ **15** und button F1 **12** the device is ready for operation. You see the Home screen. For an initial test just snap your fingers. Friction creates **ultrasound**, which you can hear in the speaker and see on the display. Now the first bats are waiting for you!

The yellow field on top shows the current **mixer-frequency** **8**. This will be set by using the buttons ▼ **13** and ▲ **15**. The better the current mixer-frequency corresponds to the **best-frequency** (the strongest called frequency), the more deep and strong the batsound will be expressed by the detector.

The area below is the so called **spectrogram** **9**.

Here you see on a frequency scale between 15 kHz and 150 kHz the frequency band of the output sound.

The bigger field thereunder is the **sonogram** **10**. Here you see the chronological sequences of the bat calls. Typically these calls have a duration of a few milliseconds, during which the frequency drops variously strong and fast, depending on the species.

You adjust the **volume** by pressing the +/- buttons **14**.



- 1 Time
- 2 Symbols
- 3 Touch-Pen
- 4 Microphone
- 5 Jack plug
- 6 USB port

- 7 Torch
- 8 Frequency
- 9 Spektrogram
- 10 Sonogram
- 11 Menu
- 12 Menu buttons

- 13 Button ▼
- 14 Buttons -/+
- 15 Button ▲ (Power On)
- 16 Hand strap



# Symbols



## Volume

Adjustment of volume by +/- buttons **14**.



## Speaker

Normal Volume.



## Boost mode 1 to 2

Increased volume (see page 27).



## Headphone

A headphone is plugged into the jack, the speaker is switched off.



## Line-Out (automatic detection)

A device with line-input is connected to the jack plug (see page 27).



## Battery

The number of bars show the state of charge.



The battery is empty. The device must be connected to a battery charger.

**Filter: ON**

## Filter (with hardware revision 02)

Activated 30 kHz preamplifier-filter (see page 24)

**Auto**

## AutoBat mode

The frequency of the bat will be detected automatically. The mixer-frequency will be adjusted accordingly (see page 22).

**Squelch**

## Squelch mode

With activated squelch noise between bat calls is suppressed (see page 22).

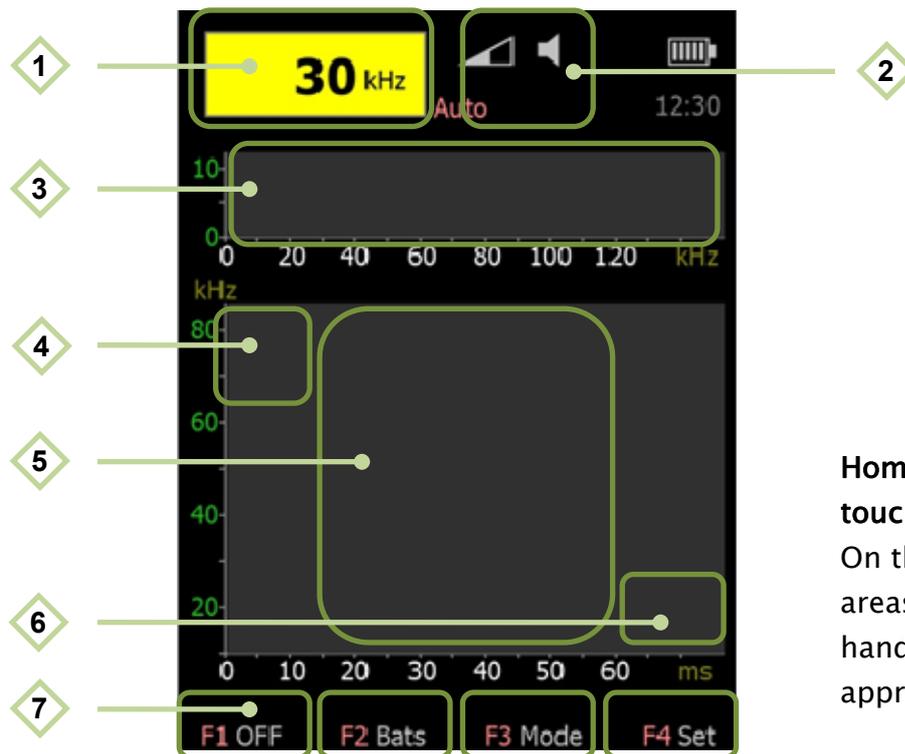
**HOLD**

## Hold mode

Recording of sonogram is stopped, the Memory menu will be displayed (saving of sonograms and spectrograms, ScreenShot function (see page 19).



# Touchscreen



## Home screen touch functions:

On the touchscreen some areas are defined for easy handling by clicking the appropriate touch fields.

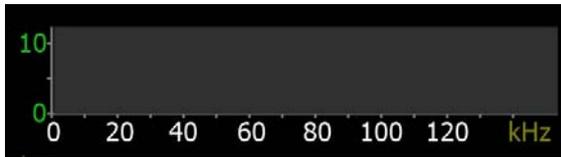
- 1 – AutoBat on/off (see page 22)
- 2 – Speaker on/off; when speaker is turned off the symbol for speaker is dark grey.
- 3 – Setting of the mixer-frequency (see page 14).
- 4 – Setting of the sonogram kHz axis (see page 25)
- 5 – HOLD mode for stopping the diagram recording and for displaying the Memory menu for storing sonograms and spectrograms and for activating the screenshot function\* (see page 19).
  - Clicking two times on the sonogram field (within 1 second) deletes the sonogram and spectrogram.
- 6 – Setting of the sonogram ms axis (see page 25)
- 7 – Touch fields F1 to F4 correlate to function buttons F1 to F4.

\* only available with installed AddOn (see page 4)



# Diagrams

## Spektrogram: 9



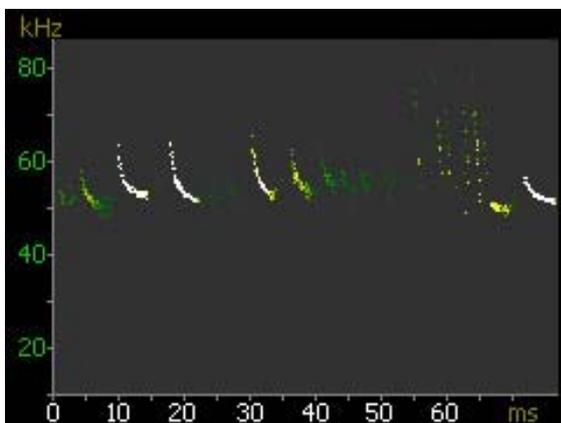
A spectrogram visualizes bat calls within the complete frequency range. The display is persistent. That means the display of frequency values remains unchanged until it gets overwritten.

In the PreAmp submenu (see page 24) you can set the gain of the preamplifier. But if the gain is set too high, the signal can overdrive. This will be shown by red dots in the spectrogram.

### **Setting of the mixer–frequency within the spectrogram:**

The mixer–frequency can be set with the ▼/▲ buttons or through clicking directly on the spectrogram field **3**. After a short click anywhere on the frequency field, the frequency jumps to that choice. On the left side of the spectrogram field lower frequencies are picked, on the right side higher ones.

## Sonogram: 10



The sonogram is a presentation of ultrasound events in a chronological order. With default setting (see page 26) the frequency axis goes from 15 to 150 kHz, the time axis from 0 to 60 ms.

The setting of the sonogram axis is described on page 25.

The amplitude values will be displayed gradually, from dark green (low amplitude) via light green and yellow to white (highest amplitude). The adjustment of the sonogram axis is described on page 25. When clicking on the sonogram field (HOLD function) the sonogram recording is stopped and the memory submenu for saving sonogram pictures is displayed (see page 19).



# ScreenShot AddOn

With the optional extension for saving screenshots (AddOn, see page 4) you can archive sonograms and spectrograms on a MicroSD card and with the program **BAT3Viewer** on your computer you can open and save the ScreenShot files (see page 16). For this purpose an inserted MicroSD card is absolutely required (see accessories page 4).

For creating ScreenShots press the button F1 (save) in the memory menu (see page 19). The ScreenShot will be saved as a ScreenShot file SCRxxxx.B3 on the MicroSD card in the folder SCR00 (xxxx=ScreenShot number). The numbering is continuous from 1 to 9999 (max. 512 files per folder).

## **SSF BAT3 with included AddOn:**

By ordering the SSF BAT3 with included AddOn the activation is already fixed in the system. No additional installing is necessary.

To indicate the activated function the SSF BAT3 will show the text: "AddOn: File" when switching on or in the About menu.

## **Subsequent installing of the AddOn:**

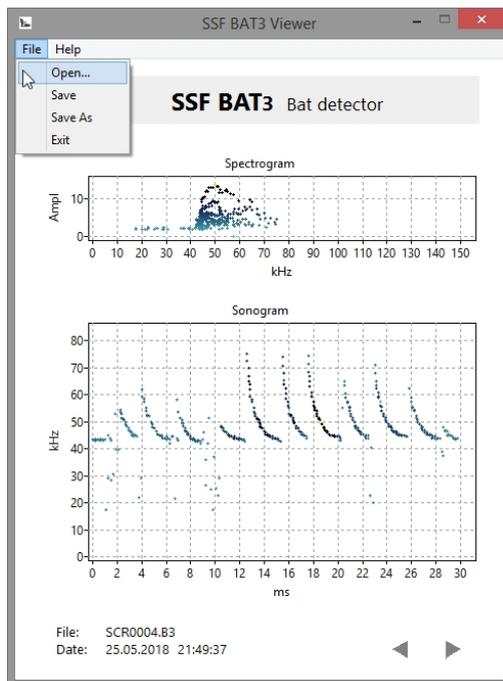
In subsequent order of the AddOn you will receive an activation file per email. For this the last 5 digits of the serial number of the device will be needed. You will find the serial number in the About menu (see page 18). Copy the received activation file onto the MicroSD card. After the restart of the SSF BAT3 the AddOn is activated and the activation is firmly fixed in the system. After that the activation file will not be needed again and can be deleted.

To indicate the successful installation of the function the SSF BAT3 will show the text: "AddOn: File" when switching on or in the About menu.

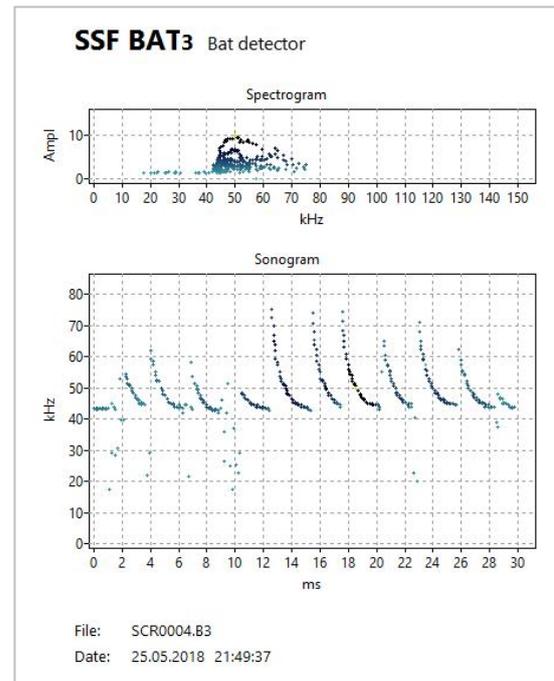


# BAT3Viewer for ScreenShot display

The program **BAT3Viewer\*** is available for the operating systems Windows, Mac OS and Linux. The program is portabel and can be started without installation. You can download the program BAT3Viewer on the homepage [www.mekv.de/bat3](http://www.mekv.de/bat3). Just copy the program into a folder of your choice, e.g. c:\user\username\BAT3



BAT3Viewer



Print sheet

**File/Open:** Open a ScreenShot file (SCRxxxx.B3)

**File/Save:** Save ScreenShot as JPG picture file

**File/Save As:** Save with query as JPG, TIFF or BMP

**File/Exit:** Exit program

**Help/About:** Info

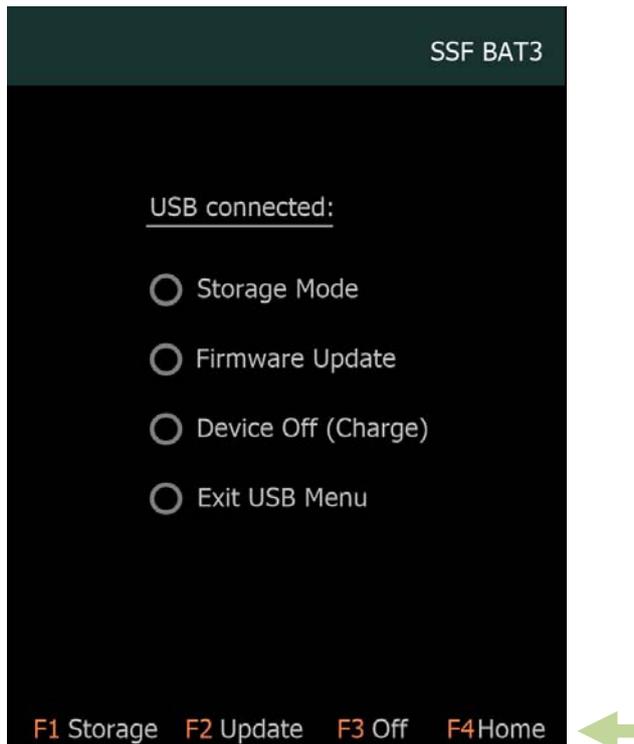
**Help/Color:** Color setting for diagrams

**Arrows:** Browsing back and forth

\* useful only with AddOn (see accessories page 4)



# Description of the USB menu



The USB menu is displayed when switching on the SSF BAT3 with plugged USB connection. This menu is also reached through the About menu (see page 18).

The task selection is carried out when pressing the buttons F1 to F4 or by clicking the touchscreen.

## Button F1: Storage Mode:

Enabling the MicroSD card in the SSF BAT3 as USB drive for reading and writing data on a computer. If no MicroSD card is inserted in the SSF BAT3, this item is greyed out.

## Button F2: Firmware Update:

Start the bootloader program on your PC. Connect PC and SSF BAT3 with the USB cable. Then press the button F2 for Firmware update on the SSF BAT3. Now you have to confirm within 5 seconds in the Bootloader program with the "Connect" button (see also page 29).

## Button F3: Device Off:

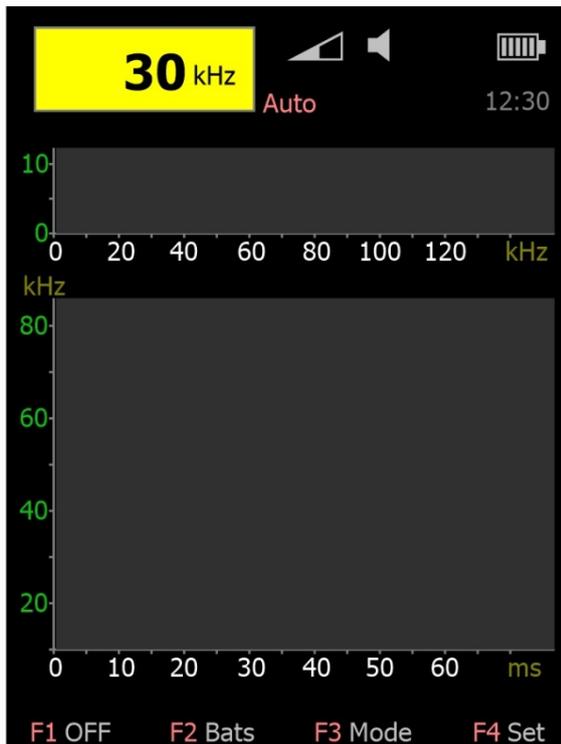
Shut down the device, battery will be loaded.

## Button F4: Exit USB Menu:

Exit USB menu and start the SSF BAT3 surface.



# Description of the Home screen



Menus and submenus are reached by pressing the buttons F1 to F4:

F1: OFF  
F2: Bats  
F3: Mode  
F4: Set

To exit the menus or submenus press the button F4 (Home).

With a long press of the buttons F1 to F4 (1 second) you can switch the back light intensity (see Dim function on page 27).

## Button F1: OFF

F1 OFF      Switch off device  
F2 Help      Help on operation of the device  
F3 About      Display of version and serial number, USB menu (see page 17)

## Button F2: Bats

F1 List      Bat list (see page 20)  
F1 Data      Bat database (see page 20)  
F2 Info      General informations and definitions (see page 20)

## Button F3: Mode

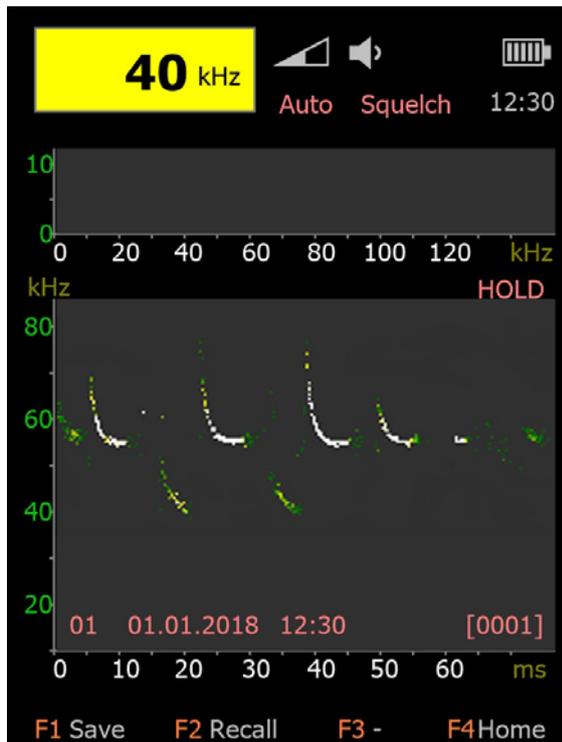
F1 AutoBat      Automatic detection of bat calls (see page 22)  
F2 Squelch      Squelch on/off (see page 22)  
F3 Torch      Torch on/off; torch switches off automatically after 60s.

## Button F4: Set

F1 PreAmp      Settings for the microphone preamplifier (only with hardware revision 02, see page 24)  
F2 Sonogr      Adjustment of the sonogram axis (see page 25)  
F3 Options      Options screen for adjustment of device characteristics (see page 26)



# Description of the Memory submenu



## HOLD function and Memory submenu:

By clicking the sonogram field  (see page 13) the diagram recording stops (HOLD mode) and the memory submenu is shown.

In HOLD mode you can calmly look at an interesting bat call. This state is shown at the top of the sonogram by the text "HOLD". When clicking again the sonogram field the HOLD mode is left.

When clicking the sonogram fields twice (within 1 second) the diagrams are cleared

### Button F1: Save

Up to four diagrams can be held in the internal memory. By saving more than four diagrams the oldest one is overwritten. With inserted MicroSD card the saved diagrams will not be lost after switching off the device (see page 8).

**Save with ScreenShot AddOn\*:** Create and save a ScreenShot on the MicroSD card (see page 15).

After saving the the SSF BAT3 returns to the normal operating mode (Home screen).

### Button F2: Recall

Shows the with Save (F1) internally saved diagrams.

**Recall with ScreenShot AddOn\*:** Shows the last 10 ScreenShots.

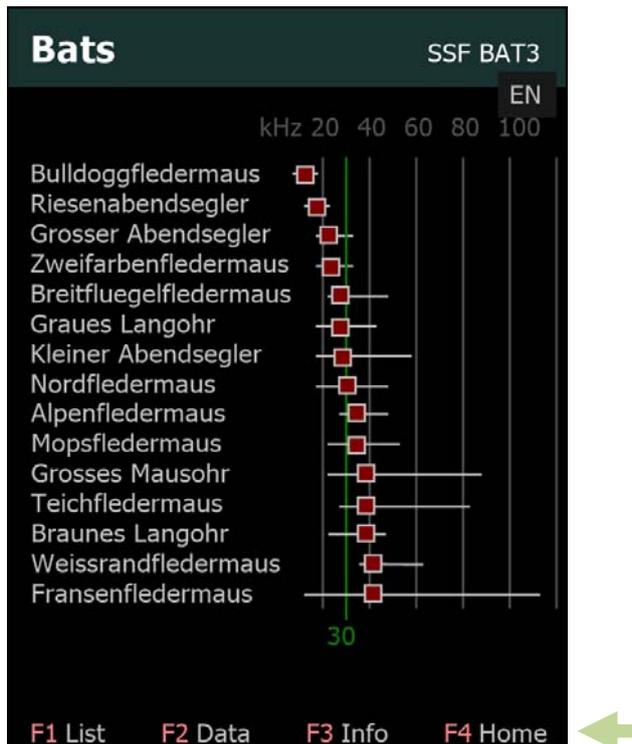
Left side at the bottom of the sonogram you see the internal memory number with date and time of the exposure. At the right side you see the number of the ScreenShot file.

### Button F4: Back to the Home screen

\* only with AddOn (see accessories page 4)



# Description of the Bat screen



By pressing the button F2 in the Home screen you get to the **Bats** screen (see page 18).

Here you find information on all bat species currently found in Europe in a database and as a bat list for an overview.

By clicking the DE/EN-symbol on the top right you can change the displayed language between German and English.

## Button F1: Bat list

The listing of names is adjusted dynamically to the set mixer-frequency. The frequency range and the best-frequency of each individual species are displayed on the right side of the bat names. The green line shows the currently set mixer-frequency (see picture). Clicking the touchscreen or with buttons ▼/▲ you can go to the next page of the bat list.

## Button F2: Bat database

Here you find information on size, ultrasound calls and flight style of the different bat species (see page 21).

## Button F3: Information and definition of terms

Informations and definitions for bat detection and for the function of an ultrasound detector; these pages you scroll by clicking the touchscreen or by using the buttons ▼/▲.

## Button F4: Back to the Home screen



# Description of the Bat screen



On the touchscreen some areas are defined for easy handling by clicking the appropriate touch fields

## Touchscreen in the database view:

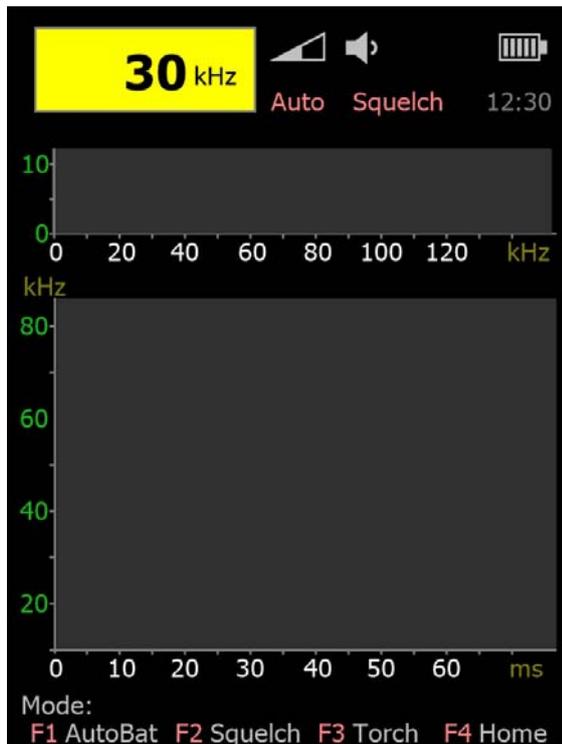
- 1 – Change the displayed language between german and english; affects bat database, bat list, information screen; the chosen language is saved when shutting down the device.
- 2 – Enlarge the bat picture; click again to go back to normal view.
- 3 – Change the sort algorithm; the sorting mode is shown in the header: "Bats (A-Z)" or "Bats (Frequency)".
- 4 – Scroll between bat species; you can also scroll with the ▼/▲ buttons.
- 5 – Touch fields F1 to F4 correlate to function buttons F1 to F4.

### **Attention:**

Pictures of the bat species are only shown with inserted MicroSD card and with installed file "B3RESN" (see page 8).



## Description of the Mode submenu



By pressing the button F3 in the Home screen you get to the **Mode** submenu.

This is very useful to quickly change the state of AutoBat, Squelch or switching the Torch on/off.

### Button F1: AutoBat on/off

With activated AutoBat function, the mixer-frequency is set automatically to the bat call with the highest amplitude (see also description in the Options screen at page 28). You see the activated AutoBat function by appearance of the text "Auto" at the top, next to the frequency field.

You can also activate/deactivate AutoBat by clicking the yellow frequency field  (see page 13).

### Button F2: Squelch on/off

The button F2 allows you to quickly switch on/off of the squelch function. With activated squelch noise between bat calls is suppressed. If the squelch function is enabled you see the text "Squelch" on top of the device right beneath the icons.

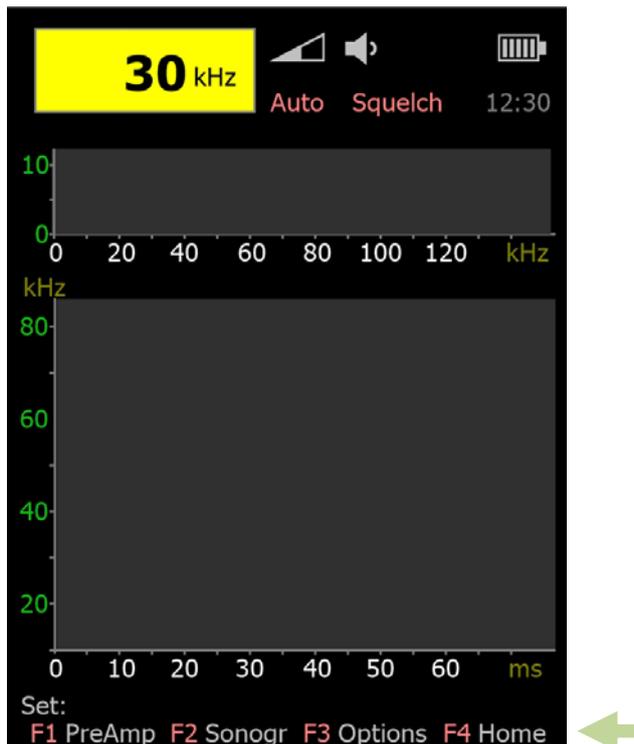
### Button F3: Torch

Torch on/off; torch switches off automatically after 60s.

### Button F4: Back to the Home screen



## Description of the Set submenu



By pressing the button F4 in the Home screen you get to the **Set** submenu.

Within the Set submenu you can call the menu for changing preamplifier and sonogram parameters and for changing device characteristics.

### Button F1: PreAmp

Settings for the microphone preamplifier (only with hardware revision 02, see page 24).

### Button F2: Sonogr

Adjustment of the sonogram axis (see page 25).

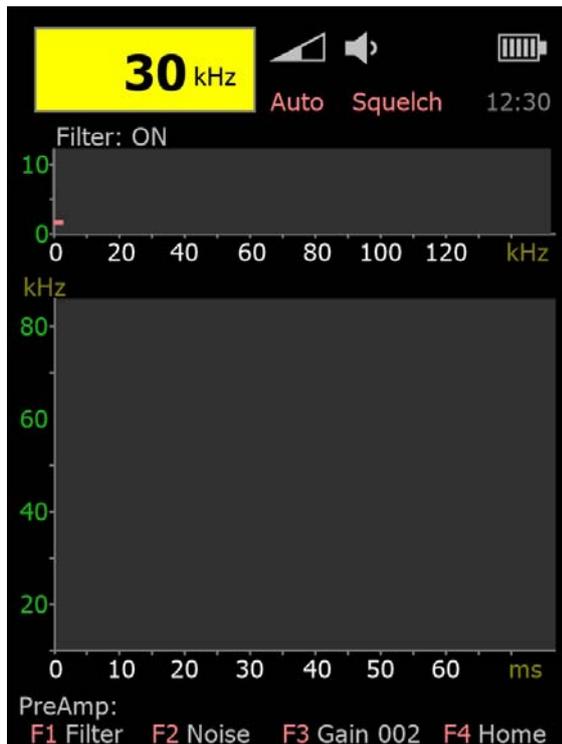
### Button F3: Options

Options screen for adjustment of device characteristics (see page 26).

### Button F4: Back to the Home screen



# Description of the PreAmp submenu



By pressing the button F1 in the set-submenu you get the **PreAmp** submenu.

The PreAmp submenu is for setting parameters for the microphone pre-amplifier.

The menu is only shown with hardware revision 02.

## Button F1: Filter

Switching on/off of an additional low-pass filter for attenuation of frequencies below 30 kHz (e.g. subsonic noise). With activated filter you see the text "Filter: ON" above the spectrogram field.

## Button F2: Noise

This option is for reducing the detection of microphone noise of the signal input. If it is set too low, the device triggers with every noise, if it is set too high you might lose low bat calls. The chosen trigger level is shown by a small red line at the left border of the spectrogram. The level also affects AutoBat and Squelch.

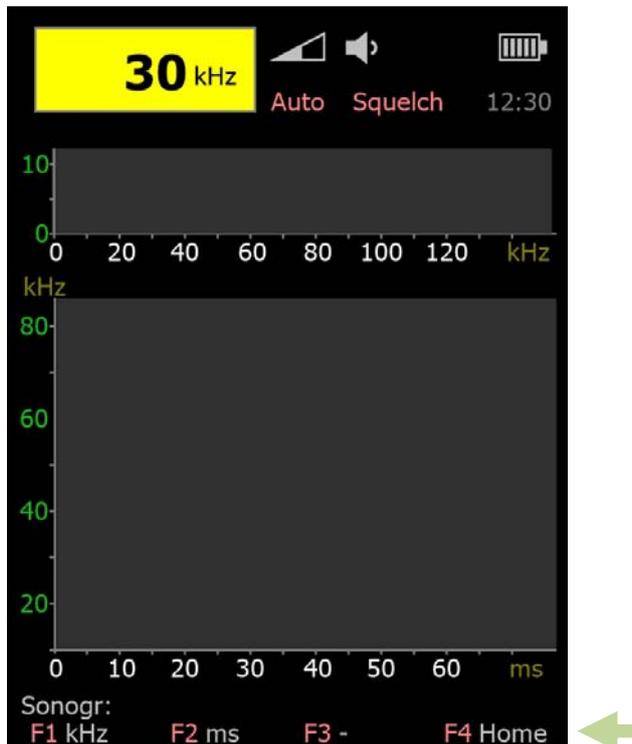
## Button F3: Gain 000

After pressing the button F3 you can set the preamplifier gain with the -/+ buttons. If the gain is set too high the amplifier might overdrive with loud input signal. An overdriven signal is shown in the spectrogram by red dots. When overdriven the frequency measurement is inaccurate and the speaker sound is distorted. **Recommendation:** set the gain to maximum level 4, with low bat calls a little higher.

## Button F4: Back to the Home screen



# Description of the Sonogram submenu



By pressing the button F2 in the set-submenu you get the **sonogram** submenu.

Here you can adjust the sonogram axis.

The setting of the axis is also possible by clicking the touch-screen (see page 13).

## Button F1: Sonogram frequency axis (kHz)

With this button you adjust the range of the frequency axis: 15–50 kHz, 15–80 kHz, 15–140 kHz.

## Button F2: Sonogram time axis (ms)

With this button you adjust the range of the time axis: 0–30 ms, 0–60 ms, 0–120 ms.

The greater the chosen value of the axis setting, the bigger is the overview in the sonogram. Smaller values bring a better resolution.

The axis parameters are saved when shutting down the device.

## Button F4: Back to the Home screen



# Description of the Options screen

Options User1		SSF BAT3
Audio:	Speaker On LineOut +0	[Off/On/Boost] [Level -9 to +9]
Display:	Light 9 Dim 4	[2 to 9] [1 to 8]
Eco:	05 min Wake: BAT	[Off/1-30 min] [BAT/Key/Noise]
AutoOff:	Batt. 10 min USB 10 min	[oo, 1-60 min]
AutoBat:	Slow	[Off/Slow/Fast]
Clock:	00 : 00	
Date:	01 . 01 . 2018	
Select:	▼▲	Change: -/+
F1 Default F2 User F3 Utils F4Home		

By pressing the button F4 (Set) in the home screen and pressing of button F3 (Options) afterwards, you get to the **Options** screen (see page 18).

The Options screen allows you to adjust the device settings. The settings will be saved after turning off the device.

The value, which should be adjusted, is selected with the buttons ▼/▲. With the buttons +/- the selected value will be changed (see description of the options page 27ff).

## Button F1: Default

The options for the current user are reset (see values in the image).

## Button F2: User

Swap between user1 and user2 with each separately configurable options. The current user is shown in the header. The options remain after shut-down of the SSF BAT3.

## Button F3: Utils

Opens the Utils screen. Here you can reach the function Quick Format MicroSD. (Attention: by using this function all data on the MicroSD card are lost).

## Button F4: Back to the Home screen



# Description of the Options screen

## **Audio/Speaker:**

Four volume settings are available: Off – normal – boost1 – boost2. In boost mode the volume is higher. You can use this mode for example for guided group tours. The setting will be indicated by the speaker icon on the Home screen (see page 12).

The speaker can be switched on or off by clicking the speaker symbol in the Home screen.

## **Audio/LineOut:**

The detector automatically recognizes if an headphone or another device is plugged into the jack **5**. The LineOut level is adjustable. The standard is level 0 and the value is adjustable between -9 and +9.

## **Display/Light:**

Setting for the background light of the display; this setting has a direct influence on the power consumption of the device and thus on the operating time. At the start the background light is set bright und switches back to the set brightness after 2 seconds.

In the Home screen you can switch between the bright and dimmed display light by long pressing a function key (F1 – F4). This function is useful, if in the dimmed level you are not able to read the display properly because of bright ambient light.

## **Display/Dim:**

Setting the dimmed level of the background light; this is used in the ECO mode to conserve the battery.

## **ECO:**

After the time set here has passed, the brightness of the display will be set to the dimmed value (see Display/Dim option) and the speaker will be turned off, in order to save battery capacity.

## **ECO/Wake:**

With this function you can set in which way the system awakes from the ECO mode. Three settings are available. With the setting “Key” the system leaves the ECO mode after pressing any button, with setting “BAT” additionally after recognizing a bat call, with setting “Noise” when receiving any ultrasonic sound.

If the speaker was manually switched off, the speaker will not automatically switch on when leaving the ECO mode.



# Description of the Options screen

## **AutoOff:**

Time until device switches off automatically; 30 seconds before the automatic shutdown the information "AutoOFF pending: press key to resume" will be displayed. By pressing any key the AutoOff function is interrupted.

The setting  $\infty$  means that the device will not be switched off automatically (continuous operation). AutoOff can be configured separately for USB or battery operation.

## **AutoBat:**

In the AutoBat mode the mixer-frequency is set automatically to the currently strongest ultrasonic frequency. There are two settings available for the speed, with which the systems responds, "Slow" and "Fast". Since bat calls can always vary a bit, the mixer-frequency in the "Fast" setting often jumps back and forth. In the "Slow" setting new passing bat species can be missed. The optimal setting depends on the situation.

If in the AutoBat mode the frequency is changed manually with buttons ▼/▲, the AutoBat mode is interrupted for a few seconds.

Switching on/off the AutoBat mode is also available in the Mode submenu or by clicking the the yellow frequency field (see page 13 and 22).

## **Clock:**

Setting of the time shown on the Home screen; the clock is still powered by the battery when the device is turned off. If the changing of the battery takes longer than 1 minute, the clock must be set new.

## **Date:**

Setting of the date; date and time are used as timestamp when diagrams are saved.



# Firmware update

The SSF BAT3 uses a DSP processor with a special operating system (firmware). This firmware is constantly being improved and enhanced by new functions. The version of the firmware is shown after switching on the device (see page 10) and in the About menu (see page 18). The firmware can be updated via an USB interface of a Windows-PC.

For firmware updates you need the file "BAT3-Update.zip" which can be downloaded on the producer's homepage: [www.mekv.de/bat3](http://www.mekv.de/bat3).

Save the update file on your computer in a folder of your choice e.g.

c:\user\username\bat3. After unzipping you will get two files: "mikro-Bootloader USB HID.exe" (bootloader software) and "BAT3.hex" (update file).

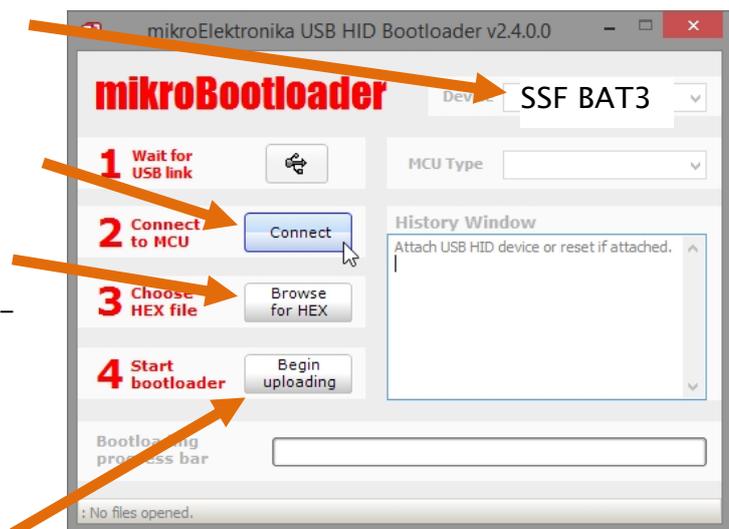
## Updating the SSF BAT3 firmware:

Start the bootloader software. Connect the computer and the SSF BAT3 with an USB cable. In the USB menu (starts automatically after restart when USB is connected, reachable also in the About menu) choose the option "Firmware Update".

The bootloader is ready as soon as you can see the text "SSF BAT3" in the bootloader window. Now you must confirm by clicking the "Connect"-button within 5 seconds.

Then click on "Browse for HEX" and browse in the following Pop-Up-Window for the update file "BAT3.hex". Click on the "Open" button to open the file.

The upload of the file to SSF BAT3 starts after clicking on "Begin uploading". The process is displayed on the progress bar. After successful completion you can click on "OK" and the SSF BAT3 starts with the new firmware.



Please visit the producer's homepage for future product updates and enhancements: [www.mekv.de/bat3](http://www.mekv.de/bat3)



The **SSF BAT3** detector is a **Heterodyne–ultrasonic receiver** (mixer procedure). By the help of a frequency–mix–procedure, the non–audible ultrasonic sound of a bat is converted into an audible signal, played back by the speaker.

The mixer–frequency can be adjusted by the user or adjusts automatically (AutoBat–setting). When setting the frequency manually, the user has to decide which frequency range is of special interest. If the frequency of bat calls lies far outside of this range, they get missed.

The discovery of flying bats with the use of the **SSF BAT3** is easy and quickly learned. The exact determination of found bat species is usually very difficult, sometimes impossible and in any case requires a lot of experience. The following information shall give some initial directions. Those who want to get deeper into the determination of bat species by the use of an ultrasonic detector will have to use specialist literature or take practical lessons by an experienced specialist. Another way is to participate in a „detector–workshop“, offered by bat protection organizations.

Frequency data always relate to the best–frequency. It has to be taken into account that the frequency can vary a little within a species. Even the same animal, depending on the situation (barrier or open airspace, hunting in groups or alone, air moisture, etc.), can alter the used frequency.

Finally the so–called „Doppler–Effect“ occurs. The frequency increases when the bat flies towards the detector and reduces when the bat flies away from the detector.

**CF–calls:** A constantly frequent call (CF = constant frequency) is a call, which consists predominantly of one frequency. For human beings such calls have a clear sound. Short CF–calls remind one of the sound of water drops which fall into a water basin. The best–frequency in this case corresponds to the frequency, in which the far bigger part of the call is located. In Europe clear and long CF–calls are only uttered by horseshoe bats (Family: Rhinolophidae).

**FM–calls:** Frequency modulated calls (FM = frequency modulated) are calls, which range over a wide frequency band in a short period of time. Many bat species start such FM–calls with high frequencies and quickly fall to lower frequencies. For human ears such calls sound like a knocking and feel like they do not have a sounding component. The best–frequency only represents a small part of the call. It is located where the call features the highest acoustic pressure, in other words, the highest volume.



**QCF-calls:** Some bat species send calls which consist of FM- and CF-parts. Typical representatives here are the pipistrelle bats. Their calls begin very high at around 100 kHz and then quickly fall to approx. 45 kHz. This frequency is then held for a relatively long time (approx. 9 milliseconds).

In addition to these first indications for the bat species, the calls can also deliver important ecological information. So called "**Feeding Buzzes**" allow you to hear if the bats are hunting insects. Shortly before the catch of an insect, the bats emit more calls per time than normal. This is due to the fact that they need to know exceedingly exactly where the insect is located. Therefore it sounds roughly like this: „tack - tack - tack - tacktacktacktatatatata ttrrrrrp“, whereas the last part reminds of a fast-closing zipper.

It is also important to know that bats not only emit calls for orientation. They also have a whole string of other calls, for example for communication, which are partially also located above 15 kHz. These include mainly characteristic **mating calls**, which sometimes can be used for identification of species.

## References:

The tabular overview of the frequency ranges and the main frequencies were taken from the "Stiftung zum Schutze unserer Fledermäuse in der Schweiz (SSF)" (*Foundation for Protection of our Bats in Switzerland*). The majority of information in the bat database were taken from the recommendable books „Die Fledermäuse Europas“ by C. Dietz and A. Kiefer, published in 2014 by Kosmos, and the Kosmos-Naturführer „Die Fledermäuse Europas“ by W. Schober and E. Grimberger (Edition 1998). Species occurring endemically on islands (Sardinia, Canary Islands) are excluded.

Special thanks go to Dr. Wolfgang Fiedler from the Max-Planck-Institute for Ornithology in Radolfzell for the description of the detection methods and the bat calls and for the creation of the overview of European bat species.

## Abbreviations:

QCF- and FM-calls are explained on page 30

„ms“ = millisecond

„L/s“ = number of calls per second



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Information in this manual is subject to technical changes.

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