

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 stored in internal memory.
- **Spectrogram** (persistant display)
- Frequency range **15 to 150 kHz** infinitely adjustable in steps of 1 kHz
- **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.
- Generation of up to **512 screenshots of sonogram and spectrograms** as picture file for external use (accessories)
- **Easy to handle**, adjustments 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 ∞)
- **Handy size and low weight:** 104x57x15 mm (HxWxD), 125 g



Development and manufacturing of SSF BAT3:

microelectronic VOLKMANN

Konstanz/Germany

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Technical data

Product name:	SSF BAT3
Ambient temperature:	0°C to 40°C
Battery:	Li-Ion battery 1200mAh, 3.7V, 4.44Wh
Operating time:	according to screen brightness ca. 3–6 hours continuous operation
Microphone:	Ultrasonic Electret (FG-23629)
Frequency range:	15 kHz to 150 kHz
Processor:	DSP-Processor 140 MHz
Signal processing:	"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
Speaker:	Rear speaker 1.5 W, additional front speaker
Display:	TFT color screen with 240 x 320 pixels
Jack plug:	Headphone-/Lineout (automatic detection via impedance measuring)
USB:	Battery-charge via USB-power supply, Firmware-Update via PC (see page 27)
MicroSD-card reader:	MicroSD-card max. (FAT16 max. 4GB)
Weight:	125 g (incl. battery)
Dimensions:	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 4 GB FAT 16
- AddOn for saving screenshots as BMP picture (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 re-use.

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:

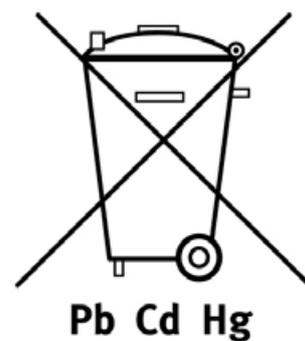
The consumer is obliged to give back used batteries. You may return any batteries and rechargeable batteries after use to the distributor or to any intended treatment facility (e.g. public waste management authorities or any distributors) free of charge.

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, maximum size 4 GB, file system FAT16 (FAT) (not included) 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 10) 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

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 FAT16-file system. FAT32 will not be supported on SSF BAT3. MicroSD-cards, purchased from us, are ready for operation and formatted with FAT16 (FAT).

Insertion or replacement of the MicroSD-card:

1. Remove the battery (see page 7) and switch off the USB plug.
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. Insert the MicroSD-card (electronical contacts towards the device). Pay attention that the small nose on the card is placed in the slot designed for that purpose. 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.

Functions of the MicroSD-card:

- Extension of the bat database with pictures. The necessary file "BAT3N.RES" is already installed on MicroSD cards you receive from us. It can also be copied to the card (see below).
- 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 17).
- Saving of screenshots (spectrogram, sonogram, Home-screen) as picture file in BMP-format for external use (AddOn, see accessories on page 4 and description of the Screenshot AddOn on page 14 and 17).

Copying of files between computer and MicroSD card:

Windows will identify the MicroSD-card as a USB-drive and display it in the file explorer as a drive. So you can easily drag & drop files back and forth between the SSF BAT3 and your computer.

Copying of file "BAT3N.RES" (if not available):

1. Download the file "BAT3N.RES" from www.mekv.de/bat3
2. Connect the computer and the SSF BAT3 using the USB-cable.
3. Windows identifies the MicroSD-card as a USB-drive.
4. Copy the file "BAT3N.RES" to the MicroSD of the SSF BAT3.

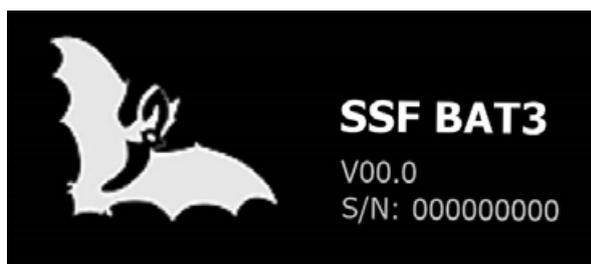


Switch on/off

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.



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 25).

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.

At every switch on the device starts automatically with the settings that were last selected.

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 26: Auto-Off) to save battery consumption.

Shortly before the expiry of that period the brightness of the display reduces (see page 25: 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.

Windows identifies the MicroSD-card as a USB-drive. If connected, you will see a USB-symbol in the symbols bar of the SSF BAT3 (see page 11). Without MicroSD, Windows shows the error message: "USB device could not be recognized".



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 via 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 | 7 | Torch | 13 | Button ▼ |
| 2 | Symbols | 8 | Frequency | 14 | Buttons -/+ |
| 3 | Touch-Pen | 9 | Spectrogram | 15 | Button ▲ (Power On) |
| 4 | Mikrophone | 10 | Sonogram | 16 | Hand strap |
| 5 | Jack plug | 11 | Menu | | |
| 6 | USB-port | 12 | Menu buttons | | |



Symbols



Volume

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



Speaker

Normal Volume.



Boost-Mode 1 and 2

Increased volume (see page 25).



Headphone

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



Line-Out (automatic detection)

A device with line-input is connected via the jack plug (see page 25).



USB

The device is connected to a computer via USB port and the MicroSD card is recognized as USB memory device (see page 8).



The **Screenshot**-function is activated. Via the touchscreen you can choose the area of the display for creating a picture file (only available with optional AddOn, see page 14 and 17).



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 22).

Auto

AutoBat-Mode

The frequency of the bat will be detected automatically. The mixer-frequency will be adjusted accordingly (see page 20).

Squelch

Squelch-Mode

With activated squelch noise between bat-calls is suppressed (see page 20).

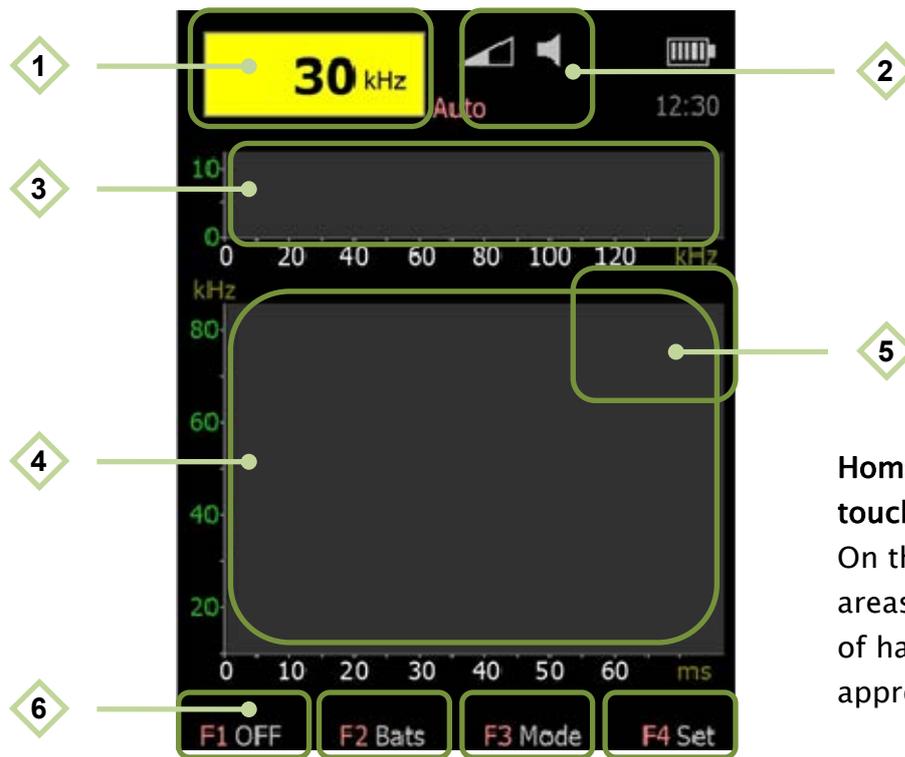
HOLD

Hold-Mode

Recording of sonogram is stopped (see page 17).



Touchscreen



Home-screen touch functions:

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

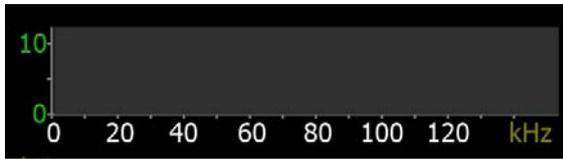
- 1 – AutoBat on/off (see page 20)
- 2 – Speaker on/off; when speaker is turned off the symbol for speaker is dark grey.
- 3 – Setting of the mixer-frequency (see page 13).
 - When screenshot function is activated* (camera symbol): creation of spectrogram picture and saving on MicroSD card (see page 14 and 17)
- 4 – HOLD-Mode for stopping the sonogram recording and for displaying the memory-menu for storing sonograms and spectrograms and for activating the screenshot function* (siehe Seite 17)
 - Clicking two times on the sonogram field (within 1 second) deletes the sonogram and spectrogram.
 - When screenshot function is activated* (camera symbol): creation of sonogram picture and saving on MicroSD card (see page 14 and 17)
- 5 – When screenshot function is activated* (camera symbol): creation of a screenshot of the whole screen and saving on the MicroSD card (see page 14 and 17)
- 6 – Touch fields F1 to F4 correlate to function buttons F1 to F4.

* only available with installed AddOn (see page 4)



Diagrams

Spectrogram: 9



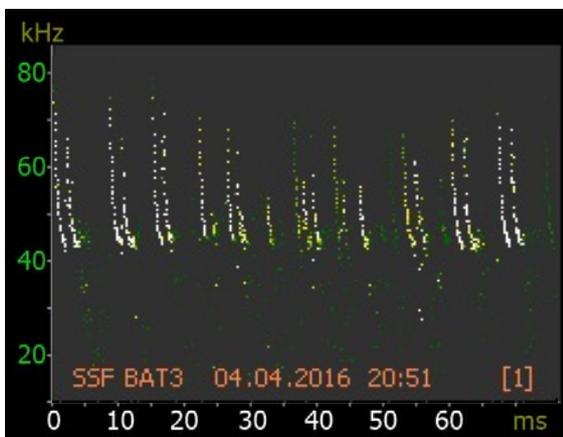
A spectrogram visualizes bat calls within the complete frequency range. The display is persistent. That means the display of frequency values remains unchanged until it gets overwritten.

In the PreAmp-submenu (see page 22) 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 . After a short click anywhere on the frequency field, the frequency jumps to that choice. On the left side of the spectrogram field more 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 24) the frequency axis goes from 15 to 150 kHz, the time axis from 0 to 60 ms.

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 23. When clicking on the sonogram field (HOLD-function) the sonogram recording is stopped and the memory submenu for storing sonogram pictures is displayed (see page 17).

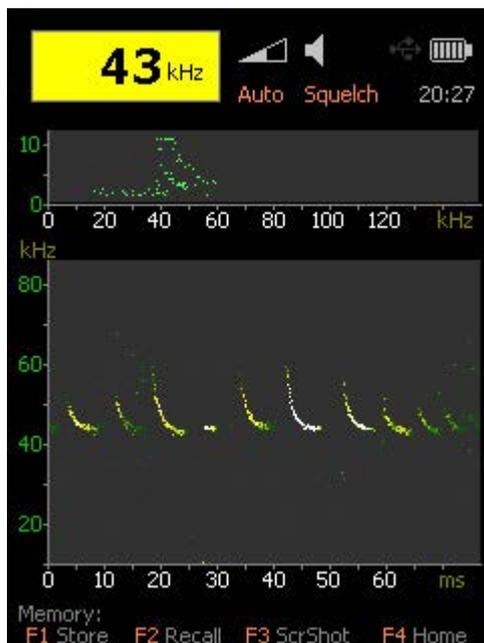


Screenshot AddOn

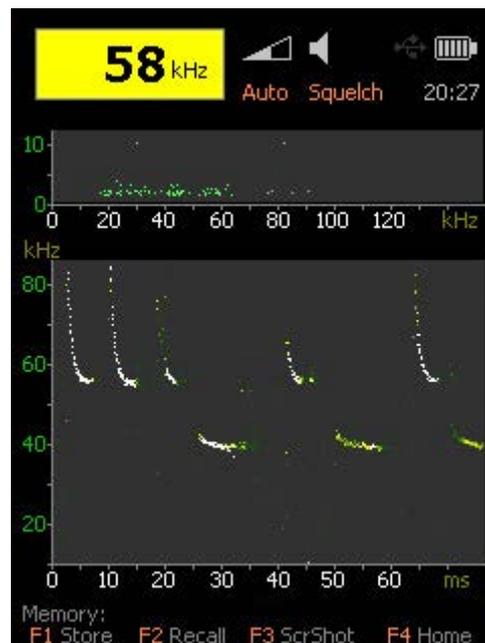
With the optional extension for saving screenshots (AddOn, see page 4) you can archive sonograms and spectrograms as Bitmap picture file (BMP) on a MicroSD card. These can be read out and edited on your computer. For this purpose an inserted MicroSD card is absolutely required (see accessories page 4).

The screenshot function is activated in the Memory-submenu (see page 17).

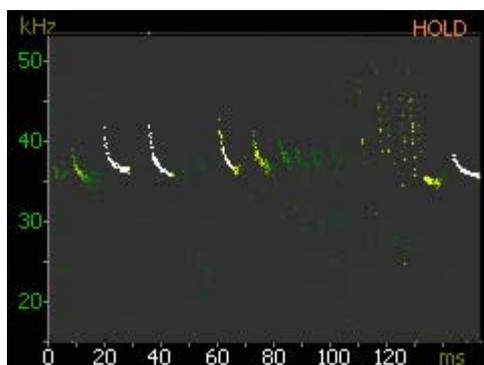
Examples for screenshots:



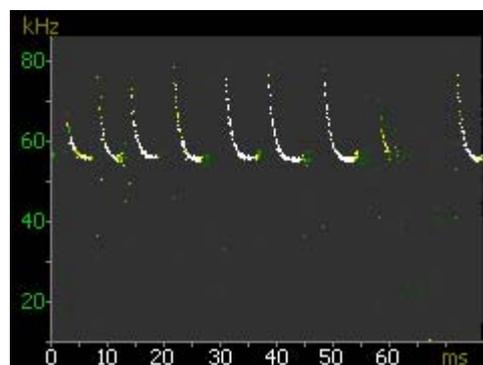
SCREEN00.BMP
(Common Pipistrelle Bat)



SCREEN01.BMP
(Soprano Pipistrelle Bat)



SONO00.BMP
(Nathusius Pipistrelle)



SONO01.BMP
(Soprano Pipistrelle Bat)



Screenshot AddOn

Installing the AddOn for saving screenshots:

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

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 16). Copy the received activation-file on to 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 activated additional function the SSF BAT3 will show the text: "AddOn: File" when started.

Attention:

You can read the screenshot pictures via your computer. Because of the FAT16 file system maximum number of files is limited to 512 files (see also page 8).



Description of the Home-Screen



Menus und submenu 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 25).

Button F1: OFF

- F1 OFF Switch off device
- F2 Help Help on operation of the device
- F3 About Display of version and serial number, Firmware-update (see page 27)

Button F2: Bats

- F1 List Bat list (see page 18)
- F1 Data Bat database (see page 18)
- F2 Info General informations and definitions (see page 18)

Button F3: Mode

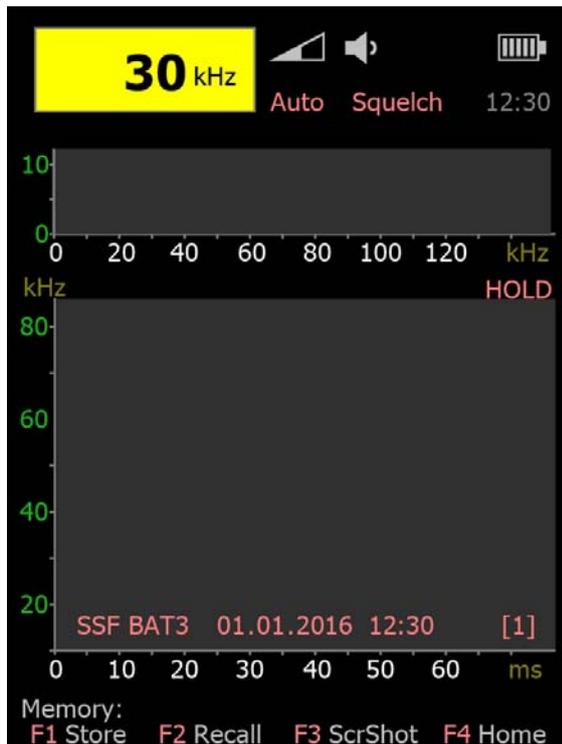
- F1 AutoBat Automatic detection of bat calls (see page 20)
- F2 Squelch Squelch on/off (see page 20)
- F3 Torch Torch on/off; torch switches off automatically after 60s.

Button F4: Set

- F1 PreAmp Settings for the microphone preamplifier (only with hardware revision 02, see page 22)
- F2 Sonogr Adjustment of the sonogram axis (see page 23)
- F3 Options Options screen for adjustment of device characteristics (see page 24)



Description of the Memory-submenu



HOLD-function and Memory-submenu:

By clicking the sonogram field  (see page 12) the sonogram recording stops (HOLD-Mode) and the memory submenu is showed.

In HOLD-Mode you can look at rest to an interesting bat call. This state is showed at the top of the sonogram by the text "HOLD". When clicking again the sonogram field the HOLD-mode is leaved.

Button F1: Store

Up to four sonograms can be hold in internal memory. By storing more than four sonograms the oldest one is overwritten.

With inserted MicroSD card the stored sonograms will not lost after switching off the device (see page 8).

Button F2: Recall

Show the internally stored sonograms (Store function F1).

Button F3: ScrShot

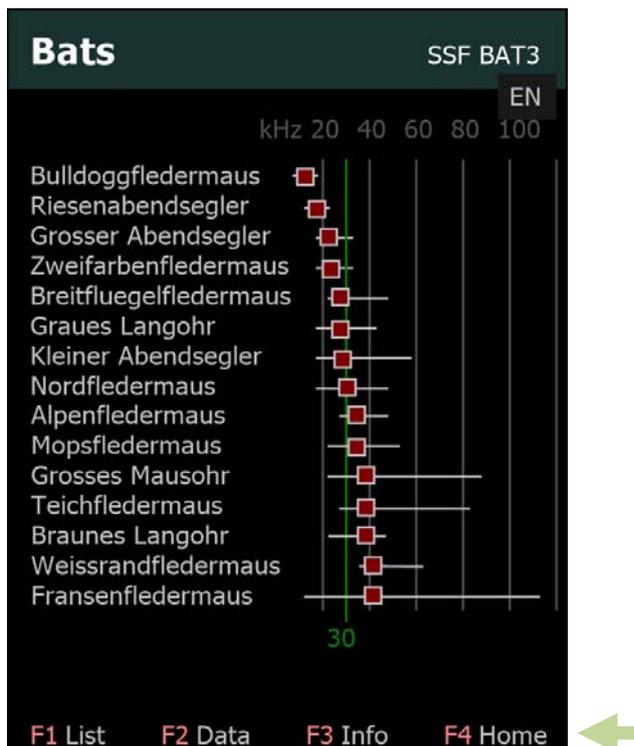
Activate/deactivate the screenshot-function (only with MicroSD-card and with optional AddOn, see accessories Seite 4).

The screenshot function is activated when the camera-symbol at the top of the sonogram is on. When activated you can choose which area of the screen you want to export as screenshot by clicking the touchscreen at following areas: the whole screen when clicking at the camera symbol, the sonogram or spectrogram when clicking the respective field.

Button F4: Back to the Home-screen



Description of the Bat-Screen



By pressing the button F2 in the home-screen you get to the **Bats**-Screen (see page 16).

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 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 19).

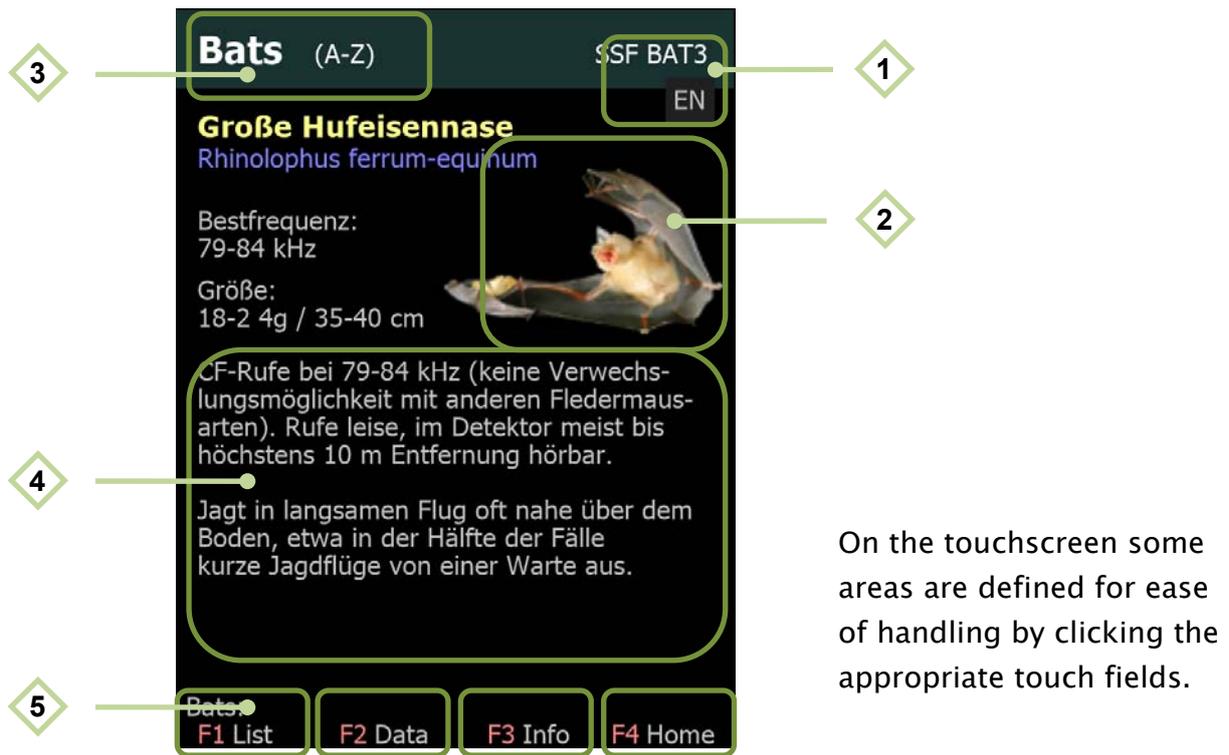
Button F3: Information and definition of terms

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 ease of handling by clicking the appropriate touch fields.

Touchscreen in the database view:

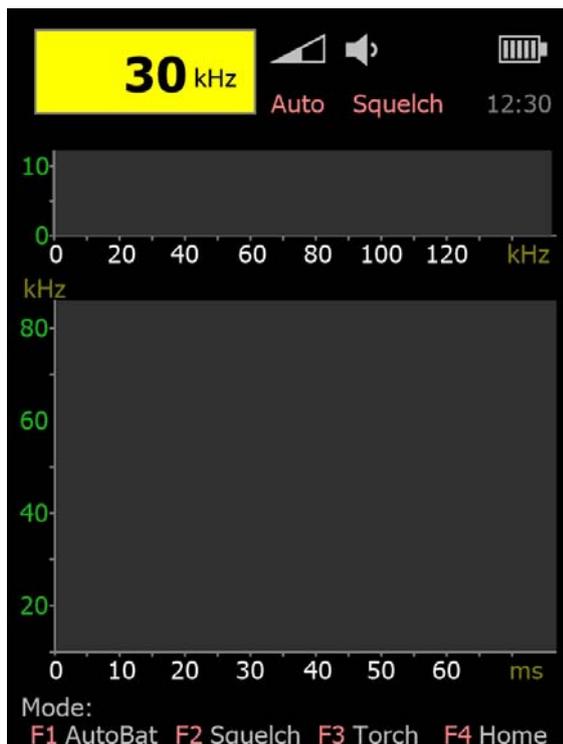
- 1 – Change the displayed language between German and English; affects bat database, bat list, information screen; the chosen language is saved when shutting down the device.
- 2 – Enlarge the bat picture; click again to go back to normal view.
- 3 – Change the sort algorithm; the sorting mode is shown 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 "BAT3N.RES" (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 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-menu at page 26). 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 12).

Button F2: Squelch on/off

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

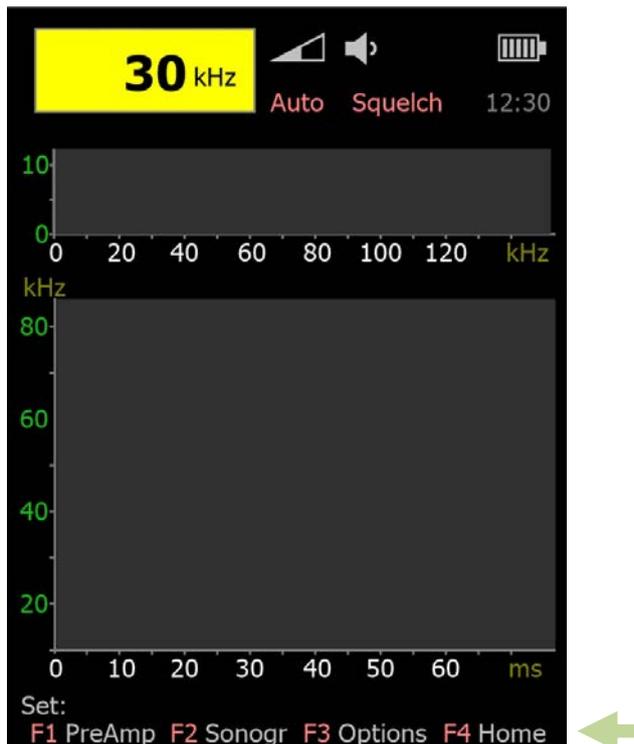
Button F3: Torch

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 22).

Button F2: Sonogr

Adjustment of the sonogram axis (see page 23).

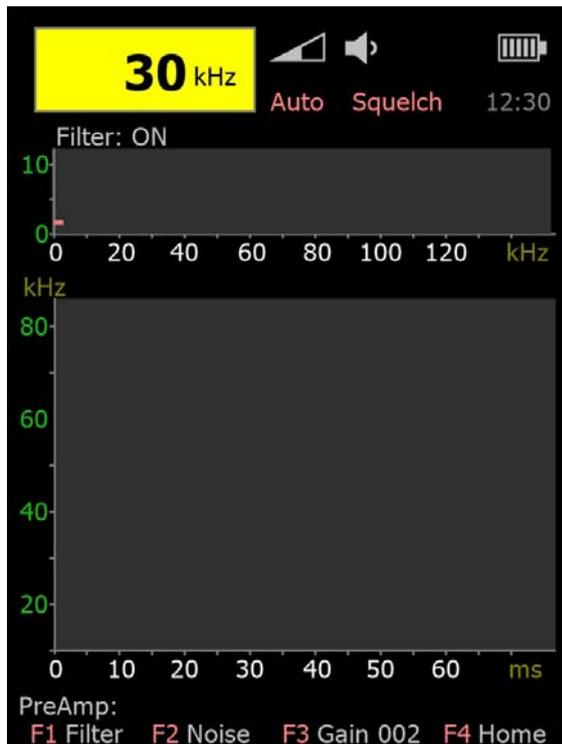
Button F3: Options

Options screen for adjustment of device characteristics (see page 24).

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.

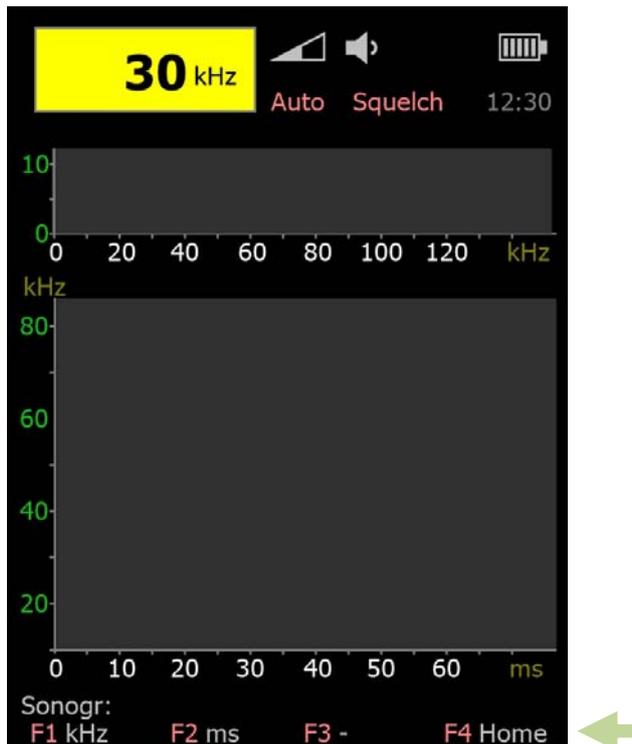
Button F3: Gain 000

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 Sonogramm–submenu



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

Here you can adjust the sonogram axis.

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		SSF BAT3
Audio:	Speaker On [Off/On/Boost] LineOut +0 [Level -9 to +9]	
Display:	Light 8 [2 to 9] Dim 4 [< Light]	
Eco:	05 min [Off/1-30 min] Wake: Bat+Key [Bat+Key/Key]	
AutoOff:	10 min [oo, 1-60 min]	
AutoBat:	Fast [Off/Slow/Fast]	
Clock:	00 : 00	
Date:	01 . 01 . 2016	
Select:	▼▲ Change: -/+	
F1	Default	F2 User F3 - F4 Home

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 16).

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

Button F1: Default

The default values are loaded (see values in the image).

Button F2: User

A previously saved configuration is loaded.

Saving of configuration

The saving of the current settings as a user configuration is carried out by a long press of button F2 until the "Settings Saved!" is displayed.

Button F4: Back to the Home-screen

Description of adjustment possibilities in the Options-Screen:

The value, which should be adjusted, is selected with the buttons ▼/▲ (painted yellow). With the buttons +/- the selected value will be changed (see description of the options page 25).



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 11).

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 earphone 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 always set to level 8.

Display/Dim:

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

Additionally in the home-screen you can switch between the chosen display light and the dimmed level by long pressing a function key (F1 – F4).

In this way you can dim the display to your predefined level of brightness, if the display dazzles you while bat observation.

This function is also useful, if in the dimmed level you are not able to read the display properly because of bright ambient light.

ECO:

After the time set here has passed, the brightness of the display will be set to the dimmed value 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. Two settings are available. With the setting „key“ the system leaves the eco-mode after pressing any button, while the setting „bat+key“ leaves the eco-mode by pressing any key and additionally after receiving an ultrasonic sound.



Description of the Options-Screen

AutoOff:

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

The setting ∞ means that the device will not be switched off automatically (continuous 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 by using the 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 12 and 20).

Clock:

Setting of the time shown on the home-screen; time and date are 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 sonograms 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 (siehe Seite 9) and in the About-menu (siehe Seite 16). The firmware can be updated via an USB interface of a Windows-PC.

For firmware updates you need the bootloader file "BAT3-Update" which can be downloaded on the producer's homepage: www.mekv.de/bat3
Save the update file on your computer in a folder of your choice (e.g. c:\user\bat3). After unzipping you will get two files: "mikro-Bootloader USB HID.exe" (bootloader software) and "BAT3.hex" (update file).

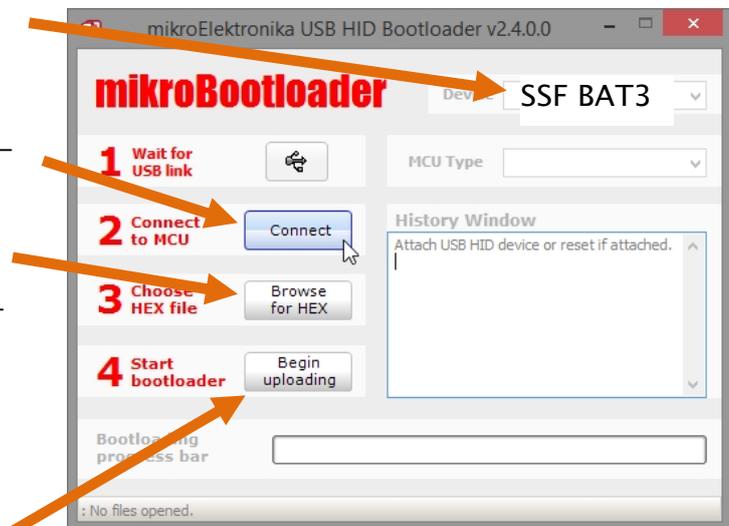
Updating the SSF BAT3 firmware:

Start the bootloader software. Connect the computer and the SSF BAT3 with an USB cable. When the connection is established successfully, an USB-symbol in the symbol bar of the SSF BAT3 is shown. Now you can invoke the update by pressing the following button sequence in the home-screen: F1-F3-F1 (Off-About-Update).

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

Then click on "Browse for HEX" and search in the following Pop-Up-Window 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" (4). The process is displayed on the progress bar. Upon 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



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 28.

„ms“ = mMillisecund.

„L/s“ = number of calls per second





Development of SSF BAT3

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), 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...

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